An Infrastructure Action Plan for Burundi

Accelerating Regional Integration

September 2009

African Development Bank

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Foreword

The 53 countries that make up the African region have a combined gross domestic product of $1.1 trillion - a not insignificant market. The striking characteristics of the region are the low-level of intra-Africa trade, despite the size of the continental economy, the array of impediments to market integration, and the poorly developed network of continental infrastructure, especially in the areas of electric power, transport and communications. There is a compelling case for much greater emphasis on measures that will accelerate economic integration within the continent. African countries are increasingly realizing the advantages of regional co-operation and integration as a strategy to achieve economic growth and collectively to play a more important role in the global economy. To this end, African countries and governments, through regional economic communities and the African Union, are pursuing an agenda of continental integration along a road map of establishing free trade areas, customs unions and common markets. The African Development Bank (AfDB) recognizes that policy actions and investment in infrastructure have important roles to play in the development of continental trade and in promoting economic linkages within Africa. In recognition of this fact, the development of Africa's infrastructure and economic integration are key components of the strategic direction being pursued by the Bank.

The focus of this Report is on the services associated with electric power, transport and communications infrastructure in Burundi. The Report includes a detailed examination of the current status of the infrastructure and services in these three sectors in Burundi and the extent of links to the infrastructure networks of the other members of the East African Community (EAC). Even more than in other countries of Sub-Saharan Africa, access to these services is limited to a relatively small part of the population, the cost of the services is high and, in the particular case of electric power, the available services are unreliable. Successful implementation of the proposed program over the next two decades will close the substantial infrastructure gap between Burundi and other developing countries and lay the foundation for an extended period of strong economic growth within the country.

The Report is important for several reasons. First, it provides the Government, the donor community and the private sector with a detailed assessment of infrastructure investment opportunities in Burundi and the wider region. It proposes an Action Plan to develop these opportunities, and in so doing, helps fill the gap created by the absence of master plans for the development of the electric power, transport and communications sectors. It can therefore be used to inform and support the Government's ongoing dialogue with donors and the business community about the further development of these sectors. Increased coordination within this partnership can improve the alignment of investments with the national objectives, as set out in Burundi's Poverty Reduction Strategy Paper (PRSP) of 2006, and regional priorities for infrastructure development within the EAC. In this way, the Report can contribute to the overall efficiency of the development process in Burundi.

Second, the Report has wider application within Africa. It provides an integrated framework within which to assess the infrastructure requirements of a country, the investment and maintenance costs associated with these requirements, and the human and institutional capacity building required for successful design and implementation of such a program. The Report also examines the links between infrastructure and key production sectors of the economy that have high growth potential, including mining, commercial agriculture, and specific opportunities within the industrial sector. This type of analysis can be used in other countries to translate broad objectives for infrastructure development, as set out in PRSPs or national development programs, into tangible programs for action that can accelerate growth and economic integration. Governments are then better placed to mobilize financial and technical support within the donor community and among international investors.

The Report is the first of a series of country and regional studies that the African Development Bank (AfDB) will prepare to assist member governments in identifying measures that they can take, individually and collectively, to close the infrastructure gap and accelerate integration of

their economies. Wider application of the framework used in this Report will make an important contribution to this program. The initiative reflects the intention of the AfDB to strengthen its capacity for analyses of individual country conditions, as well as regions within Africa and the continent as a whole. In this way, the AfDB will enhance its role as a Knowledge Bank for Africa - a service of benefit to all members. To achieve this important objective, the Bank intends to build internal staff capacities and support efforts of member governments to build their own internal capacities for analysis that can underpin effective policy-making and translate national development strategies into tangible programs of action. As with the Burundi report, these action programs can then be used to formulate activities to be supported by the governments concerned, by donors, and by private investors.

Aloysius Uche Ordu
Vice President for Operations I, Country
and Regional Programs and Policy
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Preface

The main report is divided into two distinct parts. The four chapters of Part A provide an overview of the proposed Action Plan, along with its costs and expected benefits. Part B, which consists of three chapters, gives the details of the programs proposed for the electric power, transport and communications sectors. Nine annexes to the Report with detailed background information are available separately in an electronic format. These annexes, along with the maps included in the main report, are available on the website of the African Development Bank.

They can be accessed at:
http://www.afdb.org/en/countries/east-africa/burundi/

The African Development Bank and the World Bank are collaborating on the preparation of a Country Economic Memorandum (CEM) for Burundi. The relevant findings of this Report on infrastructure will be integrated into the forthcoming CEM. Because of these links to the ongoing work by AfDB and World Bank staff on the CEM, and the need to avoid duplication of effort, this Report does not address a range of more general issues about the economy; for example, it does not attempt to put the proposed infrastructure investment program into a broader context about future priorities for development spending in the national budget and by the donor community. These aspects of development policy and resource allocation will be addressed in the CEM.

Acknowledgements

The Report has been prepared under the guidance of Christian Lim, Economist in the East Africa Regional Department 'A' of the AfDB (OREA), who is responsible for Bank activities in Burundi and Task Manager for the activity. The primary author of the report was Russell Cheetham, President of the Asia-Pacific Investment Services Corporation, and Lead Consultant to the Department for this assignment. Mr. Lim also made major contributions to the Report itself by conducting consultations with the Government, the donor community and other stakeholders in July and August, 2009, and undertaking a detailed analysis of the prospects for the nickel mining industry in Burundi. Other members of the team were Prime Nyamoya and Jérôme Ngambiri, Consultants located in Bujumbura, Burundi. Messrs Nyamoya and Ngambiri played major roles in collecting and verifying a large amount of the data used in the Report from a wide variety of sources within Burundi.

The work undertaken for this Report was initiated by OREA under the leadership of Aloysius Uche Ordu, Director of the Department at the time. Significant contributions to the early design of the work were also made by Steve Kayizzi-Mugerwa and Richard Walker, respectively the former Lead Economist and Economist. The Report has been prepared under the general guidance of Diarietou Gaye and Catherine Baumont, respectively Director and Lead Economist of OREA. A number of other AfDB staff made valuable contributions, including the following: Youssef Arfaoui, Anas Benbarka, Vincent Castel, Hela Cheikhrouhou, Abdelaziz Derrahi, Amadou Thierno Diallo, Hans-Hartlieb Dirk, Benedict Kanu, Brighton Kishebuka, Adiara Kone-Traore, Nirina Letsara, Edouard Masengo, Ali Ismail Mohamed, Jean-Baptiste Nguema-Ollo, Senou Niafatou, Queen Nworisara-Quinn, Amadou Oumarou, Alex Rugamba, Leonard Minega Rugwabiza, Mike Salawou, Houmaida Kolawole Santanna and Yattien-Amiguet L.

The team benefited greatly from the support and assistance of many officials within the Government of Burundi, including the following: Nestor Barasokoroza, Alexis Bizimungu, Didace Birabisha, John Dikumwami, Vital Narakwiye, Pierre Ndamama, Jean Ngendakuriyo, Nestor Niyuongeko, Richard Nkurunziza, Joseph Ntirandekura, Idi Pressadi, Jean Rigi, Damien Riragonya, Emile Sinzumusi, and Ministers Anatole Kanyenkiko, Samuel Ndayiragije and Philippe Njoni. Dorsati Madani and Hannah Nielsen, Managers of the Burundi CEM project for the World Bank, have made significant contributions to this work by fostering close collaboration and providing insightful comments. The Report also benefited from peer reviews by the following staff from the World Bank: Eric Mabushi, Daniel Benitez, Déo-Marcel Niyungeko, Jean-Pascal Nganou, as well as Eric Donni from the European Union. Other contributors include: Peter Kinuthia and Frederic Owiti (EAC), Gilbert Midende, Brice Houeto, Méthode Shirambere and Léonard Yofani (Société concessionaire de l'Exploitation du Port de Bujumbura), and Celestin Nduwamungu (REGIDESO). The team also had very productive meetings with the staff of the International Monetary Fund in Washington DC, and Burundi-based representatives of a number of other donors with active programs of support for infrastructure in Burundi. The cooperation and support of staff in these institutions are gratefully acknowledged.

The maps included in the Report were prepared by the Seattle-based Kroll Map Company in the United States. Electronic versions of base maps were made available by the World Bank for the preparation of these maps. The OREA Department wishes to acknowledge the generous assistance provided by the World Bank in preparing these maps.

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Abbreviations and Acronyms

ACD	Associations of Community Development
ADF	African Development Fund
AfDB	African Development Bank
AICD	African Infrastructure Diagnostic Study
AIDS	Acquired Immune Deficiency Syndrome
AIS	Air Navigation Services
ARCT	Telecommunication Regulatory Agency of Burundi
ASYCUDA	Automated System for Customs Data
ATS	Air Traffic Management System
BCB	Banque de Crédit de Bujumbura
BDC	Business Development Center
Bf	Burundi francs
BOO	Build Own Operate
BOOT	Build Own Operate and Transfer
BOT	Build Operate and Transfer
CAA	Civil Aviation Authority
CASSOA	Civil Aviation Safety and Security Oversight Agency
CEBEA	Burundi Center for Alternative Energies
CEM	Country Economic Memorandum
CEPGL	Economic Community for the Countries of the Great Lakes
CFL	Compact Fluorescent Lights
CNDD-FDD	Conseil National pour la Défense de la Démocratie-Forces pour la Défense de la Démocratie
COMESA	Common Market for Eastern and Southern Africa
COMTRADE	UN Trade Data Base
DGEE	General Directorate of Water and Energy
DGHER	General Directorate of Water and Rural Energies
DRC	Democratic Republic of Congo
DSF	Debt Sustainability Framework
EAC	East African Community
EAC-BIN	East Africa Broadband ICT Infrastructure Network
EACCU	East African Customs Community Union
EALA	East African Legislative Assembly
EAPP	East Africa Power Pool
EASSy	East Africa Submarine Cable System
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
ECCAS	Economic Community of Central African States
EE	Energy Efficiency
EGL	Electrification of the Great Lakes Region
EIRR	Economic Internal Rate of Return
EIU	Economist Intelligence Unit
EPA	Economic Partnership Agreement (with the European Union)
EU	European Union
FDI	Foreign Direct Investment
FIRR	Financial Internal Rate of Return
FNT	Fonds National Routier
FTA	Free Trade Area
FY	Fiscal Year
GDP	Gross Domestic Product
GWh	Gigawatt Hours
GSM	Global System for Mobile communications

GTZ	German Aid Agency
HIPC	Highly Indebted Poor Countries
HIV	Human Immunodeficiency Virus
IATA	International Air Transport Organization
ICAO	International Civil Aviation Organization
ICOR	Incremental Capital Output Ratio
ICRC	International Committee of the Red Cross
ICT	Information and Communication Technologies
IDA	International Development Association
IFC	International Finance Corporation
IMF	International Monetary Fund
IPPF	Infrastructure Project Preparation Facility
IRR	Internal Rate of Return
ISTEEBU	Institute of Statistics and Economics
IT	Information technology
ITU	International Telecommunications Union
km	Kilometer
koe	Kilos of oil equivalent
KPA	Kenya Port Authority
kV	Kilovolts
kW	Kilowatts
kWh	Kilowatt Hours
LDC	Less Developed Country
LV	Low voltage
MD	Managing Director
MDR	Ministry of Rural Development
MoU	Memorandum of Understanding
MT	Metric Tons
MW	Megawatts
MRIEAC	Ministry for Regional Integration and East African Community
MTPE	Ministry of Public Works and Equipment
MTPT	Ministry of Transport, Post and Communication
MV	Medium voltage
MWEM	Ministry of Water, Energy and Mines
NBI	Nile Basin Initiative
NCTTCA	Northern Corridor Transit Transport Coordination Committee
NGN	Next Generation Network
NELSAP	Nile Equatorial Lakes Subsidiary Action Programme
NEPAD	New Partnership for African Development
nfs	Non-factor services
NGO	Non-Government Organization
ns	Not significant
NTM	Non-tariff Measures
ODA	Official Development Assistance
OdR	National Roads Authority
OECD	Organization for Economic Cooperation and Development
OREA	East Africa Regional Department A (of the African Development Bank)
p.a.	Per annum
PIDA	Programme for Infrastructure Development in Africa
PPP	Public-Private Partnership

PRSP	Poverty Reduction Strategy Paper
RCIP	Regional Communications Infrastructure Program
REC	Regional Economic Community
REGIDESO	Régie de Production et de Distribution d'Eau et d'Electricité
RSA	Civil Aviation Authority
SADC	Southern African Development Community
SAR	Search and Rescue
SARP	Standards and Recommended Practices
SCADA	Supervisory Control and Data Acquisition
SME	Small & Medium Enterprise
SNEL	Société Nationale d'Electricité
SIMBA	Similarity Based Complex Analysis System
SINELAC	International Great Lakes Countries Electricity Board
STAP	Short-Term Action Plan
TEAMS	East African Maritime System
TC	Transport Costs
TRE	Telecommunications Regulatory Environment
TOC	Train Operating Concession
toe	Tons of oil equivalent
TRC	Tanzania Railways Corporation
TP	Transport Prices
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNFPA	United Nations Family Planning Agency
UNSO	United Nations Statistical Office
US	United States of America
USGS	United States Geological Survey
VAT	Value Added Tax
VOC	Vehicle Operating Costs
VSAT	Very Small Aperture Terminal
WKPL	Western Kenyan Pipeline
WSIS	World Summit on the Information Society

Executive Summary

The Key Findings

To address the problem of pervasive poverty in Burundi, the Government is committed to accelerating the economic growth of the country. This Report concludes that a major improvement in infrastructure is critical for a successful transition to sustained strong economic growth of 6-7 percent a year in real terms. A concerted program of action will be needed over the next two decades to overcome the current serious infrastructure deficiencies of the country in power, transport and communications. The proposed Infrastructure Action Program outlined in this Report is built around three key policy objectives:

- Step up spending on infrastructure to ensure improved access to services and reduce the cost and improve the reliability of these services, thereby removing some of the main obstacles to sustained strong economic growth. The core Infrastructure Action Program to be implemented over the next two decades would cost $4.6 billion at 2007 constant prices. In addition, $1.2 billion would be spent on maintenance of assets in these three sectors.
- The $5.8 billion program will create substantial opportunities for development of domestic business activities. To generate a strong domestic supply response to this ambitious program and ensure sustained economic growth of 6-7 percent a year, the Government will need to design and implement comprehensive programs for development of small and medium business and for skills development in the labor market. Both of these programs are essential complements to the Infrastructure Action Program.
- Implementation of the proposed Action Plan will require increased attention to coordination of the power, transport and communications programs within the Government. It will also require close cooperation between the Government and the donor community in the design and implementation of these programs. Emphasis on coordination on these two fronts can improve the alignment of investments with national and regional priorities and the overall efficiency of the development process in Burundi.

It is important to emphasize that an expenditure of some $5.8 billion over the next two decades is, in fact, required to meet the current national objectives for infrastructure development. These programs will also lay the foundations for a major investment in nickel mining in the decade ahead that can bring substantial additional benefits to the country.

The Infrastructure Deficit is Substantial

On just about any measure of infrastructure coverage - road density, telephone density, power generation capacity, or service coverage - Burundi lags behind most other regional groupings in the world. Burundi also lags behind other EAC member countries in access to basic infrastructure services. About 90 percent of the population lives in rural areas. Despite the importance of agriculture, only a relatively small portion of the rural population has access to all-season roads. The road densities in areas of arable land are substantially lower in Burundi than elsewhere in Africa and in other low income countries. Only two percent of the population in Burundi has access to electricity, compared with 16 percent for Sub-Sahara Africa and 41 percent for other low income developing countries. Burundi is also lagging in mainline and mobile telephone densities, as well as internet access. Teledensity remains poor at three percent of the population, with more than 90 percent of subscribers concentrated in urban areas. Access to safe water and sanitation in Burundi is roughly comparable to other low income countries.

Not only is access to infrastructure services limited, but the poor state of infrastructure leads to substantially higher costs. Prices for services can be two to three times that of other countries, further undermining the competitiveness of Burundi business in regional and global markets. The cost and adequacy of these services affects commercial opportunities for small farmers, entrepreneurs, and businesses - small and large. Business surveys in Burundi consistently identify the cost of power and the poor reliability of the service as the single most important obstacle to increased business investment.

In the agriculture sector, transport costs represent, on average, 35 percent of import prices and 40 percent of export prices of agricultural products in Burundi. High infrastructure costs and lack of access are major obstacles to improved incomes and well-being for the very large part of the population that depends on agriculture for a livelihood.

Main Components of The Infrastructure Action Program

The focus of the proposed Infrastructure Action Program outlined in this Report is on power, transport and communications. Discussions with the Government of Burundi have confirmed the key objectives for the Program.

Programs for the Power Sector

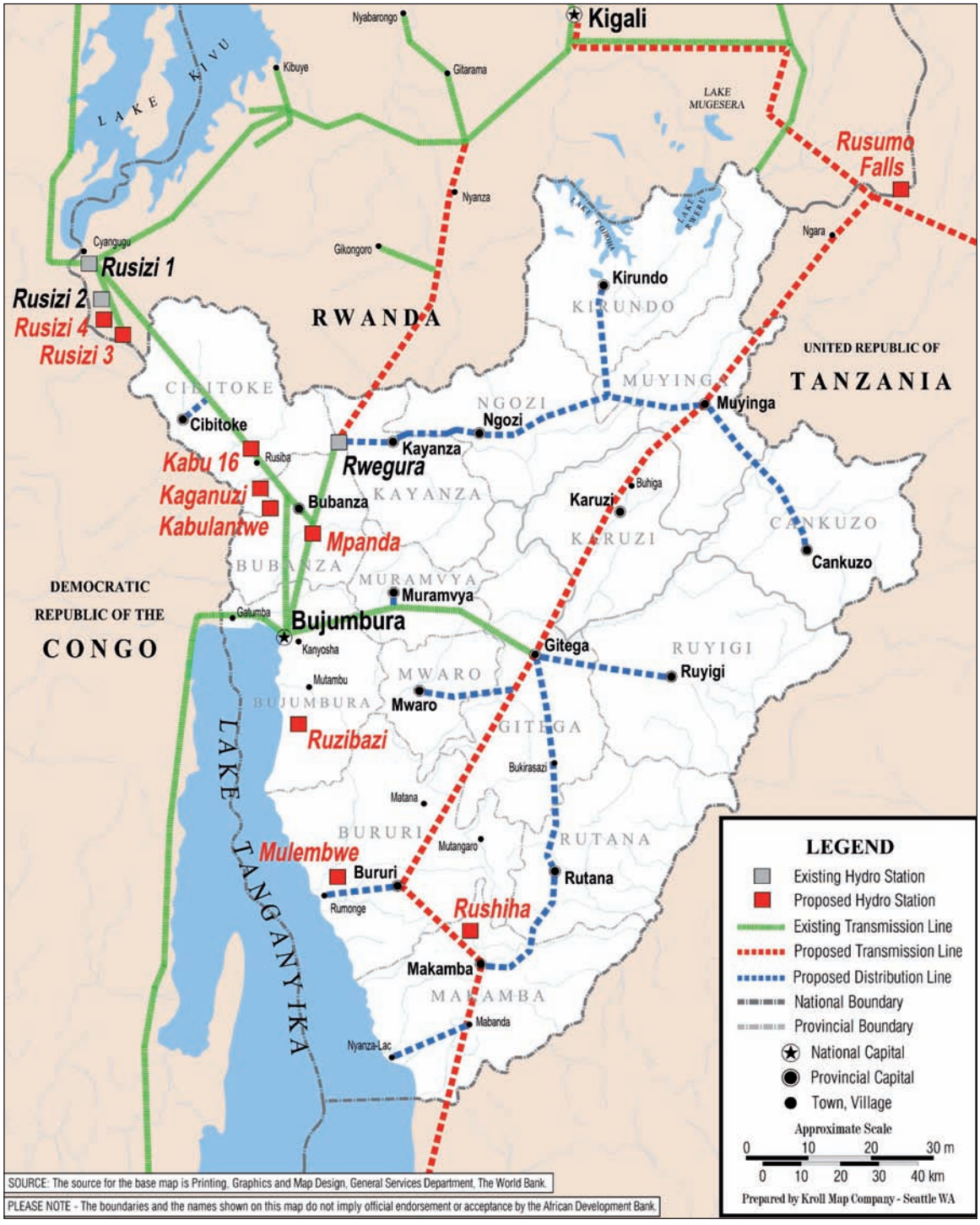
The proposed program for the power sector has six key objectives:

- Through increased investments in domestic and regional generation capacity, ensure that the business community and households have access to reliable power supply 24 hours a day.
- Establish a national transmission and distribution grid by 2015, with all 15 of the provincial capitals linked to this grid which would supply electricity 24 hours a day at reasonable cost.
- With the grid in place, increase the electrification rate from the current two percent of households to 25 percent by 2020 and at least 40 percent by 2030. By 2020, 85 percent of urban households would have continuous access to the national distribution network, and by 2030, one-third of all rural households would be linked to the grid.
- Give priority to further development of domestic energy sources to avoid excessive dependence on imported supplies of electricity. At the present time, about 45 percent of total supply is imported. The design of the Action Program aims to keep this dependence at less than 50 percent and close to current levels until 2024, after which there would be a gradual increase in imported supplies of electricity.
- Improve demand management and reduce system losses.
- Ensure that the national electricity utility is built up into an effective and financially sound entity.

To meet the projected demand for power, the required generation capacity for Burundi would be about 600 MW by 2030, compared with less than 40 MW at present. The domestic and regional power plants identified and included in the proposed Action Program would be sufficient to meet the needs of the country until the mid 2020s. Provided that no further major mining or power intensive industrial projects are launched, the supply deficit would grow to about 1,240 GWh by 2030. The implication is that Burundi would need an additional 200 MW of capacity to meet domestic demand. The working assumption in the proposed program is that this shortfall is met by the import of additional electricity. The key policy question for the longer-term is whether to investigate other domestic hydro power sites within Burundi and develop these in order to keep dependence on imported power to prudent levels, or whether to allow increased dependence on imported power. If all the additional required capacity was domestic, the share of domestic power in total consumption would be 75 percent by 2030. A potential issue with these domestic sites is that the cost of the electricity produced may be significantly higher than that imported from Ethiopia via the EAPP grid. The trade-off between the degree of self-sufficiency in power supply and the cost of power and its effects on the competitiveness of Burundi business is discussed at some length in Chapter 5.

The ongoing operational and financial rehabilitation of the national power utility, REGIDESO, is central to its role as a major source of funding for the future power program. With continued prudent financial management the utility would develop into a major corporation by 2030, at which time it would have assets of about $1.6 billion and revenues of about $300 million a year (both at 2007 constant prices).

Hydro Power Stations and Transmission Grid for Burundi



The improved cash flow in the decade ahead would allow the utility to pass on benefits to consumers with an ongoing reduction in power tariffs from about 2016, which would lower the average tariff to less than nine U.S. cents a kWh. From about 2020 onwards, the utility would be able to fund the bulk of the power development of the country from its own resources and from prudent access to commercial sources of debt financing.

Action Plan for the Transport Sector

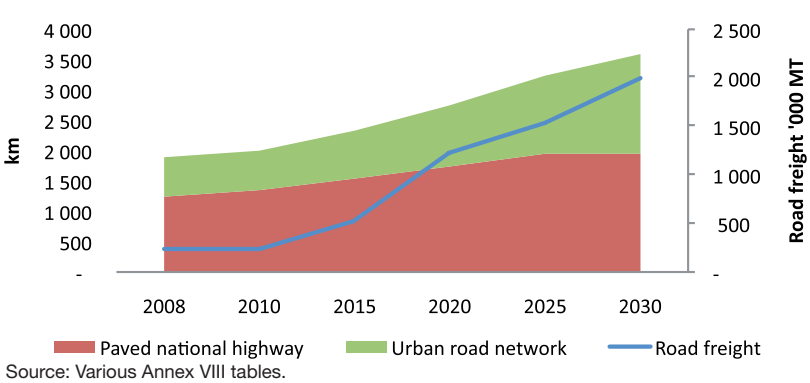
The key objectives of the proposed action plan for the transport sector are to lower the costs of transport for the entire economy and to improve access to local and international markets. The proposed program focuses on road transport and civil aviation, and also provides for further investigation of the possibility of a rail extension from Tanzania into Burundi.

The main component of the transport program is the upgrade and expansion of the road network of the country over the next decade. The proposed program would rehabilitate and pave the entire 1,950 km of national roads by 2020, and for those national routes where traffic densities are high it would upgrade roads to enhanced standards that can accommodate the increased traffic. By 2030, the urban road network would be expanded from the current estimated 650 km of roads to about 1,650 km so that all 2.6 million urban dwellers at that time are within 500 meters of a road that can carry vehicular traffic. The other key component is a program that will improve provincial, community and local feeder roads in key agricultural areas to facilitate access to product markets at home and abroad, and to key inputs, such as fertilizer, required for production activities. In conjunction with the rehabilitation of the road network, the program would increase substantially budget allocations for routine maintenance of these facilities.

The international airport in Bujumbura would be expanded and modernized. The intent is to ensure, within the next five years, full compliance with the ICAO-mandated standards and procedures for international passenger travel and for freight. This would be done through a program of staff training and investment in infrastructure. As a result of this program, the international airport would obtain an ICAO "Certification of Aerodromes." These improvements would allow Burundi to attract major international airlines and air freight companies, thus opening up opportunities for development of tourism and air freight of high value export products to European and Middle East markets.

The options for the extension of the Tanzanian rail network into Burundi have also been reviewed as part of this study. What emerges is that if the nickel deposits in the Musongati area of Burundi are developed for the export of nickel ore, and if the mine sites have access to the rail network, the four million tons of ore to be carried makes the investment in the rail extension quite attractive. The potential problem is that international investors interested in developing the site may prefer to refine the ore at the mine and ship the metal to export markets. In this case the volume of mine-related freight is substantially smaller - an estimated 50,000 MT of nickel metal a year and a small quantity of cobalt. Based on the assessments made for the future volumes of international freight in and

Road freight and Road Infrastructure



Source: Various Annex VIII tables.

out of Burundi each year that are unrelated to the mine activities, it would appear that the rail extension is not economically viable unless it carries a large volume of mine freight. If one of the two options were to go ahead in the absence of the mine, it is likely that the rail operator would require substantial public subsidies. The program proposes further evaluation of the costs and benefits of a possible extension of the Tanzanian rail network into Burundi.

The proposed program would lower the costs of transport for the entire economy and improve access to local and international markets. The benefits of lower transport costs under the program would be substantial; for example, at current costs for road freight of 13 U.S. cents per ton/km or more, it costs about $230 to move a ton of fertilizer from the ports in Kenya and Tanzania to Burundi. A reduction in transport costs to 8 U.S. cents a ton/km, the rate that prevails in these neighboring countries, would lower the freight cost of the fertilizer by almost $100 a ton. These types of cost reductions can have a significant impact on the profitability of farming and other business activities.

Development of the Communications Network

The proposed communications program aims to improve substantially access to international communications network and to lay the foundations for a national communications grid that will provide communities and business through Burundi with low cost voice and data communications.

East Africa is the only heavily populated region of the world that does not have access to the long-established international system of submarine cables that allow for low cost transmission of data and voice communications. The Eastern Africa international submarine cable network is currently being laid off the coast of East Africa with funding from the World Bank and a consortium of private investors. It is expected to become operational in 2010. Burundi would be linked to this low-cost international communications network via fiber optic cables that are currently being laid in Kenya and Rwanda. This cable extension to Bujumbura is expected to be completed by June 2010. With further developments already underway, Burundi would have four separate access routes to this regional communications network and the submarine cable.

Against this backdrop, the key elements of the communications program are as follows:

- A high priority is attached to the immediate development of a national communications grid of fiber optic cable and digital microwave that would be linked to the regional network. This program is already funded by the World Bank and will begin implementation shortly. On completion in 2012, it will have laid a fibre optic network of some 400 km throughout Burundi, along with a digital microwave network that will serve particular communities throughout the country.
- Launch an ambitious program to expand access to this low cost international communications network for schools, hospitals, universities, the business sector, and local communities throughout the country.
- Develop a range of applications, including e-government, e-commerce, e-schools, and e-health and complete the ongoing work on the legislative framework for the communications industry and corresponding regulatory framework related to e-security, fraud, privacy, data protection, and intellectual property rights.
- Promote the entry of additional private suppliers of communications services throughout the country to ensure competition and service quality.

Such a national grid would give communities, businesses, and a wide range of institutions throughout the country, access to low cost communications within the country and with the region and rest of the world. Rural as well as urban communities are expected to benefit from this program. According to the World Bank, for example, incomes of agricultural producers can rise by about nine percent through the use of mobile telephones.

Proposed Telecommunication Infrastructure for Eastern Africa

Building human and institutional capacities

Given the size of the proposed program to be implemented over the next two decades, Burundi will have to make a large investment in building domestic capacities to manage the program and benefit fully from the services it will be able to provide. There are four specific components for the proposed capacity building program:

Development Expenditures on the Core Infrastructure Program (US$ millions at 2007 constant prices)

	2010-19	2020-30	Total
Public expenditures			
Power sector	813	764	1 577
Transport sector			
Roads	1 139	989	2 129
Ports	13	15	28
Civil aviation	11	6	16
Sub-total	1 163	1 009	2 172
Communications	48	28	75
Total	2 024	1 801	3 825
Associated private investment			
Power sector	458	8	465
Civil aviation	190	55	245
Communications	24	33	57
Total	672	96	767
Total	2 695	1 896	4 592

Source: Table 3.2

- Strengthen capacities of individual ministries for project design and implementation, including for example, arrangements for procurement and site supervision. These programs are of particular importance for the ministries responsible for power and transport.
- Strengthen and restructure arrangements for oversight and regulation of the power, transport and communications industries, given the substantial structural changes that would occur under the proposed Action Program. In the case of communications, for example, the proposal is to facilitate a transition to a neutral regime with respect to regulation of technology and service.
- Strengthen capacities for regular collection and analysis of survey data for these three industries. In the case of road transport, for example, surveys of transport service providers will provide basic information about the evolving amounts of passenger and freight traffic, the costs of service provision and prices of services offered to the public. Regular surveys of road traffic will be required for assessments of evolving road maintenance and upgrading requirements.
- Adopt appropriate standards for infrastructure construction and training of skilled workers for these industries. With specific standards for two lane paved national highways, for example, the donor community can then ensure that projects they fund do comply with these standards. Similarly, there is a need for clear standards for accredited institutions that train skilled trades people such as electricians. In developing these standards, close attention should be given to the evolving requirements of the EAC.

The proposed program would provide substantial support for the development of these capacities and for a wide range of technical studies that will be required for informed decision making in the early phases of the program. There is considerable urgency associated with the start of these capacity building programs.

The Required Investment for Infrastructure is Large

Development Expenditures

The core Infrastructure Action Program calls for development expenditures of $4.6 billion (at 2007 constant prices) over the next two decades. Successful implementation of this proposed program will essentially close the large infrastructure gap between Burundi and many other developing countries.

The power program would involve expenditures of about $2 billion, including about $465 million of private investment in new domestic generation facilities that would sell power to the national grid.

The roads program would require about $2.1 billion. The civil aviation program would involve a public-private partnership (PPP) arrangement under which the upgrade and operation of the airport and related services would be handled by one or more privatecontractors. The total amount of investment required for the aviation sector is estimated at $260 million over the next $20 years. The program includes about $120 million for the further development of the national communications grid and widespread community access to this grid.

The bulk of these expenditures would be capital outlays on infrastructure assets such as road networks, airport facilities, power stations and transmission and distribution lines, and communications networks. About three percent of the outlays ($170 million) would be used to meet the cost of the wide-ranging program of capacity building initiatives and various technical studies included in the Action Plan.

In the event that the railway extension was to proceed, the estimated cost is about $600 million (at 2007 constant prices), not including the cost of rail extensions to mine sites in the Musongati area. It is assumed that these latter costs would be met by the mine operator, in the event that the rail transport option was to be used. The proposal is to use a PPP-type arrangement to fund and operate the rail service if the project was to proceed. A small amount of public investment would be required for various studies and for capacity building within the government for oversight and regulation of the rail services.

Expenditures on Routine Maintenance

The combination of prolonged civil war and limited public financial resources led to deterioration in the basic infrastructure of the county. The ongoing program of infrastructure rehabilitation and the proposals to complete this rehabilitation in the decade ahead will restore and upgrade these facilities. The challenge then will be to step up allocations for routine maintenance of this infrastructure, and thereby contain the need for further large outlays for rehabilitation.

The proposed Action plan for Infrastructure calls for $1.2 billion outlays on routine maintenance over the next two decades. The bulk of these expenditures are for the maintenance of the power and roads infrastructure. As the accompanying table indicates, these estimates for maintenance spending include expenditures by the public sector, as well as private sector outlays on power and civil aviation infrastructure that would be operated under some form of public-private partnership (PPP) arrangement.

The proposed program represents a major step-up in funding for routine maintenance. In the case of the government component, outlays for maintenance average $25 million a year in the decade ahead. This compares with maintenance outlays for transport, power and communications infrastructure in the range of $8 million a year at the present time. In the 2020s, maintenance outlays by the public sector would step up to an average of about $85 million a year. These maintenance programs will provide important business opportunities for local companies and will

Routine Maintenance Expenditures on the Core Program (US$ millions at 2007 constant prices)

	2010-19	2020-30	Total
Public sector outlays			
Power sector	132	409	540
Transport sector			
Roads	105	160	265
Ports	4	6	10
Civil aviation	3		3
Sub-total	112	166	277
Communications	9	19	29
Total	253	594	847
Associated private sector			
Power sector	79	153	232
Civil aviation	33	83	116
Communications	4	14	18
Total	115	250	366
Total	368	844	1 212

Source: Annex Table VI.8.

create substantial additional employment opportunities. As the subsequent discussion indicates, early action will be needed to develop the requisite skills in the labor force (electricians, for example) for these programs.

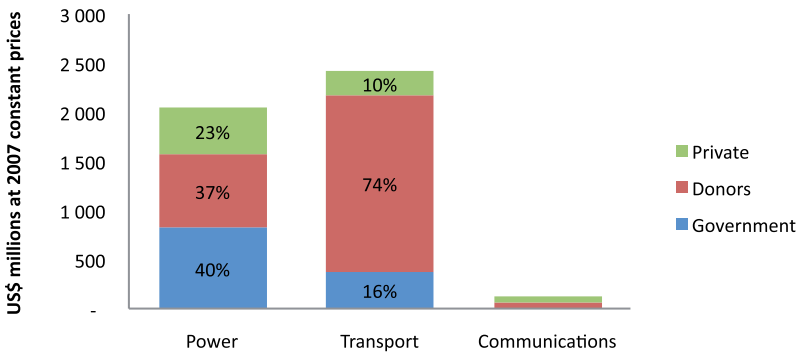
Proposed Funding Arrangements for the Program

The three main sources of funding for the program are the Government of Burundi, including the electricity utility and the airport authority, the donor community, and the private sector. The Government and donor community each fund major portions of the power program, but the strategy is to look to the private sector to own and operate the new domestic hydro stations that are proposed. In the case of the roads program, the donor community would fund about 80 percent of the program. The civil aviation program would be financed by the private sector, except for a small amount of donor and government funding for the human and institutional capacity building that will be required. For the program as a whole, the Government would fund about 27 percent, the donor community about 56 percent, and the private sector about 17 percent.

There are important differences in the timing of the required support from each of the three groups. Because of the current limited financial resources of the Government, its contribution in the first ten years of the program accounts for only 21 percent of total public expenditures on the program. In the second ten-year period, the Government contributes about $835 million, equivalent to 46 percent of the total public expenditure program. The improvement in these public funding capacities comes from three sources. As noted earlier, the financial position of the power utility, REGIDESO, is projected to improve substantially in the coming years as its customer base is built up. The expectation is that under the Base Case Scenario discussed below the utility will be able to finance about two-thirds of the new capital outlays for the power sector during 2020-2030. Second, the funding capacities of the airport authority would also be built up through a combination of increased air services and increases in the landing, freight and passenger fees. The third point is that the proposed Infrastructure Action Program is based on the expectation that the mining of ore deposits in the Musongati area would begin in 2017. Revenues from the mining operation in the form of income taxes and royalties are projected to be about $1.9 billion during 2020-2030. With a much stronger financial base, the Government may also be able to draw on long-term loan funding from international development agencies for particular components of the proposed program.

The proposed donor funding amounts to $1.4 billion during 2010-2019 and $1.2 billion in the following decade. The requirement for the coming decade is equivalent to an average of about $160 million a year of donor support. According to the African Development Bank (2009), Burundi has been receiving about $450 million a year in aid from all sources. The proposed infrastructure

Funding Arrangements for Core Infrastructure Program



Source: Annex Tables VII.10, VIII.3 , VIII.5, and IX.1.

program would therefore account for about one-third of current aid allocations. Such an allocation for infrastructure in Burundi is not exceptional and would likely find substantial support from within the donor community, given the importance that donors attach to overcoming the very large infrastructure deficit of the country. In the second decade of the program, the required donor funding averages $100 million a year - equivalent to about 20 percent of the current aid program.

The Government will need to take early steps to present to the donor community the case for enhanced support aimed at closing the infrastructure gap in Burundi. As the subsequent discussion of the growth and employment impact of this program makes clear, a step-up in infrastructure investment, in combination with development of the substantial mineral resources of the country in the decade ahead, lays the foundations for sustained economic growth in the range of 7 percent a year over the next two decades - a growth performance that has a significant impact on the incidence of poverty in the country.

Development of Burundi's Substantial Mineral Resources

Burundi has significant exploitable mineral resources, but for years the civil war held up their development. Uncertainties about the prospects for developing these resources have been compounded by the lack of adequate power and transport infrastructure. A key element of the strategy for accelerating development in Burundi that is outlined in this Report is the development of the country's extensive deposits of nickel. National nickel reserves are estimated at about 285 million tons. The most important nickel reserves are at Musongati, which has estimated reserves of 180 million tons of laterite deposits, putting it among the ten largest known deposits worldwide that have not yet been developed. The Musongati field is part of the "nickel belt" that extends from south-central Burundi to north-west Tanzania.

Development of these nickel deposits is an important objective of the Government. A number of international companies have expressed interest in commercial exploration of these resources. The Government has recently undertaken to reform the legal framework for the sector to make these investment opportunities more attractive to major producers. Two possible options have been proposed at one time or another for the actual mining operation: one is the export of nickel ore; the other is the export of metal from a refinery at the mine site. The first option would involve the transport of some four million tons of ore a year from the mine site to the Port of Dar es Salaam for shipment overseas to a refinery. These large volumes would require access to the rail transport network of Tanzania. This scenario therefore depends on completion of one of the current options for the proposed public rail extension from Tanzania into Burundi, and construction of rail spurs to the mine sites. The other option is to refine the ore at the mine site and transport refined metal to the coast for shipment abroad. If the ore is refined at the mine site, the quantities of metal to be shipped are estimated at about 50,000 tons a year. In this scenario, transport of the metal by road to the railhead at Kigoma is seen by industry analysts as the preferred option. The working assumptions used in the Base Case Scenario for the Action Plan is that the Musongati ore field is developed and brought into production by 2017, nickel and cobalt will be refined at the mine site, and that the mining company ships the refined metal by road to the railhead at Kigoma. The capital cost of mine development, not including power and transport requirements, is estimated at about $1.44 billion.

The infrastructure requirements of the mining operation are substantial. The proposed Action Plan for Infrastructure would address the two key infrastructure concerns associated with the further development of the mining industry - access to reliable supplies of low cost power, and suitable arrangements for the transport of mining supplies into the country and export of mineral products to international markets. The mine would require access to about 75 MW of installed generation capacity, which would be supplied from the national grid. The additional domestic hydro sites to be developed in the decade ahead would add sufficient

capacity to meet the needs of the mine at start-up in 2017. The transport and related infrastructure required to support the mining operation includes the complete rehabilitation of the rail line from Dar es Salaam to Kigoma, and purchase of additional locomotives and wagons to handle the increased freight generated by the mining operations. It would also require some upgrade of facilities at the Port of Dar es Salaam to handle the large volume of imported materials, and the exports of metal. The total cost of these improvements is put at about $640 million.

The benefits that flow from the project would be substantial. Gross revenues of the mining company would be about $975 million a year, with a net operating surplus of about $600 million a year. Taxes and royalty payments to the Government would be the subject of negotiation with the mining company concerned. For the purposes of this Report, these are assumed to be a little under $200 million a year. On this basis, the mining operation would have a net income of about $430 million a year. The IRR for the project is estimated at 23 percent - the implied return on equity invested in the operation is likely to be viewed as attractive by potential investors.

There are, of course, a number of uncertainties and potential risks associated with the proposed project. The project will require close cooperation and coordination between Burundi and Tanzania regarding plans for upgrading the existing rail lines and the large increase in the volume of freight to be transported to and from the Port. These discussions would need to be coordinated with parallel discussions with international mining companies that have expressed interest in developing the deposits. A second concern is that the rate of return on the project is particularly sensitive to changes in the price of nickel. The current outlook for the nickel market, therefore, may not favor quick development of these deposits. With the recent downturn in the global economy, the recent price collapse has had a major impact on nickel supply and a number of projects around the world have been put on hold or cancelled. Annual output from the Musongati mine of some 50,000 tons would require gaining about three percent of the global market at the current level of world production of 1.46 million tons.

A program for Business Development is Essential

The new business opportunities that will be created by the proposed Infrastructure Action Program and associated nickel mining project are substantial. The Box below summarizes the opportunities for a wide range of business responses, not the least of which will be in the agricultural sector to meet increased demand for food-related products that will flow from the injection into the economy of an additional $100 million a year in wages and salaries associated with the Action Program.

Experience in the last few years points to the importance of this business development initiative. Since 2004, there has been a sharp step-up in spending by donors on the rehabilitation of infrastructure and related services under the various ongoing programs. At the same time, there has been a large increase in imports of consumer goods, very likely because of existing limited supply capacities in the local market. To ensure that the proposed program does not simply lead to a large increase in imports or press in an inflationary way on internal supply bottlenecks, especially in the labor market, the Government and donor community have important roles to play in taking complementary actions that will facilitate strong responses in the economy.

The Report outlines a range of programs that can be initiated by the Government to strengthen the supply response capacities of local business, including for example:

- Careful attention to the design of contracts for civil works, maintenance and the supply of other goods and materials that can be tendered in the local market, consistent with the local supply capacities. Over time, the size of local contracts for construction and for maintenance can be increased to help promote the growth of business activities and contracting capacities.

- Improve access of local business to construction equipment through the creation of equipment pools and or leasing companies.
- Establish business centers throughout the country that can provide information and training for local business in such things as submission of bid documents for government tenders, applications to the banking system for working capital loans, as well as training in basic business skills such as bookkeeping.
- Development of training programs for the skills that will be required for construction activities and maintenance. A comprehensive approach will be needed for skilled trades such as electricians. The power program will create several thousand jobs for electricians. The challenge will be to develop the capacity of local institutions to provide the required training, to ensure that the training meets an acceptable set of standards for the trade, to develop accreditation systems for these training institutions and introduce appropriate licensing for graduates of these programs.

New Business Opportunities

The Infrastructure Action Program calls for development and maintenance expenditures of some $5.8 billion over the next two decades. About 80 percent of these are development outlays for technical services, civil works, and equipment. The balance is for the ramp-up in maintenance spending. The Program will bring major new business opportunities to Burundi. About $2.3 billion will be spent on labor services, skilled, semi-skilled and unskilled. That is an average of $100 million a year of wages and salaries paid by contractors and the Government. The challenge is to ensure that a large share of this income is spent on goods and services available within Burundi. A weak supply response from domestic business will result in a large share being spent on imports where the main beneficiaries are import agents and the freight industry. Another major opportunity flows from the $2.3 billion that would be spent on goods of various kinds. The $1.8 billion of development expenditures on goods will be primarily for construction supplies such as cement, rebars, raw materials such as aggregate for construction of road beds, ceramics for buildings, and so on. There will be good opportunities for local supply of some of these materials, as well as building a substantial domestic fabrication industry based on imported materials. Maintenance outlays for materials will include asphalt for road works, a wide range of parts for maintenance of the electrical grid, house connections, and so on. Will there be opportunities for a cement industry, a ceramics industry, or an asphalt plant, for example? The $1.2 billion of outlays on equipment will have to be imported, probably with little opportunity for domestic value added.

Total Expenditures Under the Infrastructure Action Program
(In US$ millions)

Type of service	Development expenditures	Maintenance	Total
Skilled and unskilled labor services	1 548	756	2 304
Equipment	1 233	-	1 233
Goods	1 811	456	2 267
Total	4 592	1 212	5 804

Source: Table 3.11.

The Economic Impact of the Program is Substantial

In view of the uncertainties about the availability of funding for the proposed program, whether the mining project will go forward, and whether the rail extension is economically justified, the Report examines the economic impact of a range of possible outcomes. In addition to the Base Case Scenario, the Report considers five alternative scenarios. For each of these scenarios, a simple macroeconomic model is used to assess the implications for growth and employment in Burundi. (The model used for these projections is described in Annex VI to the Report.) In all of these scenarios, it is assumed that internal security in Burundi continues to improve

Description of Various Scenarios Considered in this Report

Scenario	Description of scenario	Program or Project Included in Scenario				
		Current strategy for national development continues	Infrastructure Action Plan		Nickel mining project	Rail extension into Burundi
			With public investment component	With private investment component		
A	Base Case	Yes	Yes	Yes	Yes	No
B	Core Infrastructure Action Plan implemented	Yes	Yes	Yes	No	No
C	Private funding for Action Plan not available	Yes	Yes	No	No	No
D	Only 50% of public funding available for Action Plan	Yes	Implement 50% of Action Plan	No	No	No
E	Only 20% of public funding available for Action Plan	Yes	Implement 20% of Action Plan	No	No	No
F	Implementation of Base Case with rail extension	Yes	Yes	Yes	Yes	Yes

Source: Table 3.1.

and that there is social and political stability; that the Government continues to adhere to sound macroeconomic policies; and that Burundi, with the help of the international donor community, continues to make steady progress in reducing its vulnerability to debt distress. It is also assumed that action is taken to improve the business and investment climate and that there is a strong domestic supply response to the proposed Infrastructure Action Program.

Economic Impact in the Near-tern

For the short- and medium-term, the position taken in this Report is that the recent encouraging recovery in economic growth can be maintained. The improved economic performance has stemmed, in part, from the large increase in donor support for rehabilitation of infrastructure and related services in the economy. Since export earnings account for only about eight percent of total demand in the Burundi economy, the domestic impact of the current decline in global economic activity is likely to be limited. It is the level of domestic demand and associated supply responses that will largely determine the growth performance over the next few years. Even if no further domestic policy initiatives are taken, there will be further sharp increases in public investment expenditures until about 2011 because of the ongoing major donor-funded program of infrastructure rehabilitation. However, these projects come to a close by about 2014, and as a result, spending under these programs declines sharply from 2012 onwards. Analysis of the impact of the ongoing infrastructure rehabilitation program suggests that GDP growth may be in the range of four percent in real terms in 2009 and that it would increase to about five percent a year in 2010 and 2011. As the ongoing infrastructure program phases down after 2011, economic growth could decline to about four percent a year in 2013-2014. Serious delays in implementing the ongoing donor-funded program would result in slower economic growth in the immediate future.

The key point that emerges from this assessment of the economic outlook for the near-term is that a strong push to improve the basic infrastructure services in Burundi can sustain economic growth in the near-term and lay the foundations for a period of strong economic growth over the next two decades.

Key Outcomes for the Base Case and Alternative Scenarios (GDP at 2007 constant prices)

Indicator	Scenarios					
	A	B	C	D	E	F
	Base Case	Implement core infrastructure program	Private funding for Action Plan not available	Only 50% of public funding available for Action Plan	Only 20% of public funding available for Action Plan	Implement Base Case & rail extension
Population in 2030 (mill)	14,1	14,1	14,1	14,1	14,1	14,1
Population growth rate (% p.a. for 2010-30)	2,6	2,6	2,6	2,6	2,6	2,6
GDP in 2030 (US$ mill)	4 560	3 895	3 745	3 313	2 868	4 721
GDP growth rate (% p.a. for 2010-30)	7,2	6,4	6,2	5,6	4,8	7,4
GDP per capita in 2030 (US$)	324	277	266	236	204	336
Action Plan new investment (US$ mill)						
Public	3 825	3 825	3 825	1 890	760	3 833
Private	767	767	-	-	-	1 532
Total fixed investment (% of GDP)						
Public	14,2	15,8	16,4	12,9	10,5	13,9
Private	12,9	9,6	7,7	8,4	9,2	14,3
Total	27,1	25,4	24,1	21,3	19,7	28,2
Composition of GDP in 2030 (%)						
Agriculture	16,1	18,9	19,7	21,4	23,0	15,6
Mining	14,8	0,2	0,2	0,2	0,3	14,3
Industry (excluding mining)	23,0	26,9	26,5	25,7	23,4	23,3
Services	46,1	54,0	53,6	52,7	53,3	46,8

Source: Macroeconomic model outlined in Annex VI. Notes: (i) The new investment for Action Plan is the total required for 2010-2030; and (ii) the fixed investment share of GDP is the average for 2010-2030.

Impact of the Base Case in the Longer-term

The Base Case Scenario includes the Core Infrastructure Program and the nickel mining project. The economic benefits that accrue to Burundi under this scenario are substantial. They include:

- Sustained growth of the domestic economy that creates new business opportunities and increases incomes. GDP grows in real terms by about 7.2 percent a year over the next two decades in this Scenario. The economy expands from the current $1 billion to $4.6 billion (at 2007 constant prices) by 2030, roughly comparable to the current economies of Benin and Madagascar. The size of the domestic market for a wide range of goods and services is sufficient to open up a large range of business opportunities for domestic and offshore investors. GDP per capita increases by 4.5 percent a year to about $325 by 2030 (at 2007 constant prices). Sustained growth of incomes in this range begins to have a significant impact on the incidence of poverty in the country, with a substantial number of people at or just below the poverty line moving out of "official" poverty, although many of these people would still be vulnerable to downturns in the economy due to droughts or other disruptions.
- Increased opportunities for productive employment. Employment in the non-farm sector grows at six percent a year. Over the next two decades, about 1.3 million jobs are created in the non-farm sector, mainly in urban areas - equivalent to almost half of the 2.7 million new entrants into the labor force in this period. The share of employment in agriculture declines steadily to about 70 percent of the work force by 2030. By 2030, the industrial sector, including mining, is projected to account for almost 10 percent of employment, while the services sector is projected to account for about 20 percent.
- Improved access to infrastructure services and lower costs for these services. The sustained strong growth in the economy and employment stems from the major investment in basic infrastructure proposed under the Action Plan. More reliable power supplies, improved transport and communications services, and lower costs for these services, improve the business environment and investment opportunities for the private sector and improve Burundi's international competitiveness.
- Increased tax revenues and expanded public services. The combination of strong economic growth and the start-up of the mining operation have significant implications for the revenue position of the Government. At the present

time, public revenues are about US$200 million a year (at current prices), equivalent to about 19 percent of GDP. The long-term projections of the IMF (which do not include a nickel mining project) imply revenues of about 21 percent of GDP in the 2020s. Should the nickel mine go ahead in 2017 as proposed, the Government's revenue would be in the range of $1 billion a year by 2030 (at 2007 constant prices). The prospect of additional revenues of some $180 million a year (at 2007 constant prices) from 2017 onwards may allow Burundi to overcome its current vulnerability to debt distress and improve its access to international capital markets for various PPP-type arrangements that require private funding.

The Alternative Scenarios

The Table above summarizes the outcomes for each of the five alternative scenarios considered in this Report and compares them to the Base Case. Several key points emerge from this analysis:

- In the event that the nickel mining project does not proceed, but the Core Infrastructure Program is implemented in full (Scenario B), GDP grows at about 6.4 percent a year over the next two decades - sufficient to create a substantial amount of additional productive employment and improve incomes and productivity in urban and rural areas and contribute to a significant reduction in the incidence of poverty in the country. The main economic impact is a substantial drop in export income and government revenues.
- If private investment is not available for the power and aviation sectors (Scenario C), there is a further modest decline in growth performance, with GDP increasing by an average of 6.2 percent a year over the next two decades. The decline in the growth rate is limited because it is assumed that all the additional power that is needed to meet demand is imported from the EAPP grid. The implication is that by 2030, imported power accounts for 90 percent of total supply in Burundi.
- In Scenarios D and E, the level of public investment in the proposed infrastructure program declines from $3.8 billion over the next two decades to less than $1 billion. The growth performance of the economy declines sharply. In Scenario E, the GDP growth rate is more than two full percentage points below the Base Case. The economy has difficulty in absorbing new entrants in the labor force into productive employment opportunities. As a result, there is the risk of rising unemployment in urban areas, especially among younger people. In addition, much larger numbers of people remain in low productivity agricultural pursuits. While there may be some reduction in the incidence of poverty in the country in this Scenario, the total number of people in absolute poverty would increase substantially over the next two decades.
- Scenario F assumes that one of the rail extensions into Burundi goes ahead, but that the nickel mining operation is based on refining ore at the mine site. In the absence of the four million tons of ore exports each year, the economic impact of the rail extension is modest and GDP growth is not much higher than in the Base Case. Moreover, in this scenario, there is a risk that large public subsidies would be needed for the operation of the rail network in Burundi.

Key policy Issues for the Government

The Report has identified a number of important policy issues for consideration by the Government and donor community. These include the following:

- The importance of early action by the Government and donor community to expand support for the proposed Infrastructure Action Program.
- The role of private funding for infrastructure development under PPP or other types of arrangements and its implications for Burundi.
- The need to move forward expeditiously on the proposed nickel mining operation.
- Questions about the economic viability of the rail extension in the absence of mine-related freight.

- The appropriate degree of dependence on imported power supplies.

Early Action on the Core Infrastructure Program

It is important for Burundi to maintain the current growth momentum generated by the ongoing strong donor support for infrastructure rehabilitation. An early launch of the proposed Infrastructure Action Program requires a series of decisions by the Government and donor community regarding the design of particular programs and projects and funding arrangements for these activities. There is a degree of urgency associated with some of these decisions because implementation of a number of key components of the program needs to begin in 2010 if the above-mentioned targets for the power and transport sectors are to be realized and if the current growth momentum in the economy is to be sustained. Mobilization of a total of about $620 million in new funding will be required for activities scheduled for implementation during the first five years (2010-2014) of the proposed program.

In the case of the power program for 2010-2014, the design of some $28 million of new capacity building initiatives and technical studies needs to be firmed up so that funding arrangements can be completed. Discussions with donors and private investors regarding the funding of almost $200 million needed for the construction of new generation capacity in the next five years is under way. However, discussions about the implementation and funding arrangements for the transmission and distribution network and associated customer connections for the next five years are less well advanced. The total amount of funding required is estimated at $107 million. In the case of road transport and infrastructure, new funding in the amount of about $265 million is required for the period 2010-2014. This includes $30 million for new capacity building initiatives and technical studies, and $235 million for capital works - mainly for the national road network and the start of the expansion of the urban road network. The civil aviation program will require mobilization of $8 million for capacity building, technical studies, including detailed design work on an upgraded international airport and the groundwork needed for mobilization of private funding for the airport project. Modest amounts of funding are also required for equipment replacement in the Port of Bujumbura and for further investigation of options for the possible rail extension into Burundi. New funding requirements for the communications sector are also modest, with some $3 million required for additional capacity building from 2012 onwards when the ongoing World Bank project comes to a close.

Mobilizing Private Funding for Infrastructure

The proposed Action Plan calls for increased use of PPP-type arrangements to mobilize private sector funding for the program. In general, accessing private funding under these types of arrangements allow governments to avoid or defer public spending on infrastructure without foregoing its benefits. To manage the risks associated with the proposed PPPs and ensure that they provide high quality infrastructure services in an efficient manner, the Government will need to give careful attention to the following three broad sets of concerns: (i) the legal framework governing the PPPs; (ii) the processes for selecting and implementing PPPs, including the roles played by relevant government agencies; and (iii) the contractual obligations on which PPPs are based that directly determine the fiscal risk incurred by the government.
The contributions from private investors for the power program, civil aviation and, if it proceeds, the rail extension in Burundi, are predicated on the assumption that it will be possible to form public-private partnerships for each of these operations using BOT, BOOT or some comparable privatization techniques. A total of $1.4 billion of private funding would be needed for PPPs in these three sectors. This excludes the approximate $670 million that might be required for a rail link to the mines; it is assumed that the mining company would fund and construct these spurs, if they were to go ahead. The bulk of the private funding for these programs is required in the first decade.

These PPP-type arrangements typically involve substantial amounts of debt financing by the private

contractors. The issue that will arise in these circumstances is the manner in which lenders for these types of projects will be protected from sovereign risk, which includes risk of default, breach of covenants, availability of foreign exchange or convertibility, expropriation, and other concerns. The issue of sovereign risk is particularly important for Burundi, in view of its vulnerability to debt distress. If the required private debt financing is to be mobilized, consideration may need to be given by donors to some form of guarantee arrangements. The design of these proposed PPP arrangements will require substantial work over the next five years. Burundi will need early access to experienced legal and technical services for the work involved.

Moving Forward With the Nickel Mining Project

If private investor interest in the nickel mining project is to move forward, the Government will need to engage in negotiations with one or more potential investors on the terms and conditions for the investment. The capital cost of developing the mine site is estimated at about $1.4 billion, with an additional $600-700 million in public funding for improvements in the rail capacity of the TRC in Tanzania and in improvements at the port of Dar es Salaam. The Government will need to assemble an experienced legal and technical team for these negotiations and may need advice and assistance from a donor in this regard. In the event that the mine operation is able to proceed and the private funding can be mobilized, the $200 million a year in tax and royalty payments would, in turn, contribute significantly to improving the financial position of the Government and would help reduce Burundi's vulnerability to debt distress.

Assessing the Viability of a Rail Extension into Burundi

An important point that emerges from this study is a series of questions about the extension of the Tanzanian rail network into Burundi. If the rail is unable to carry freight generated by the nickel mining operation in Burundi, then the volumes of freight available from regular commerce appear to be too small to justify the investment at any time within the next two decades. If refining metal at the mine site is the most attractive option available to potential investors, there may be little appetite for the alternative, perhaps higher cost, option of using a rail system in Burundi for the freight services for the mine. More analysis is needed on these options before final decisions can be taken by the Government. In any event, there will be need for close cooperation and coordination with Tanzanian authorities if the mine is to go ahead, because the rail system would be used to transport metal from Kigoma to the port at Dar es Salaam. The rail network would also have to carry 600,000 tons of chemicals a year for the refinery operation.

The other point that emerges is the timing of initiatives to proceed with the rail extension. Various feasibility studies suggest that it should proceed in the decade ahead. The analysis undertaken for this Report indicates that implementation of the Infrastructure Action Program and the mine development in the decade ahead will push public and private investment to levels that are manageable, but high in relation to GDP, at least for Burundi. If the rail extension were to be undertaken at the same time, investment levels would rise to more than 80 percent of GDP for several years in the decade ahead. Given the limited absorptive capacities of the Burundi economy, this

level of investment may pose serious stability questions for the management of the economy. Careful attention to the phasing of these various programs would be required to avoid inflationary pressures.

The Degree of Dependence on Imported Power

The analysis in this Report points to the emergence of a power supply deficit by about 2024. At that time, Burundi would need access to another 200 MW of capacity to meet projected needs in the latter part of the 2020s. If this is to be met from domestic hydro sources, it would involve a capital outlay of some $400 million (at 2007 constant prices). Further investigation is needed to determine whether there are additional large hydro sites available within Burundi to meet this continuing growth in demand. The key policy question for the longer-term is whether to develop other potential domestic sites in order to keep dependence on imported power at prudent levels, or whether to allow increased dependence on imported supplies from the EAPP network. A related question is the likely cost of new sources of domestic supply compared with imports from a low cost producer such as Ethiopia.

Managing Risks and Uncertainties in the Program

A twenty-year program of this magnitude inevitably faces risks and uncertainties, large and small, foreseen and unforeseen. Many possibilities can be considered, including for example, major political risks such as deterioration in internal security, or civil disturbances in neighboring countries that affect the overall performance of the Burundi economy and its attractiveness as a destination for private investment. There are also risks that stem from the international environment, including sharply higher petroleum or raw material prices that may adversely affect the attractiveness of investments in Burundi.

For the purposes of this Report, the risks and uncertainties of most interest at this stage relate to the design, funding and implementation of the proposed program. The issues of particular concern include: (i) the availability of the various types of project funding that are required; (ii) the capacity of Burundi Government agencies to manage the formulation, design and implementation of the proposed program, including the ability of Burundi and other EAC members to reach timely agreement on key aspects of cooperation in the further development of the regional infrastructure networks and services; (iii) adoption of policies and programs that can maintain macroeconomic stability in the face of the proposed large ramp-up in investment spending within Burundi; and (iv) the design and early implementation of programs that will support strong domestic supply responses in input and product markets. To manage these risks, the Government and donor community will need to strengthen coordination mechanisms for the infrastructure sectors, starting with early completion and adoption of the proposed master plans for the infrastructure sectors. Regular meetings with donors may then be required to monitor progress in implementation of the program.

Availability of Funding

Shortfalls in funding may result in postponement or cancellation of particular projects or project components. An immediate concern, for example, is early agreement with donors or potential private investors on the funding arrangements for the new generation projects to be constructed within Burundi and the three regional generation projects in which Burundi would share power with neighboring states. Delays in reaching agreement on funding may lead to delays in commission dates for the plants. As the foregoing discussion indicates, shortfalls in public investment have a significant adverse impact on the overall growth performance of the economy over the next two decades. An inability to mobilize private funding on the scale required for the Core Infrastructure Program has the same effect, unless of course the shortfalls can be made up by increased allocations from the donor community.

Delays in Implementation

Problems with capacities of line agencies to oversee the design and implementation of the program may result in cost overruns in the program, delays in start-up and completion of particular project components, or use of sub-standard materials or civil works activities that are not in accordance with the required technical specifications of a project component. In this case, there may be waste of public funds, or premature deterioration of an asset such as a section of a road, or a power line, that leads to sharply higher levels of maintenance spending. Another area of concern relates to careful assessment of the environmental Impact of the proposed program, including the development of the nickel mine and disposal of waste materials from the refinery operation. The proposed program includes about $170 million of technical support for various aspects of program design and implementation. Early agreement with the donor community on these particular program components will make an important contribution to an effective launch of the Infrastructure Action Program.

Difficulties in reaching agreement on the terms and conditions for projects and programs that require regional cooperation may lead to delays in award of contracts for particular projects. The proposed rail extension from Tanzania to Burundi, if it is to proceed, will require substantial negotiation on how the costs and benefits of the project will be shared. A significant part of the capital cost stems from the need to improve the rail system on the Tanzanian side and provide port facilities for loading of ore or metal and unloading of mine supplies.

Macroeconomic Policy Issues

The proposed levels of investment may impose macroeconomic strains on the economy, including for example, shortages of skilled and semi-skilled labor that translate into inflationary wage pressures, and crowding out of private investment in areas unrelated to the Action Plan. Total non-mining investment is about 35 percent of GDP at the peak of the program in 2014-2016. Including the investment for the mine at this same period, the investment level is in the range of 65 percent of GDP at this time. An essential part of the next phase of the Action Plan would be detailed design work that includes programs and policies required to manage these potential pressures. It will require close attention to three aspects of the program: (i) early mobilization of the required public and private investment funds; (ii) building

capacities for effective implementation of the program; and (iii) effective management of the macroeconomic impact of the program, including, for example, early action to develop the required skills in the labor force.

Inadequate Domestic Supply Response

In the event that the capacities of domestic business cannot be built up rapidly, the risk is that large amounts of income will move out of the economy in the form of payments for imports and remittances. A particular aspect of the competition from imports relates to Burundi's recent entry into the East African Community. Membership carries with it a commitment to lower and eliminate intra-EAC tariffs on a wide range of products by 2010. Burundi producers will almost certainly face stiff competition from exporters in the large neighboring member countries. At the same time, membership requires increased attention to harmonization with policies, regulations and standards that are being adopted by the Community. A number of these standards have important implications for the further development of infrastructure facilities and services within Burundi. An early dialogue between the Government and donors interested in building these domestic supply capacities will be important. Regular monitoring of business activities and expenditures on imports will help identify obstacles to realizing a strong supply response. There will be a need for effective coordination between the Government and donors with programs that support business development activities and skills training.

Part A

An Infrastructure Action Plan for Burundi

General Map of Burundi

Chapter 1 – Major Challenges Facing the Burundi Economy

A Prolonged Period of Weak Economic Growth

The brutal seven-year civil war in the 1990s had a devastating effect on Burundi's economy and on living standards. Gross domestic product (GDP) declined by about 20 percent at that time, while per capita income fell from $150 in 1994 to about $105 in 2005 - a decline of some 35 percent. In August 2000, upon signing of the Arusha Peace Agreement, Burundi began emerging from the civil war and during 2000-2005 made a successful transition to a multi-party system of government. Parliamentary elections, based on a new constitution, took place in August 2005. The CNDD-FDD won over 58 percent of the vote and formed a new government. The national income per capita now stands at about $100, which is one of the lowest in the world. About 90 percent of the population resides in rural areas, although the urban population has grown rapidly in the past decade. According to the African Development Bank, 81 percent of the population was below the international poverty line of US$1 a day in 2006. This compares with 55 percent in 1998. The implication is that the number of people below the poverty line increased from 3.5 million in 1998 to 6.1 million in 2006.

Demand Changes

Over the past four decades, the economic performance of Burundi has been mixed, with much of the period characterized by weak and volatile growth. In the 1970s and 1980s, economic growth averaged about 3.5 percent a year in real terms. Since the onset of civil war in 1992, and the ensuing weak economic performance during 1992-2005, there have been major shifts in the structure of demand and supply in the Burundi economy. These changes provide important insights for the design of the development strategy for the decade ahead and the path to sustained strong economic growth.

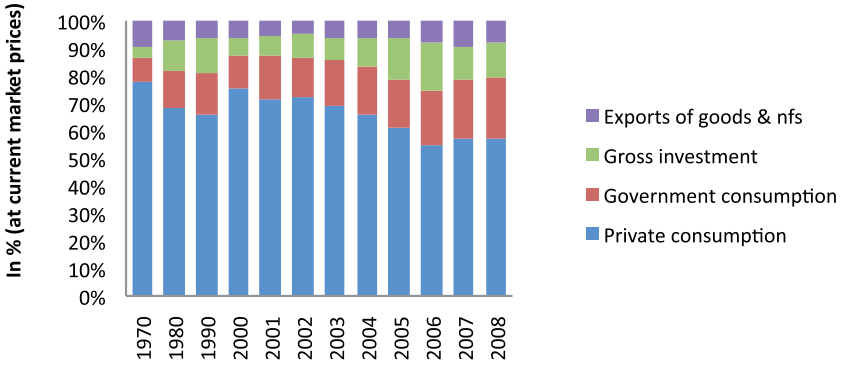
The combination of pervasive poverty, and the high costs of doing business in Burundi that stemmed in part from inadequate infrastructure and other services, has resulted in a lack of aggregate demand in Burundi for extended periods of time. The key trends are set out in Graph 1.1. a.

- For much of the past four decades, private consumption expenditures have accounted for 70 percent or more of total spending in the economy. In the first half of this decade, however, the real level of private consumption expenditure stagnated. As a result, the share of private consumption in GDP declined steadily following the cessation of hostilities and the Arusha Peace Accord in 2000. This decline in private consumption is closely linked to weak growth in production and incomes in the agriculture sector during 2000-2005. Most of the rural population depend on subsistence farming and livestock for their livelihood and have only marginal involvement in the monetized economy. It is only in the last three years that private consumption has grown in real terms.
- Until recently, investment demand has also been very weak. As Graph 1.1.a indicates, private investment in Burundi has been minimal. The reasons for the weak investment demand are discussed at great length later in this chapter, but include poor internal security, the small domestic market, and the high cost and unreliability of infrastructure services. This situation began to change in 2004-2005 when the donor community launched a major effort to rehabilitate the Burundi economy with investments in infrastructure and other services. As a result, public investment expenditures, while still at modest levels, have begun to rise. There is some evidence to suggest that private investment is beginning to rise, perhaps in response to the increased donor spending on infrastructure rehabilitation.
- The development of export markets has also been very weak. One of the most striking statistics for Burundi is that exports of goods and services have been less than 10 percent of GDP for the past three decades. In contrast, the average for Sub-Saharan countries was about 26.5 percent in the 1980s and 1990s; and during 2000-2006 it rose to 34 percent of GDP. The nominal value of exports from Sub-

Saharan countries during 2000-2006 was about $117 billion a year, excluding South Africa. Burundi's exports in the same period averaged about $70 million a year.

- The main source of growth in demand in the past decade has been recurrent expenditures of the government. Value added by government services has risen from 12 percent of GDP in 2000 to an estimated 22 percent in 2008. This level is unusually high and compares with an average of 14.5 percent for all Sub-Saharan countries during 2000-2006.[1]

Graph 1.1.a : National Income Account Components of Demand



Source: Annex Table I.5.

Table 1.1: Gross Domestic Product
US$ mill at current prices

	1970	1980	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
GDP	245	951	1148	709	662	628	595	680	797	959	980	1163

Source: Annex Table I.5.

[1] See World Bank (2008), Africa Development Indicators, 2008/09. World Bank, Washington DC, December 2008.

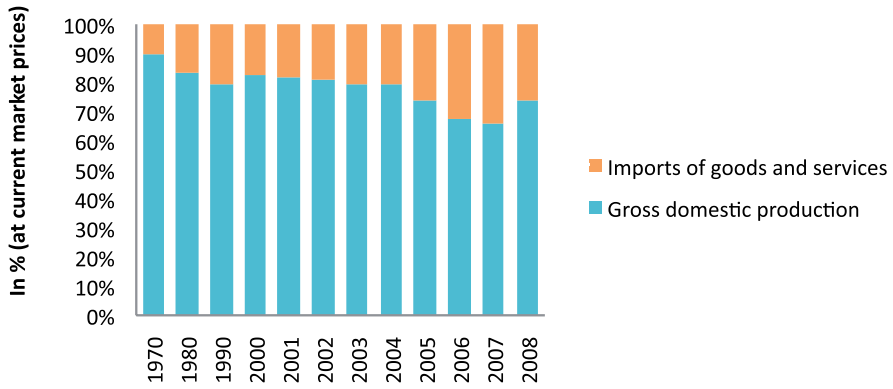
Supply Responses

The macroeconomic story. In the 1970s and 1980s, the main sources of growth were industry, construction and services, especially transport and communications. In this period, agriculture essentially grew at the same rate as the population - to a considerable extent, a reflection of the large number of people whose primary occupation was subsistence farming with little or no marketable surpluses. Between 1993 and 1996, the economy contracted sharply as the civil war intensified. Growth was restored in 1997, but for the most part it has been at disappointingly low levels. For the decade as a whole, the 1990s saw declines in all types of economic activity except for small increases in construction and miscellaneous private services. In the period immediately after the conclusion of the Arusha Peace Agreement, there was a weak economic recovery, led mainly by a large expansion of public service employment. In this period, value added by government services grew at an average of 12 percent a year and transport and communications services by 11 percent a year; agriculture, manufacturing, mining and construction all experienced declines.

In the past three years, there has been a broad-based recovery in the economy led by the increase in donor spending on rehabilitation of infrastructure and other services, and by a recovery in agriculture. Value added in agriculture increased as a result of recovery from recent severe droughts. A recovery was also recorded in manufacturing, construction and several service industries. However, it was only in 2008, that the GDP of the economy recovered to about $1 billion - a level that was last achieved in 1990.

On the supply side, one of the most striking changes relates to the growth in imports in recent years. The improved economic performance has boosted incomes and demand. The very limited supply response capacities of the Burundi economy resulted in demand spilling over into sharply higher levels of imports. Until 2004, imports had accounted for about 20 percent of total supply in Burundi for many years. Imports now account for one-third of total supply in Burundi and 45 percent of GDP in the past three years (Graph 1.1.b). The latter compares with 33 percent of GDP for Sub-Saharan Africa during 2000-2006. An important part of the recent surge in imports was the sharply higher spending on capital equipment and construction materials that stemmed from the increased levels of donor support for rehabilitation of infrastructure and other facilities. It is also the case that imports of a wide range of consumer goods surged with rising domestic incomes, including food products, pharmaceuticals, clothing and other personal effects, as well as furniture and furnishings of various kinds.

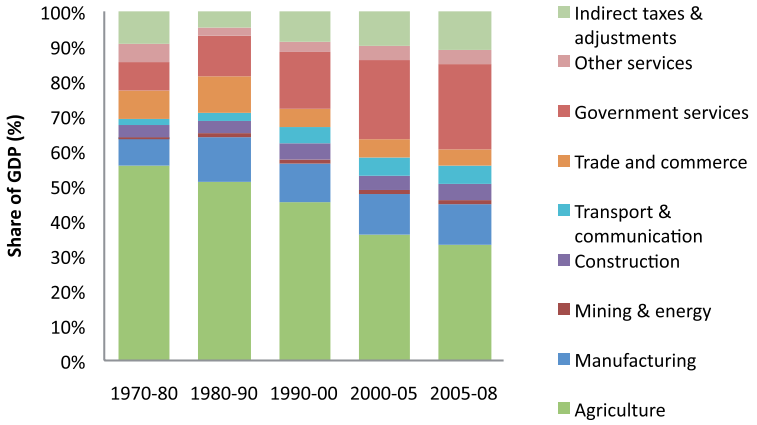
Graph 1.1.b : National Income Account Components of Supply



Source: Annex Table I.5.

The weak economic performance of the past three decades has been accompanied by important changes in the sectoral composition of output.

Graph 1.2 : Structural Change in the Burundi Economy



Source: Annex Table I.4.

Agriculture has not been a significant source of growth and as a result, its relative importance has declined steadily. In the 1970s, it accounted for almost 60 percent of GDP. By 2005-2008, its share had declined to about 33 percent. Other sources of growth in the economy are beginning to emerge as the peace process takes hold. With a strong performance over the past three years, the industrial sector (mining, manufacturing, and construction) now accounts for about 17 percent of value added in the country. Led by public service activities, the services sector accounts for about 40 percent of GDP, compared with 27 percent in the 1980s.

The business registration story. These broad trends in the national income accounts are also evident in registration data for new business activities. An analysis of the business registration data of the Ministry of Justice was undertaken for this Report, the results of which are summarized in Table 1.3. According to these records, there were 1,802 new business registrations during 2000-2008. There is no information available on the number of businesses that closed down subsequent to their registration so an accurate picture on the number of active business establishments is not available from these data. However, the accounts data for the power utility, REGIDESO, indicate that the total number of business establishment accounts averaged 2,090 for the period 2005 through 2007. The latter suggests that the sectoral details for business registrations with the Ministry of Justice do reflect the current situation for the approximate 2,000 small and medium business ventures active in Burundi.[2]

Table 1.3: Business Registrations in Burundi (For the period 2000-2008)

Sector	Registrations	
	Number	Percent
Commercial agriculture	24	1,3
Mining	50	2,8
Manufacturing	-	-
Construction	531	29,5
Services		-
International trade	430	23,9
Wholesale & retail trade	344	19,1
Accounting & consultancy	187	10,4
Finance & banking	70	3,9
Transport	63	3,5
Travel & tourism	63	3,5
Real estate	22	1,2
Telecommunications	18	1,0
Sub-total	1 197	66,4
Total	1 802	100,0

Source: Tribunal de Commerce, Ministére de Justice.

[2] These data do not reflect the number of business activities that are undertaken by individuals and families in the informal sector of the economy, the number of which is not known. As Chapter 2 indicates, some 50,000 artisanal producers are active in alluvial mining of gold.

There are several striking features about these registration data. First, two-thirds of all the registrations are for service industry activities, the most important of which are domestic and international trade. The surge in imports in recent years has led to a substantial increase in businesses registered for international trade activities. Second is the importance of business registrations in construction, more than half of which occurred during 2005-2008, very likely in response to the opportunities created by the build-up in donor funding for rehabilitation of infrastructure. Third, there is a total absence of new registrations during 2000-2008 for business activities that would be classified as manufacturing. Fourth is the very small number of business registrations for commercial agricultural activities (the 24 registrations are all for coffee processing).

These registration data highlight some of the opportunities and challenges that successful implementation of the proposed Infrastructure Action Plan will confront in promoting a strong domestic supply response. It would appear that there is a substantial number of small local construction firms, some of whom may be able to grow to reasonably large companies with well designed domestic procurement policies for the Action Plan. Similarly, there appears to be a substantial number of businesses active in the transport sector, where there has been a sustained increase in the truck fleet of Burundi in the past decade. Some of these establishments may also be able to evolve into important domestic and regional freight companies. However, small number of new registrations for commercial agriculture and manufacturing raise serious questions about the policy regime needed to encourage the development of these types of activities.

Increasing Emphasis on Regional Integration

Burundi Joins the East African Community

Being landlocked, and with long distances to the nearest seaport, the Government recognizes that increased economic integration is key to achieving greater competitiveness in regional and global markets and in laying the foundations for an extended period of strong growth. In addition to easing the current high transport costs and improving access to goods and services, regional integration will also provide a larger market for Burundi's exports and, most significantly, help attract foreign investment to boost mineral exploration and mining activities.

Burundi became a member of the East African Community (EAC) in July 2007.[3] The treaty for the establishment of the East African Community of 1999 set out a vision for the eventual unification of Kenya, Tanzania, and Uganda. The sequence of events laid out comprised the establishment of a customs union, followed by a common market, a monetary union, and eventually a political federation. The first step in this sequence is underway, with the "Protocol for the Establishment of the East Africa Community Customs Union" signed in March 2004 and coming into effect in January 2005 for the three founding members. Proposed customs reforms for the Union include: (i) adoption of the common external tariff; (ii) elimination of internal tariffs from other EAC members; and (iii) harmonization of valuation and customs procedures. At the time, it was envisaged that the Union would be completed

[3] Burundi is a member of the East African Court of Justice, the East African Legislative Assembly, the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of Central African States (ECCAS), and the Economic Community for the Countries of the Great Lakes (CEPGL). It has also applied for membership of the East African Development Bank.

by mid-2009. Progress on this program has been slow. Because the EAC's decision-making is by full consensus, lack of input from Burundi could slow preparations for the common market. Within the EAC, Burundi's economy is the smallest of the five members of the Community (Table 1.4). It has the lowest national income per capita and many of its social indicators are less favorable than those of other members. As a small, land-locked country, Burundi accords high priority to the regional initiatives of the Community, including the ongoing effort to showcase the East Africa region as an attractive destination for private investment.

Table 1.4: Basic Indicators for Burundi and the East African Community for 2006

Indicator	East African Community						Total Sub-Sahara	Africa
	Burundi	Kenya	Rwanda	Tanzania	Uganda	Total		
Population (mill)	8,2	36,6	9,5	39,5	29,9	123,7	782,5	936,7
Population growth rate (% p.a.)	2,8	2,7	2,5	2,5	3,3	2,8	2,5	2,4
GDPat current prices (US$ bill)	0,9	22,8	2,9	14,2	9,5	50,2	744,7	1 114,4
GDP real growth rate, 2000-06 (% p.a.)	2,2	3,6	6,5	6,4	5,6	4,9	4,6	4,5
Gross national income per capita (US$)	100	580	280	370	300	440	860	1 110
Investment as % of GDP	16,7	18,8	20,3	16,6	23,0	19,0	17,6	18,9
Exports as % GDP	10,9	25,1	10,3	21,9	14,8	21,1	37,2	38,3
Imports as % GDP	47,8	37,5	27,4	27,8	30,1	33,0	34,5	33,7
Life expectancy at birth (years)	49,0	53,4	45,6	51,9	50,7	51,4	50,5	53,9
Adult literacy rate (%)								
Female	52,2	70,2	59,8	62,2	57,7	62,6		
Male	67,3	77,7	71,4	77,5	76,8	76,2		
ODA per capita ($US)	50,8	25,8	61,8	46,3	51,9	43,1	48,5	43,3

Source: World Bank, Africa Development Indicators, 2008/09. Washington DC, December, 2008.

Implications of Burundi's Changing Pattern of International Trade

Burundi was a relatively closed economy until the 1990s, when several non-tariff trade barriers were abolished. The import tariff structure was revised again in 2003, cutting the maximum tariff in a phased manner from 100 percent to 30 percent. Since then, the momentum for regional integration gathered pace, culminating in Burundi's membership in the EAC in 2007. At the same time, there have been important changes in the volume of external trade and the relative importance of various trade partners. New opportunities for export and for import replacement have emerged. Successful exploitation of these opportunities will require substantial improvement in infrastructure services and reduction in the cost of these services, especially in the transport sector.

Movement toward a free trade regime for the EAC. The community is currently a customs union and negotiations are under way to transform the union into a common market. In contrast to a number of other initiatives in Africa over the past three decades, the EAC has moved quickly to eliminate a large proportion of tariffs on intra-EAC trade as an integral part of establishing a free trade area (FTA) among the founding members.[4] Kenya has made cuts of 90 percent and Tanzania and

Table 1.5: Tariffs for Agricultural Products and Manufactures

Country	Primary products		Manufactures	
	Simple mean tariff	Weighted mean tariff	Simple mean tariff	Weighted mean tariff
Burundi	25,1	11,7	14,6	13,8
Kenya	14,8	6,4	11,6	6,6
Rwanda	17,4	14,0	20,0	14,5
Tanzania	16,9	7,7	12,0	7,0
Uganda	14,6	7,0	11,7	7,6

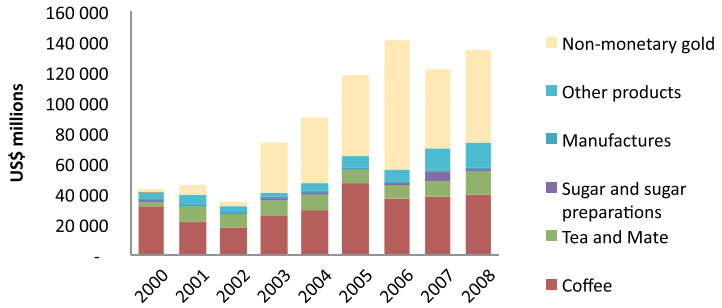
Source: World Bank (2008), African Development Indicators, 2008/09.

[4] The five EAC members are currently negotiating the second step, a further Common Market Protocol, for free movement of persons, labor, and services and to ensure the right to establishment and residence of EAC citizens within the Community. The expectation in 2008 was that this Protocol would be ratified by June 2009 with implementation to begin in January 2010.

Uganda have cut tariffs by 80 percent. The schedule of accession allows commensurate action on tariffs by Burundi and Rwanda to be undertaken until 2010. Coordination and harmonization of trade policies and programs in the EAC are to be accomplished in tandem, and so much faster than would have been expected under a free trade area. Table 1.5 sets out the average tariffs that prevailed in the EAC countries as of 2006. For the most part, the simple mean tariffs are similar; however, the weighted mean tariffs suggest that Burundi and Rwanda had higher levels of protection for primary products and manufactures than the other three member states. As noted above, these two recent members of the EAC are expected to complete their action on tariff adjustments in 2010. At that stage, there would be a high degree of uniformity among the tariff regimes of the EAC members. The EAC has adopted a three-band tariff structure with respect to the rest of the world.[5] This structure, which will likely be phased in over a period of three years, provides a substantial amount of protection for finished manufactures such as consumer goods.

In October 2008 the three regional economic communities (RECs) in Eastern and Southern Africa - COMESA, EAC and the SADC - agreed to form a free trade area. Should it be achieved, such an FTA would deepen intra-African trade by involving 26 countries (almost half of the continent), with a combined population of 527 million people and a combined GDP of $624 billion. One of the main challenges facing the partners is overlapping membership. Of the 26 countries, 17 are either already in a customs union or negotiating another customs union. One of the objectives of the FTA is to minimize and eventually eliminate the contradictions brought about by these overlapping memberships. The priority areas for policy harmonization and coordination under the proposed FTA include, among others: a common tariff regime; standard rules of origin; simplified customs procedures and documentation; harmonization of product standards; identification, removal and monitoring of non-tariff barriers; establishment of one-stop border posts, safeguard measures, and dispute settlement mechanisms.

Graph 1.6: Composition of Exports of Domestic Origin



Source: Annex Table IV.1 and Annex Table IV.2.

Burundi has also taken initiatives to benefit from other preferential trade agreements. As an EAC member, Burundi is moving towards an Economic Partnership Agreement (EPA) with the European Union (EU). While Burundi gets preferential market access under the "Everything but Arms" initiative of the EU, it faces significant non-tariff barriers.

Development of export markets. Burundi has had very limited success in building an export industry, with exports averaging 13 percent of GDP since 2003. Kenya, Tanzania and Uganda have all had more success in developing international and regional markets for their products. As the subsequent discussion indicates, Burundi's limited progress in developing industries for domestic and export markets stems, in part, from inadequate levels of infrastructure that includes lack of reliable electricity supplies and high cost road transport. The shortcomings of the infrastructure system in Burundi are discussed below, and in greater detail in Part B of this Report.

[5] These are zero percent for raw materials, capital goods, agricultural inputs, certain medicines and medical equipment; 10 percent for intermediate goods and other essential industrial inputs; and 25 percent for finished goods.

Table 1.6: Composition of Exports (US$ millions)

Product category	2000	2001	2002	2003	2004	2005	2006	2007	2008
EXPORTS OF DOMESTIC ORIGIN									
Minerals and metals									
Non-monetary gold	2 442	6 292	3 327	33 279	43 178	54 611	85 549	53 076	60 998
Metal ores & scrap metal	316	3 689	791	411	599	1 525	2 851	3 204	7 218
Other non-metallic minerals	1	1	2	4	7	5	56	2	247
Sub-total	2 760	9 981	4 119	33 694	43 783	56 141	88 457	56 282	68 462
Coffee, tea and other beverages									
Coffee	31 400	21 147	17 374	25 336	29 234	46 519	36 740	38 484	39 463
Tea and Mate	3 048	10 990	9 113	10 535	9 950	9 120	10 197	10 088	15 600
Beverages	3	1 331	1 220	1 106	1 884	1 303	565	857	1 843
Sub-total	34 451	33 468	27 707	36 977	41 068	56 943	47 503	49 430	56 906
Food products									
Sugar and sugar preparations	2 089	1 210	1 777	1 434	2 991	1 228	447	6 152	1 448
Other food products	165	217	277	247	745	313	269	1 785	1 257
Sub-total	2 254	1 427	2 054	1 681	3 737	1 541	716	7 936	2 705
Tobacco & products	74	790	424	1 017	1 025	1 145	1 102	935	1 572
Agricultural raw materials									
Hides & skins	2 901	57	27	44	258	375	1 695	3 676	2 825
Textile fibres	1	1	-	91	32	1 828	1 102	2 442	1 130
Other products	159	244	325	76	168	300	347	487	707
Sub-total	3 061	302	353	211	459	2 503	3 144	6 605	4 661
Manufactures	24	1	23	105	101	327	172	1 272	559
Total exports of domestic origin	42 623	45 969	34 679	73 684	90 174	118 599	141 094	122 461	134 864
EXPORTS OF IMPORTED PRODUCTS									
Vehicles	113	-	-	816	280	1 689	42 401	14 292	7 927
Petroleum products	-	-	-	212	5	38	351	5 909	1 128
Other products, including re-exports	118	365	431	1 156	1 647	1 730	52 226	17 095	6 687
Total exports of imported products	232	365	431	2 184	1 932	3 458	94 977	37 296	15 742
Total exports	42 855	46 334	35 110	75 868	92 106	122 057	236 071	159 757	150 606
Memo item:									
Exports of domestic origin as% GDP	6,0	6,9	5,5	12,4	13,3	14,9	14,7	12,5	1,6

Source: Annex Table IV.1 and Annex Table IV.2. Note: These COMTRADE data report substantial exports of non-monetary gold. Central Bank of Burundi and IMF export data do not include non-monetary gold. These apparent inconsistencies in export data are discussed in the text below.

In evaluating Burundi's recent export performance, it is important to distinguish between exports that are of domestic origin in which there was substantial value added domestically and those exports, including re-exports, that were originally imported and to which there is little or no value added. Table 1.6 above includes a separation of exports into these two categories. According to the export data reported by the United Nations COMTRADE database, Burundi's exports of domestic origin have grown steadily from $43 million in 2000 to an average of almost $135 million during the last three years. The bulk of the growth in these exports was in mineral products, and in particular non-monetary gold, which increased from $2 million in 2000 to $61 million in 2008. According to these data, it has been the leading export of the country since 2003. The growth in the sales of coffee has been disappointing. Coffee exports, which were $31 million in 2000, had increased to only $39 million by 2008. The other important export products are tea, metal ores and scrap, hides and skins, and textile fibers (cotton).

These export data for non-monetary gold require qualification. One the one hand, sources such as the United States Geological Survey (USGS) report a history of gold production in Burundi. As Table 2.2 in Chapter 2 indicates, the USGS production data are very similar to the volumes of gold exports reported in the COMTRADE database. However, neither the Central Bank of Burundi, nor the IMF, report the export of non-monetary gold by Burundi. The Burundi data in the COMTRADE database lists a number of countries as importers of the gold, including United Arab Emirates, Belgium, Switzerland, and others. In the case of the UAR, Burundi reported exports of gold of $61 million in 2008; the UAR reports imports of only $12.3 million of gold from Burundi in 2008. Given the long history of alluvial gold mining in Burundi, there is little doubt that gold is mined and produced. The issues here include the extent to which small enterprises and individuals involved in this activity report their production and gold sales, and the extent to which gold may be smuggled from Kivu, which borders

Burundi, and which has an active gold mining industry. It would appear that the gold industry plays an important role in the economy, but the extent of this role is unclear. As the discussion in Chapter 2 indicates, further investigation of this industry would help clarify its role and potential contribution to growth.

Traditionally, the European markets have been the most important for Burundi exporters. However, according to the COMTRADE data, the importance of these markets has declined substantially since 2000. The dollar value of exports to industrial countries increased modestly from about $30 million in 2000 to about $40 million in the past two years; but the share of exports going to these countries declined from almost 80 percent during 2000-2004 to 27 percent in the past three years (Table 1.7). The reason for the change is the export of non-monetary gold to United Arab Emirates and other countries and, to a much less extent, the growth in sales of tea to Oman. As Table1.7 indicates, if gold is excluded completely, Western Europe accounted for about 48 percent of non-gold exports in 2008. This is still a large decline since 2000 when two-thirds of non-gold exports went to Western Europe.

The decline in the importance of Western European markets has been offset by an increase in the share of exports going to African countries. From negligible levels in the first half of the decade, the share of exports going to Sub-Saharan countries, other than the EAC members, increased to about seven percent. The main markets outside the EAC have been coffee sales to Swaziland; travel goods, coffee and tobacco products to South Africa; food products and vehicles to Sudan; and vehicle exports to Chad. In Asia, there is some evidence that Singapore and China may be emerging as important markets. In the case of Singapore, sales of coffee have been rising, while in China there has been a sharp increase in exports of ores, scrap metals, and leather goods. These recent trends suggest that Burundi is able to penetrate new markets, and with carefully targeted market campaigns, it can increase exports of particular products to niche markets.

Recent growth in the importance of imports to meet domestic demand. Recovery in economic growth since 2005, coupled with a major build-up in donor-funded rehabilitation programs, has led to increased domestic demand. The limited capacities

Table 1.7: Share of Exports to Each Major Geographic Region
(As percent of total exports)

Region	Including non-monetary gold									Excl.gold
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2008
Industrial countries										
Western Europe	69,0	73,0	80,1	84,5	77,7	56,2	25,0	23,8	27,0	47,5
North America	0,9	0,1	0,3	1,3	0,8	0,2	0,3	0,8	0,8	1,3
Asia-Pacific	0,3	0,0	-	0,5	0,5	0,3	0,1	2,4	0,1	0,2
Sub-total	70,2	73,2	80,4	86,3	78,9	56,7	25,4	27,0	27,9	49,0
Emerging markets										
Sub-Saharan Africa										
EAC & DRC	14,0	25,7	17,4	6,6	9,9	13,2	14,1	26,8	16,3	28,6
Other	0,3	0,3	0,2	1,3	1,3	2,2	3,7	6,2	6,7	11,8
Middle East & North Africa	0,1	0,1	0,0	0,1	7,5	25,4	54,9	34,9	44,9	3,3
East and South Asia	0,0	0,0	0,0	0,6	1,1	1,3	0,2	1,7	3,8	6,7
South America & Carribean	0,0	0,0	-	2,7	0,0	0,0	0,4	0,5	0,0	0,0
Other Europe & CIS	-	0,1	0,7	0,6	0,5	0,8	1,2	2,8	0,3	0,5
Sub-total	14,5	26,2	18,4	11,8	20,2	43,0	74,6	73,0	72,1	51,0
Unspecified	15,4	0,7	1,2	1,9	0,9	0,3	-	-	-	-
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Memo item:										
Total exports (US$ millions)	42,9	42,2	26,6	65,9	82,7	113,8	134,0	156,2	141,8	80,8

Source: Annex Table VI.4. Note: The underlying export data for this Table include exports of non-monetary gold. The column on the right indicates market shares for exports after excluding non-monetary gold.

of domestic business to respond quickly to demand changes have resulted in a major increase in imported goods. In a little less than a decade, the value of imports has more than doubled to an average of almost $400 million a year in the past three years (Table 1.8). Imports now account for about one-third of the total supply of goods and services in the economy, compared to only 10 percent in 2000.

This surge in import demand opens up a range of possibilities for new investment by the business community. Valuable new opportunities may be emerging for domestic products that can replace imports in consumer goods, construction materials, and particular types of manufactures. These opportunities will be helped by the EAC tariff of 25 percent on finished goods. Imports of consumer goods, including food products, clothing, footwear, furniture and furnishings, have increased from a little over $30 million a year in 2000-2001 to an average of $100 million a year in the past three years. Within this total, imports of food products have averaged $35 million a year and cereals and cereal products account for about $20 million. The other products where the size of the import demand is of potential interest are sugar and related products (about $4 million a year), and dairy products (about $2 million a year). There may also be new opportunities for the local manufacture of clothing, footwear, furniture and furnishings, imports of which have averaged about $8 million a year in recent years.

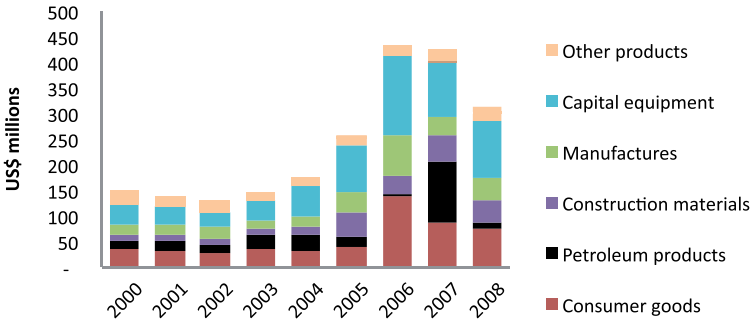
Table 1.8: Changing Composition of Merchandise Imports
(In US$ millions)

Product Category	2000	2001	2002	2003	2004	2005	2006	2007	2008
Consumer goods									
Food products	20,3	16,3	11,9	20,6	13,1	14,6	31,9	46,3	27,1
Beverages	0,5	0,2	0,4	0,4	1,1	1,2	59,0	1,8	2,0
Tobacco	0,2	0,1	0,0	0,1	0,0	0,0	3,3	0,8	0,8
Pharmaceuticals	10,1	12,2	10,4	11,2	15,3	16,4	26,6	25,4	32,0
Clothing & apparel	1,9	2,4	1,7	2,4	2,1	3,4	10,3	9,6	7,6
Furniture & furnishings	0,6	0,8	0,7	0,7	0,5	2,2	4,8	1,9	5,1
Other	1,3	0,3	0,2	0,2	0,4	0,4	0,5	0,8	0,4
Sub-total	34,8	32,3	25,4	35,6	32,6	38,1	136,4	86,6	75,0
Raw materials, fats and oils	16,7	4,4	4,6	2,8	2,2	3,5	5,4	5,8	8,6
Agricultural supplies	4,5	7,6	4,1	5,4	5,1	4,7	6,2	5,0	6,2
Petroleum products	17,8	17,4	16,6	26,7	28,5	21,8	4,1	118,4	10,4
Chemicals	7,4	7,6	10,8	6,0	7,7	11,3	10,7	9,9	11,9
Construction materials	10,7	12,9	14,2	14,3	17,3	48,6	38,2	50,7	43,2
Manufactures	21,4	20,8	20,6	15,3	21,6	37,0	77,6	36,9	44,8
Capital equipment	36,3	35,3	31,6	38,6	57,8	91,9	155,1	109,0	113,6
UN special code	0,7	0,6	0,8	0,0	-	1,4	-	0,8	1,5
Total	150,2	138,9	128,8	144,7	172,7	258,2	433,6	423,0	315,2

Source: Annex Table IV.3.

Other areas of particular interest are agricultural materials and construction materials. Burundi currently imports a large portion of the inputs needed for commercial agriculture (a total of about $6 million a year at present). Areas that warrant further examination include seed and fertilizer production and packaging materials for saleable food and other agricultural products. As a result of the ramp-up of donor support for rehabilitation of infrastructure and facilities, imports of construction materials have increased sharply to about $45 million a year. There is minimal domestic capacity for the supply of these materials at present, but as the discussion in Chapter 2 suggests, there may be substantial potential for new business activities in these areas. Two product areas where there is likely to be very little opportunity in the foreseeable future for import substitution investment are petroleum and capital goods. Imports of petroleum products, which are primarily for use in the transport industry, have jumped to an average of about $45 million a year in recent years, while capital goods

Graph 1.8: Changing Composition of Merchandise Imports



Source: Annex Table IV.3.

imports have increased to an average of $125 million a year.

In contrast to exports, there are no distinct trends at the aggregate level in the sources of supply for imports. Western Europe remains the single most important supplier, with relatively small amounts coming from North America and Asia (mainly Japan). Among emerging market and developing countries, the share of imports from African countries has remained steady at about 28 percent of total imports (Table 1.9). Since 2003, there has been a steady recovery in the share of imports from East and South Asia, largely as a result of increased use of Chinese and Indian supplies. Imports from these two countries consist of a wide range of manufactures and capital equipment, and have risen from about $7 million in 2003 to the current level of about $40 million a year.

Table 1.9: Share of Imports from Each Major Geographic Region
(As percent of total imports)

Region	2000	2001	2002	2003	2004	2005	2006	2007	2008
Industrial countries									
Western Europe	36,8	36,8	36,7	26,1	32,3	35,0	30,6	22,0	40,9
North America	3,2	3,4	2,3	2,6	1,4	3,3	2,8	1,5	1,8
Asia-Pacific	2,8	4,6	4,9	10,2	14,1	9,0	10,9	7,0	4,9
Sub-total	42,8	44,8	43,9	39,0	47,8	47,3	44,4	30,5	47,6
Emerging markets									
Sub-Saharan Africa									
EAC and DRC	22,0	16,4	24,7	37,5	30,6	21,8	12,3	21,7	24,5
Other Africa	10,1	7,7	8,6	9,6	6,6	6,5	6,1	4,8	5,2
Middle East & North Africa	14,3	15,9	8,2	4,2	3,8	4,7	5,4	31,7	8,0
East and South Asia	9,6	12,7	13,1	7,7	9,8	10,1	12,2	10,3	13,7
South America & Carribean	0,3	0,3	0,1	0,4	0,3	0,5	0,2	0,1	0,5
Other Europe & CIS	0,7	2,1	1,0	1,1	0,6	9,0	5,4	0,9	0,5
Sub-total	57,0	55,1	55,8	60,6	51,7	52,6	41,7	69,5	52,4
Unspecified	0,2	0,1	0,3	0,5	0,4	0,1	13,9	0,0	-
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Memo item:									
Total imports (US$ millions)	150,2	138,9	128,8	144,7	172,7	258,2	433,6	423,0	315,2

Source: Annex Table VI.5.

Reducing Barriers to Trade Facilitation

While there has been progress on tariff reduction and harmonization in the EAC, a recent World Bank study suggests that several non-tariff measures (NTMs) are still reported to impede the free trade in goods.[6] The report says that the private sector in the region also perceives that such NTMs may become more prevalent in the larger countries as tariff protection is reduced. Removal of NTMs is now a priority for the EAC; but the required analysis and follow-up actions will not be easy. Many of these NTMs "…have little formal documentation and/or only very unreliable data. The required analysis and policy implications of NTM removal are neither clear nor precise, even for developed countries."[7] The Report provides a very detailed analysis of the current status of NTMs in the EAC, along with recommendations on follow-up actions that are needed.

Barriers to intra-community trade are numerous. These are mostly a consequence of the economic structure of the countries; their institutional policies and weak infrastructures; and their weak financial and capital markets. The economic structures are broadly similar and include low-capacity manufacturing sectors, lack of diversified production, and production and marketing policies that lack coordination and harmonization. Weak infrastructure and institutional policies are partly responsible for poor intra-EAC trade. Furthermore, numerous roadblocks and checkpoints on highways contribute to the delays in the delivery of goods and to higher transport costs.

Customs regulations require excessive documentation, which must be done manually because the process is not automated and ICTs are absent in most of the customs offices. Furthermore, customs procedures are outdated and lack transparency, predictability and consistency. These inefficiencies also result in delays which tend to raise transactions costs. A common measure of the cost of NTMs is the number of person-days lost during goods transit and clearance at the internal borders and along the transport corridors before reaching the destined market. As Table 1.10

[6] World Bank (2008), Non-Tariff Measures on Goods Trade in the East African Community, The World Bank, Washington DC, September 29, 2008. The EAC's working definition of non-tariff measures (NTM) is 'quantitative restrictions and specific limitations that act as obstacles to trade.'

[7] Ibid., page 2.

Table 1.10: Trade Facilitation and Non-Tariff Measures

Indicator	Goods	Burundi	Kenya	Rwanda	Tanzania	Uganda
Average cost to ship a 20ft container from port to final destination ($)	Exports	2 147	1 980	3 840	463	1 050
	Imports	3 705	2 325	4 080	695	2 945
Average time to clear customs (days)	Exports		5	7		5
	Imports	11	9	13		7

Source: World Bank (2009), Africa Development Indicators 2008/09.

indicates, it takes an average of 11 days to clear goods through customs in Burundi; all goods entering through any of the 13 crossings in Burundi with customs stations needs to be cleared at the Bujumbura Port. (The Map below indicates the location of each of these customs stations.)

Donors are providing support for customs modernization programs, but according to the World Bank (2008) assessment, planned improvements have been slow and are done on a bilateral basis with insufficient attention to harmonization. There are, for example, varying systems for import declaration and payment of applicable duty rates. Frequent use of COMESA certificates of origin by businesses of EAC member states suggests that standardization of EAC certificates of origin is not functional. Four EAC members (Burundi, Rwanda, Tanzania and Uganda) have opted to use the ASYCUDA system developed by UNCTAD; Kenya has opted to use SIMBA. These systems are not fully integrated and as a result, lead to delays in customs clearances. Lack of capacity of clearing agents impedes Burundi's goods trade, since the declaration process is slow. Agents are not necessarily conversant with the use of the ASYCUDA and may have only limited familiarity with customs procedures and regulations.

Another emerging trade facilitation issue of particular importance for Burundi is the application of 'testing, certification and other conformity assessment' for technical, sanitary and phyto-sanitary standards. The EAC members are beginning to apply such standards and norms in their intra-EAC goods trade. Much time can be lost in these processes because the various EAC bureaus of standards operate at very different levels of capacity and ability in applying standards and providing certifications. In the particular case of Burundi, building these capacities is at a very early stage of development. As the discussion in the following chapters indicates, with improved infrastructure services and lower costs, important opportunities for Burundi to develop a more diversified export base of agricultural products is likely to emerge. Having in place the required procedures to ensure compliance with appropriate sanitary and phyto-sanitary standards will be essential for the development of these markets.

In addition to the foregoing barriers to intra-EAC trade, payment and insurance systems are also not well developed. Foreign trade financing, export credit facilities and export insurance systems are also not readily available in all countries. Burundi has run a large trade deficit with the other EAC members each year since 2000. In the past five years, the deficit has been in the range of $30-50 million a year - equivalent to about 20 percent of Burundi's overall merchandise trade balance. The persistent deficit raises questions about the adequacy of arrangements for financing the imports, and whether additional measures are available to lower the costs of this trade financing now that Burundi is a member of the EAC. There is no interconvertibility of African currencies because monetary and financial regulations are not harmonized at the regional and national levels. There is a gap between the needs of exporters and the insurance services and products offered.

Location of Border Crossings and Customs Stations in Burundi

The Infrastructure Deficit in Burundi

The Infrastructure Deficit is Substantial

The combination of weak and volatile economic growth and the civil war of the 1990s resulted in a very inadequate infrastructure system in Burundi. Widespread destruction of facilities and lack of rehabilitation and maintenance has impaired access to facilities and raised the costs of these services, and in so doing, has contributed to the lack of domestic and foreign private investment in Burundi.

There is wide agreement that improved infrastructure services in Burundi, and other member states of the EAC, are critical for the further development of productive capacities and for sustained economic growth.[8] The position taken in this Report is that a much stronger emphasis on regional integration of infrastructure within the EAC is central to reducing the current high infrastructure costs. This is especially the case for Burundi which is isolated from larger networks that offer the possibility of access to more efficient larger scale technologies. Chapter 3 outlines the proposed Action Plan for reducing the infrastructure gap in Burundi and for accelerating its integration with EAC members and other neighboring countries.

Table 1.11 above provides an overview of the access to basic infrastructure services in 2006 in Burundi, other member states of the EAC, and Sub-Saharan Africa as a whole. On just about any measure of infrastructure coverage - road density, telephone density, power generation capacity, or service coverage - Burundi, and for that matter, EAC countries, lag behind most other regional groupings in the world. Burundi also lags behind other EAC countries in access to basic infrastructure services. Despite the importance of agriculture in all five of the EAC countries (equivalent to about 38 percent of GDP), only a relatively small portion of the agricultural population has access to all-season roads. The road densities in areas of arable land are substantially lower in the EAC than elsewhere

Table 1.11: Basic Infrastructure Coverage for the East African Community, 2006

Indicator	East African Community						Other Country Groupings	
	Burundi	Kenya	Rwanda	Tanzania	Uganda	Average	Sub-Sahara Africa	Other Low Income
Roads								
Percent of roads paved	10	14	19	9	23	15		
Paved road density							31	134
Road density for arable land	13	12	12	9	14	12	137	211
Total road density	48	11	57	9	36	12		
Electric power								
Generation capacity	6						37	326
Electricity coverage	2	13	5	11	8	10	16	41
Electric power consumption	14	138		61				
Communications								
Mainline density	4	8	2	4	4	5	16	78
Mobile density	25	201	33	146	67	126	175	76
Internet density	7	76	11	10	50	39	34	30
Water and sanitation								
Access to improved water	71	57	65	55	64	60	58	72
Access to improved sanitation	41	42	23	33	33	35	31	51

Source: World Bank (2008), Africa Development Indicators, 2008/09; and www.infrastructureafrica.org. Road density is in kilometers of road per square kilometer of arable land; telephone density is in lines per thousand population; generation capacity is in megawatts per million population; electricity, water, and sanitation coverage are in percentage of population.

[8] According to a recent study, Africa's "infrastructure deficit" is holding back per capita economic growth by at least two percentage points a year, and reducing the productivity of business operations by as much as 40 percent. See Africa Infrastructure Country Diagnostic, Africa's Infrastructure: A Time for Transformation. www.infrastructureafrica.org.

in Africa and in other low income countries. Only 10 percent of the population in the EAC (and only two percent in Burundi) has access to electricity, compared with 16 percent for Sub-Sahara Africa and 41 percent for other low income developing countries. The EAC is also lagging in mainline telephone densities, although mobile phone densities are higher. Teledensity remains poor at three percent of the population, with more than 90 percent of subscribers concentrated in urban areas. Internet access for the EAC is comparable to other low income countries. Access to safe water and sanitation in EAC is roughly comparable to other low income countries. A recent World Bank report provides a very useful summary of the main infrastructure problems in the EAC.[9] Examples of widespread problems found in the community were as follows:

- Poor roads and bridges. The main regional corridors and core road network are mostly paved. Acute problems arise due to the variable condition of parts of core/regional network, and the increasing levels of traffic congestion on roads in and around major urban centers that, in turn, affects access to the ports of Mombasa and Dar es Salaam. The Map below gives the location of the main road transport corridors in East Africa.
- Dilapidated railways. Disrepair of railroad infrastructure and equipment is characterized by the aging track, shortage of cars, and inadequate locomotives. Most of the railway systems in Kenya, Tanzania and Uganda have now been contracted out to concessionaires. This is expected to lead eventually to improved operational and financial performance of these rail networks. The Map below gives the location of the rail transport network in the East African Community.)
- Inadequate ports and inland container freight stations. Problems include inadequate storage and handling capacity, the poor condition of handling equipment, such as cranes, and of adequate rolling at Kigoma, Bujumbura and Dar es Salaam. In 2007, for example, about 700 containers were being offloaded each day at the port in Dar es Salaam, but maximum capacity of Tanzania International Terminal Services to deliver containers out of the port was only 300. Inland container freight stations have similar problems.

[9] See World Bank (2008), Non-Tariff Measures on Goods Trade in the East African Community: Synthesis Report. World Bank, Washington DC, September 29, 2008.

Transport Corridors for the East African Community

Railway Network of the East African Community

- Insufficient cargo vessel capacity at the Great Lakes. Age and disrepair of the merchant fleet on Lake Tanganyika and Lake Victoria is a serious problem. There is no shipyard on Lake Tanganyika that could maintain or renovate the existing fleet, but with current low levels of traffic on the Lake, a shipyard may not be viable.
- Inadequate facilities at the border posts. Problems at the border posts include: understaffing relative to the volumes of activities and cargo handled; limited parking space for cargo trucks at most posts; lack of truck scales so customs agents must estimate the loads; inadequate office facilities, including lack of computer equipment; and inadequate bonded warehouses.
- Poor power supply. A number of border posts have no electricity, and for others, the power supply is unreliable as there is a lack of fuel for generators. As a result, book keeping must be done manually.

Costs of Infrastructure Services are High

Not only is access to infrastructure services limited, but for Burundi (and many other African countries), the poor state of infrastructure leads to higher costs. Prices for network infrastructure services can be two to three times higher than in the rest of the developing world. Within the EAC, there are substantial differences in the cost of infrastructure-related services (Table 1.12).

Perhaps the most important issue for Burundi, and for the EAC, is electricity services - both access and reliability. Only one in 10 people in the EAC has access to electricity and in Burundi only one in 50 has access - almost all of whom reside in Bujumbura. Even among the small portion of the population with access to power, demand exceeds supply capacities and as a result, households and businesses experience regular blackouts. According to a recent World Bank business survey, the lack of electricity was cited by a large majority of businesses in Burundi, Tanzania and Uganda as the most serious constraint to business activity in these countries (Table 1.13). Unreliable services make the cost of doing business very high. Electrical outages average 12-14 days a month - in other

Table 1.12: Service Costs and Difficulties in East African Community

Indicator	Burundi	Kenya	Rwanda	Tanzania	Uganda	Sub-Sahara Africa
Supply problems						
Water failure for firms receiving water (days per years)	12	85		105		
Electrical power outages per month (number)	12		14	12	11	
No. of days for electrical connection (days)	24	51	18	44	33	
Firms with access to private generator (%)	42	71	58	46	29	
Fuel prices (US$ per liter)						
Diesel fuel	1,22	0,98	1,08	0,99	1,01	0,98
Gasoline	1,20	1,12	1,11	1,04	1,17	1,03
Communications costs						
Price basket for internet ($ per month)	52,00	79,20	29,40	93,60	95,80	42,10
Fixed line local call for 3 minutes in peak hours ($)	0,07	0,11	0,08	0,16	0,28	0,14
Cellular local call for 3 minutes in peak hours ($)	0,58	0,64	0,79	0,69	0,67	0,77
International call to U.S. for 3 minutes in peak hours ($)	0,07	0,13	0,18	0,14	0,28	0,13

Source: World Bank (2008), Africa Development Indicators, 2008/09.

- Expensive cross-border communication. Counterpart revenue authorities located immediately across a border communicate on land lines charging international rates. Private telecommunication companies - such as Zion, MTN and Safaricom - are developing special arrangements for cross-border calls at local rates, but these do not cover Burundi.

Table 1.13: Major Constraints to Private Business and Investment
(Viewed by firms as a major constraint: % of firms surveyed)

Indicator	Burundi	Kenya	Rwanda	Tanzania	Uganda
Lack of electricity	72,3	..	55,0	88,4	84,2
Availability of finance	50,9	..	36,0	40,6	47,8
Court system	40,7	..	67,1	46,7	43,5
Tax rates	36,1	..	44,7	36,7	62,7
Transportation	21,1	..	27,4	14,1	22,2
Customs and trade regulations	20,9	..	13,5	11,6	9,8
Corruption	19,7	..	4,4	19,7	23,6
Crime, theft & disorder	19,7	..	4,1	16,4	13,4
Labor skills	11,8	..	11,7	19,7	10,2
Labor regulations	3,9	..	2,8	4,8	1,3

Source: World Bank (2008), Africa Development Indicators, 2008/09.

words, firms experience power outages 40-45 percent of the time in a typical year. As a result, a large percentage of firms in Burundi, Kenya, Rwanda and Tanzania have their own back-up generator, or share access to one. The Burundi business community faces the highest fuel charges in the EAC. In the case of power, for example, back-up generators cost US$0.40 to US$0.50 per kWh to run, cutting into business profits and reducing the ability of local business to compete in regional and international markets. These charges are 20 percent higher than the average for all Sub-Sahara countries - another reason that can discourage business from coming to Burundi, and result in location of production bases elsewhere in Africa.

About 20 percent of respondents cited transportation as a major concern for their business. Concerns about the high cost of transport may stem from poor road conditions and the resulting high operating costs of vehicles; but even when road conditions are adequate, long delays at border crossings and in clearing customs can add significantly to the cost of transportation (Table 1.10). Communications costs in Burundi, on the other hand, are lower than in the other member countries of the EAC because of the Government's pricing policy for these services. International calls to the U.S., for example are half the rates that apply in the other countries. However, as Table 1.11 indicates, access to communications services in Burundi is the lowest among EAC members and one of the lowest in Africa.

Key policy issues and implications for infrastructure

The design of the proposed Infrastructure Action Plan for Burundi is also shaped by three specific aspects of macroeconomic policy: (i) the implications of continued rapid population growth; (ii) the need to create jobs for a labor force that is expanding rapidly; and (iii) the need to improve the climate for private investment to ensure an adequate supply response in the economy and to attract the international investment needed to implement key components of the Infrastructure Action Plan.

Continued Rapid Population Growth and Urbanization

Burundi faces the prospect of sustained rapid growth in population for another decade or more. Continued rapid population growth has important implications for the future levels of urbanization, for labor force growth and employment, and for the future infrastructure requirements of the country in both rural and urban areas. The major challenge is to accelerate economic growth, create employment and respond to pressures for education, health, housing and infrastructure services in urban centers throughout the country.

Table 1.14: Estimated Population Increase Since 1990 and Preliminary Census Results for 2008

	Population (millions)			Growth rate (% p.a.)	
	1990	2000	2008	1990-00	2000-08
Total population					
Female	2,91	3,33	4,11	1,36	2,67
Males	2,77	3,14	3,93	1,27	2,85
Total	5,68	6,47	8,04	1,31	2,75
Memo items:					
Total area ('000 sq. km.)	27,83	27,83	27,83		
Population density	204	233	289		
Female % of total	51,2	51,5	51,2		

Source: For 1990-2000, United Nations, World Population Prospects: The 2008 Revision; and for 2008, UNFPA, Bujumbura, Burundi.

The preliminary results from the October 2008 census put the population at 8.04 million at the time of the census (Table 1.14). The census results suggest a population growth rate of about 2.75 percent a year during 2000-08, compared with growth of 1.3 percent a year during the 1990s. Detailed population projections have been prepared for this Report (Table 1.15). These put the total population at about 14 million by 2030, which compares with the 'Medium Variant' of 11.9 million published by the United Nations. The basis for these projections is discussed in Annex II. A key issue that shapes the outlook for population growth is the current and future total fertility of women of child bearing age in Burundi. The UN projections assumed that total fertility had already declined to 4.7 by 2005. Independent surveys indicate that total fertility in Burundi remains high and in the range of 6.5. The continued high total fertility rate suggests that there will be only a slow decline in total fertility, which, in turn, suggests a gradual decline in the population growth rate.

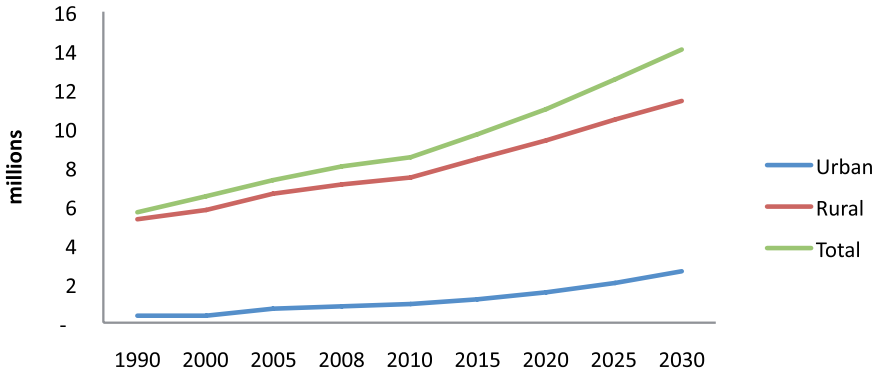
The urban population of Burundi is currently estimated at about 850,000 - equivalent to an urbanization rate of 10.6 percent (Table 1.16). Urban population growth is currently estimated to be in the range of six percent a year, which suggests that about 30,000 people are migrating from rural to urban areas each year. For the purposes of this Report, the rate of increase in the urban population is projected to decline to about five percent a year in the decade ahead. The implication is that by 2030 the urban population would be about 2.63 million people - three times the current level. At that time, the urban population would account for about 19 percent of total population - still well below the average of 30 percent for all low income developing countries.

Table 1.15: Population Growth in Burundi (millions)

	1990	2000	2005	2008	2010	2015	2020	2025	2030
Total population									
Female	2,9	3,3	3,8	4,1	4,3	4,9	5,6	6,3	7,1
Male	2,8	3,1	3,6	3,9	4,2	4,8	5,4	6,2	6,9
Total	5,7	6,5	7,4	8,0	8,5	9,7	11,0	12,5	14,1
Female population % of total	51,2	51,5	51,2	51,2	51,1	50,8	50,8	50,7	50,7
Population growth (% p.a.)	3,0	1,3	2,6	2,8	2,8	2,7	2,6	2,5	2,4
Population density (persons per sq. km.)	204	233	265	289	305	349	396	448	505

Source: Annex Table II.4.

Graph 1.15: Population Growth and urbanisation



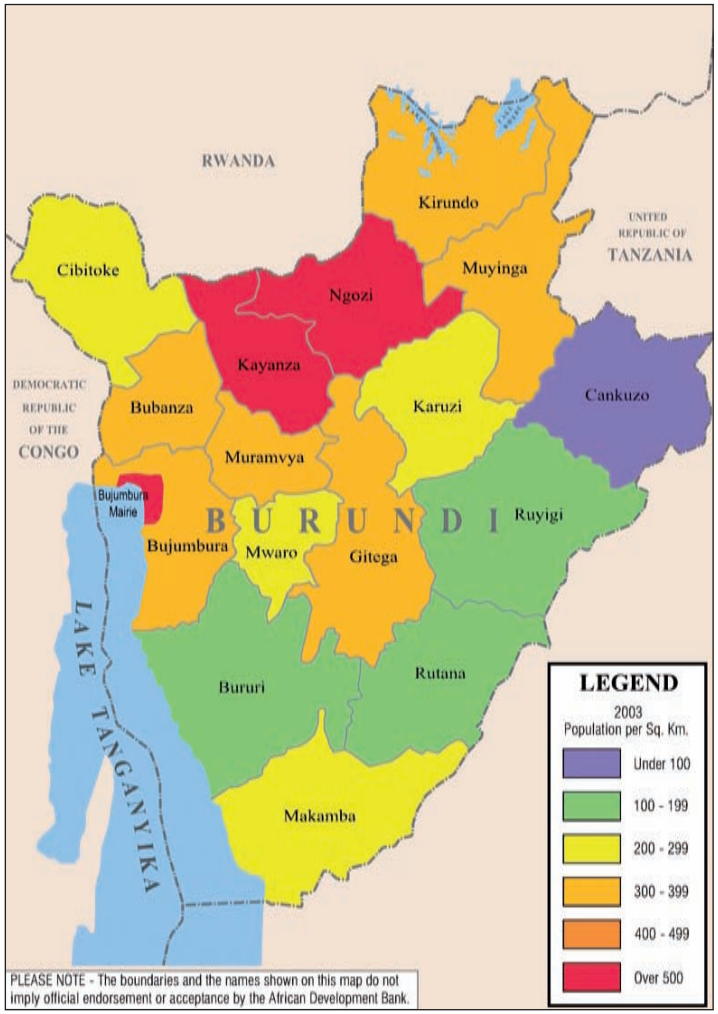
Source: Annex Table II.4

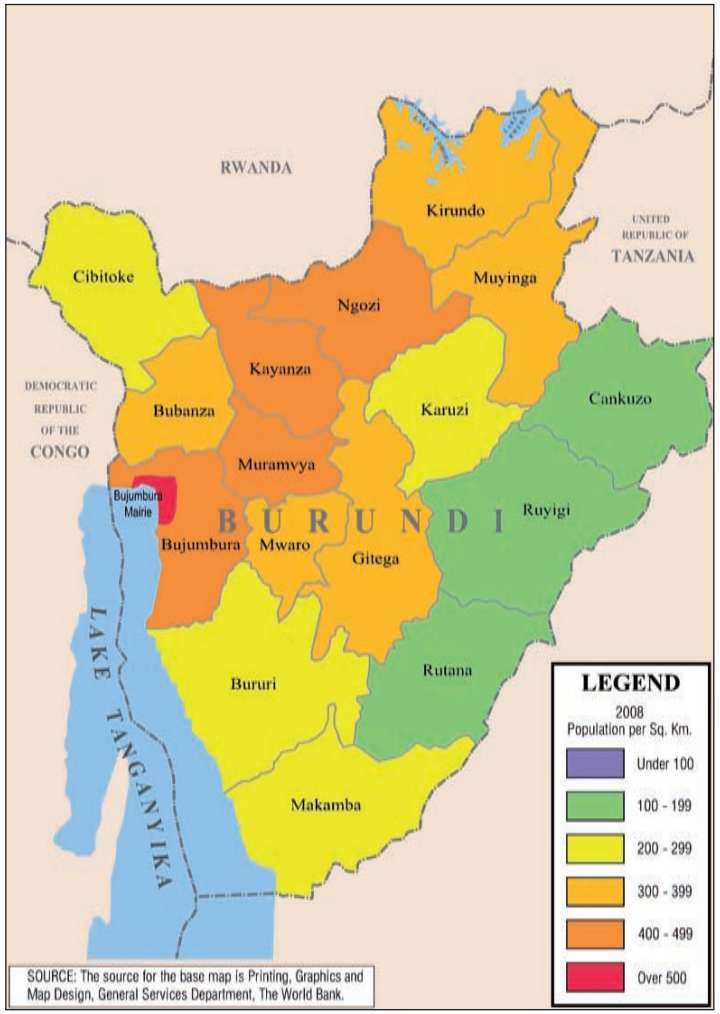
Table 1.16: The Impact of Urbanization

	1990	2000	2005	2008	2010	2015	2020	2025	2030
Population distribution (mill)									
Urban	0,36	0,56	0,71	0,84	0,96	1,26	1,62	2,07	2,65
Rural	5,32	5,91	6,67	7,19	7,54	8,44	9,41	10,41	11,41
Total	5,68	6,47	7,38	8,04	8,49	9,70	11,03	12,48	14,05
Urbanization rate (%)	6,3	8,7	9,6	10,5	11,2	13,0	14,7	16,6	18,8
Population growth (% p.a.)									
Urban		4,6	4,9	6,6	6,5	5,5	5,0	5,0	5,0
Rural		1,1	2,4	2,7	2,3	2,3	2,2	2,0	1,8
Population per sq. km.	204	233	265	289	305	349	396	448	505
Number of households ('000)									
Urban			131	156	177	233	301	384	490
Rural			1 361	1 468	1 538	1 723	1 920	2 124	2 328
Total			1 492	1 624	1 715	1 957	2 221	2 508	2 818
Household size (persons)									
Urban			5,4	5,4	5,4	5,4	5,4	5,4	5,4
Rural			4,9	4,9	4,9	4,9	4,9	4,9	4,9
Average			4,9	4,9	5,0	5,0	5,0	5,0	5,0

Source: Annex Table II.4.

Provincial Population Densities in 2003 and 2008





However, the prospect of continued urban growth of six percent a year cannot be ruled out, given the increasingly high population densities the 2008 census revealed in many of the provinces. In this latter scenario, the urban population would be about 3.1 million by 2030. By 2030, the average population density is projected to be about 500 persons per square km. (Table 1.16) - almost double that of 2005. The Map below provides a comparison of provincial population densities in 2003 and 2008.The mostly densely populated provinces - Bujumbura, Nzogi, Kayanza and Muramvya - already have population densities of 400-500 people per square km. Some 2.1 million people, or 26 percent of the total population, lived in these four provinces at the time of the Census in 2008. Dealing with such a large increase in the urban population will pose major challenges for the Government for delivery of health and education services, as well as providing for housing and basic infrastructure (water, electricity, transport and communications) for the main cities. Currently, there are no serious assessments of these future requirements or their likely costs. A detailed assessment of strategies and options for urban development should therefore be considered as part of the follow-up to this Report. Chapter 3 explores the implications for provision of road and power infrastructure services for these urban areas. In the case of electricity, for example, about 32,000 households in urban areas currently have access to electricity (equivalent to 21 percent of all urban households). The Government's target for electrification in 2020 is 25 percent of the population. The proposed program set out in Chapter 5 calls for an electrification rate of 85 percent of urban households by 2020. An additional 225,000 households would therefore be connected to a much larger urban distribution network in the decade ahead.[10]

The prospect of continued rapid increases in the urban population also raises important questions about policies and plans related to the spatial dimensions of urbanization in Burundi. At present, Bujumbura's population is estimated at about 580,000 to 600,000 - equivalent to about 70 percent of the urban population of the country.[11] If provision of basic services in Bujumbura continues to outstrip those of other urban centers, it is possible that the bulk of the future urban population will be found in Bujumbura, and perhaps to a less extent, Gitega. If Bujumbura continued to account for 70 percent of urban population, it would be a city of close to two million people by 2030.

Again, more detailed assessments of options are needed, but it does appear that there is a case for ensuring that basic services are developed in as many as five of the leading urban centers over the next two decades, thereby dispersing urban populations around the country and laying the foundations for more than one or two centers of urban/commercial driven growth. This would likely include Gitega, Muyinga, Bururi and other emerging urban centers. In that connection, for example, is there a case for early demarcation of land in and around the main urban centers that can be set aside for future housing expansion and as industrial parks or zones and that are supplied with reliable services such as power, water and communications? This is a common model in many LDCs. It may have a role in Burundi as one of the ways in which private sector development and job creation can be promoted.

The Need for Job Creation

The ongoing rapid population growth translates into continued pressures in the labor market. The labor force, which is currently estimated at about 4.3 million people in the 15-64 age group, appears to be growing by more than four percent a year (Table 1.17). Based on the foregoing projections, the labor force would increase by about 2.8 million over the next two decades,

[10] Although it is beyond the scope of this Report, it is clear that there is need for a comparable assessment of the manner in which the urban population would be provided with water and sewerage services. At a capital cost of say $500 per household for water and sewerage connections (at 2007 constant prices), providing adequate services for an additional two million urban dwellers would cost about $250 million.

[11] There are a number of informal estimates of the Bujumbura population. This Report uses the results of the recent JICA (2007) transport study, which undertook a detailed survey and put the population of the city at 547,700 in 2007.

Table 1.17: Growth in Burundi Labor Force

	1990	1995	2000	2005	2010	2015	2020	2025	2030
Population aged 15-64 years									
Male	1,43	1,52	1,60	2,01	2,46	2,82	3,13	3,49	3,97
Female	1,50	1,60	1,70	2,11	2,57	2,91	3,23	3,59	4,09
Total	2,93	3,12	3,30	4,12	5,03	5,73	6,36	7,08	8,06
Labor force (mill)									
Male	1,30	1,40	1,49	1,87	2,30	2,62	2,93	3,25	3,61
Female	1,38	1,48	1,58	1,95	2,33	2,61	2,92	3,24	3,60
Total	2,67	2,88	3,07	3,82	4,63	5,24	5,84	6,50	7,21
Distribution of labor force (mill)									
Urban	0,17	0,23	0,29	0,38	0,50	0,67	0,86	1,09	1,40
Rural	2,50	2,65	2,78	3,44	4,13	4,57	4,99	5,40	5,81
Total	2,67	2,88	3,07	3,82	4,63	5,24	5,84	6,50	7,21
Labor force growth rate (% p.a.)									
Urban			5,5	5,4	6,2	5,5	5,0	5,0	5,0
Rural			1,0	4,6	2,9	1,9	1,7	1,5	1,4
Total			1,4	4,6	3,2	2,3	2,2	2,1	2,1
Participation rates (%)									
Males	90,7	91,9	93,0	93,6	93,5	92,9	93,5	93,3	91,0
Females	91,8	92,5	93,2	93,1	90,8	89,9	90,4	90,2	88,0

Source: Annex Table III.1.

although rising levels of enrolment in high schools and tertiary education institutions could reduce the increase to some extent. These numbers underscore the importance of policies and investments that can accelerate economic growth and job creation. There are currently about 170,000 new entrants into the labor force each year, many of whom have only minimal levels of education. Moreover, there is high unemployment and underemployment among the many young people already in the labor force.

A policy issue of particular importance is the extent to which the urban labor force increases as a result of the rapid urbanization discussed earlier. The urban labor force is currently estimated at about 500,000 (Table 1.17). It is projected to grow to about 1.4 million by 2030 at an average annual rate of about 5.5 percent a year, while the rural labor force would grow at about 2.3 percent a year. If labor productivity (and real income) in urban areas is to rise moderately in this period (say at 2.5 percent a year in real terms), the projections suggest that the urban economy of Burundi would have to grow by about eight percent a year in real terms. The resulting growth in business demand for power, water, transport, communications, financial and other services would be in the range of 10 percent a year. In the case of electricity, for example, sales to the business community are currently about 52 GWh. Growth in business demand for power of 10 percent a year would imply sales of about 320 GWh by 2030 and as Chapter 5 below indicates, a large increase in generation capacity.

Improving the Investment Climate

The final point about the setting within which an accelerated program of infrastructure

Table 1.18: Trends in Fixed Capital Investment in Burundi
(Average for each decade and for 1970-2007)

Indicator	1970-79	1980-89	1990-99	2000-08	1970-08
Fixed investment as % GDP	8,6	16,1	11,5	14,4	14,2
Average ICOR					
At current prices	0,8	2,2	1,7	1,4	1,5
At 2007 constant prices	2,9	5,9	0,9	6,1	3,0

Source: Annex Table I.5 and Annex Table I.6.

development must be considered concerns the policy environment for investment. To achieve strong economic growth Burundi needs to raise the level and effectiveness of both public and private investment. As Chapter 2 indicates, the further development of Burundi's agricultural and mineral resources, and investment in emerging new activities related to the proposed major expansion in infrastructure services, will require substantial amounts of investment by the public and private sectors.For much of the past three decades, the level of investment in Burundi has be low in comparison with many other low income developing countries. The relatively low level of investment is one of the main reasons for the weak economic growth performance during 1970-2007. For 1970-2007, the average level of fixed investment was equivalent to 14.2 percent of GDP (Table 1.18), which compares with 21 percent for all Sub-Saharan countries over the same period.

Nonetheless, serious capacity constraints remain. These can limit the returns on public investment and those of private investors. In the case of the power sector, household and business demand for power is well in excess of the capacity of the system to supply power. As a result, load-shedding is extensive and economic growth that can be stimulated by, for example, improved road infrastructure and transport services, can be undermined by power shortages. These types of inefficiencies are captured by incremental capital-output ratios (ICORs). ICORs in the range of 3 to 4 are typically associated with sustained strong economic growth. Table 1.18 reports the ICORs for Burundi when calculated at current prices and at 2007 constant prices. The former are unusually low, perhaps because of long periods of low investment and the dominant position of subsistence farm output where variations in output are determined mainly by climatic conditions from year to year and population growth. ICORs are higher when calculated at constant prices, largely because of differences in the national income account deflators for investment and GDP. For 1970-2007 as a whole, the average ICOR is 3.[12]

Table 1.19: Trends in Fixed Capital Formation in Burundi
(In US$ millions)

Indicator	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Fixed investment											
Public	157,2	88,8	47,8	40,1	50,5	50,2	72,5	151,7	209,8	143,3	153,0
Private											
FDI										0,4	0,5
Domestic	31,0	5,0	5,7	16,6	9,4	13,7	15,6	13,6	28,8	44,2	48,0
Sub-total	31,0	5,0	5,7	16,6	9,4	13,7	15,6	13,6	28,8	44,6	48,5
Total	188,2	93,8	53,5	56,7	59,9	63,9	88,1	165,2	238,6	187,8	201,5
Fixed investment (% of GDP)											
Public	13,7	8,9	6,7	6,1	8,0	8,4	10,7	19,0	21,9	14,6	13,2
Private	2,7	0,5	0,8	2,5	1,5	2,3	2,3	1,7	3,0	4,6	4,2
Total	16,4	9,4	7,5	8,6	9,5	10,7	13,0	20,7	24,9	19,2	17,3
Memo items:											
Exchange rate (Bf=US$1.00)	171	250	721	830	931	1 083	1 101	1 082	1 029	1 082	1 186
GDP	1 148	1 000	709	662	628	595	680	797	959	980	1 163
Investment-related imports											
Capital goods			36,3	35,3	31,6	38,6	57,8	91,9	155,1	109,0	113,6
Construction materials			10,7	12,9	14,2	14,3	17,3	48,6	38,2	50,7	43,2
Total			47,0	48,2	45,8	52,9	75,0	140,4	193,3	159,7	156,8
Total as % of fixed investment			87,8	85,0	76,5	82,8	85,2	85,0	81,0	85,0	77,8

Source: Annex Table I.5. Note: Estimates for private investment for 1990-2005 are from World Bank sources; for 2006-2008, estimates are those of authors.

[12] This estimate is quite a bit lower than that reported in a recent IMF paper for the same period. The IMF study reported an average ICOR of 5.2 for the period 1970-2007. It argued that this high ICOR was evidence of widespread inefficiencies that came from State intervention in the economy, notably in the coffee sector. Olivier Basdevant, How Can Burundi Raise Its Growth Rate? The Impact of Civil Conflict and State Intervention on Burundi's Growth Performance. IMF Working Paper, WP/09/11, January 2009

The dominant role of public investment. As noted earlier, after almost two decades of low levels of investment, there has been a significant recovery in the past four years (Table 1.19). The main driver has been sharply higher levels of public investment since the donor community began the rehabilitation of Burundi's infrastructure and related services in 2004-2005. Public investment has gone from an average of about $50 million a year in the early part of this decade to an average of about $160 million a year in the past three years - equivalent to about 16 percent of GDP.

The recent step-up in public investment has been an important development for Burundi. However, as the discussion in Chapters 3 and 4 indicates, the proposed Action Plan for Infrastructure will require substantially larger amounts of public investment than has been mobilized thus far. Concerns have been expressed by some donors about the effectiveness of the public investment undertaken in various African countries. These concerns, some of which may be applicable to Burundi, include poor planning and project selection, tardy project preparation, inadequate procurement and budget provisions, especially for maintenance. In Burundi and elsewhere, lack of maintenance has been a serious problem, resulting in the need for substantial programs of rehabilitation. The sectoral programs give close attention to building capacities of the relevant ministries to plan, design and implement the proposed program and to maintain the assets created, as well as building the financial capacities of the state bodies responsible for service provision, such as the power utility, REGIDESO.

The level of private investment is low. What private investment does occur comes from domestic investors. There has not been any significant inflow of foreign direct investment (FDI) into Burundi in recent years. It is only in the past few years that the level of private investment has begun to rise. The level of private investment is estimated to be equivalent to about five percent of GDP, compared with as little as two percent at the beginning of the decade. These levels are small in comparison with economies that have been successful in creating the conditions for sustained strong economic growth in the range of 6-8 percent a year.

A strong supply response to the proposed Infrastructure Action Plan will require private investment and improved economic efficiency. These, in turn, will require a business friendly environment and solid institutions. However, the business environment in Burundi is something of an obstacle for private investment. As noted earlier, the lack of electricity was cited by a large majority of firms in Burundi as the most serious constraint to business activity. Other major concerns of the business communities included the availability of finance, the court system and tax rates. Transportation, customs and trade regulations were referred to by about 20 percent of those surveyed.

Table 1.20: Doing Business in Burundi, 2007 and 2008

Ease of …	2008 rank	2007 rank	Change in rank
Doing business	174	175	1
Starting a business	124	114	-10
Dealing with licenses	171	171	0
Registering a property	122	133	11
Getting credit	170	170	0
Protecting investors	147	147	0
Paying taxes	109	108	-1
Trading across borders	167	164	-3
Enforcing contracts	148	147	-1
Closing a business	178	178	0

Source: World Bank (2009), Doing Business 2008.

Table 1.21: Business Environment in the East African Community

Indicator	Burundi	Kenya	Rwanda	Tanzania	Uganda	Sub-Sahara Africa
Starting a business						
No. of procedures to register	11	8	9	12	18	11
Time spent on registration (days)	43	73	16	29	28	56
Registering property						
No. of procedures	5	8	5	9	13	7
Time required (days)	94	64	371	73	227	103
Cost (% of property value)	11,5	4,2	9,4	4,4	4,6	11,3
Enforcing contracts						
No. of procedures	44	44	24	38	38	39
Time required (days)	558	465	310	462	535	673
Construction permits						
No. of procedures	20	10	16	21	16	18
Time (days)	384	100	227	308	143	261

Source: World Bank (2008), Africa Development Indicators, 2008/09.

According to a recent World Bank (2009) report, Burundi is still among the least business-friendly countries in the world, although there was a slight improvement in 2008 over 2007 (Table 1.20). Burundi was ranked at 174 for the overall ease of doing business. Areas where Burundi compares most unfavorably with other countries include dealing with licenses, getting access to credit, trading across borders, and closing a business. Areas where Burundi has made progress in improving the business environment include registering a property and paying taxes. Burundi compares well with other members of the EAC in some areas: for example, registering a property involves fewer procedures and a shorter time than several other member states, but it is more expensive than in other states (Table 1.21). In other areas, Burundi compares unfavorably.

In the particular case of construction permits, Burundi has a large number of procedures and the issue of a permit takes more time than any other EAC member country. Given the prospect of a substantially larger public investment program in civil works, actions by the government to improve the environment for local business in construction activities will be a particularly important step towards promotion of the domestic construction industry.

The expectation is that public-private partnerships (PPPs) will play an important role in the civil aviation and rail sectors, and perhaps in power generation. It may take time to build the legal and regulatory environment for such private investment, in which case, project agreements will need to form the basis for major new private investments in infrastructure. A careful review of the existing laws and regulations governing domestic investment and foreign direct investment is beyond the scope of this study. But such a review is a matter of priority in the event that the current laws and regulations do not make adequate provision for public-private partnership arrangements and related project agreements for individual investments.

Chapter 2 – Emerging Sources of Growth for Burundi

Creating Conditions for Sustained Strong Growth

The Government's objective for the short- to medium-term is to manage a successful transition to an extended period of economic growth of 6-7 percent a year in real terms. At this level of growth, the country would have an opportunity to reduce the high incidence of poverty that is pervasive, and with the resulting stronger growth in incomes, increase substantially domestic demand for a wide range of goods and services.

A fundamental aspect of the design of the Action Program outlined in Chapter 3 is the assumption that the increased infrastructure spending under the Plan will generate multiplier effects within the economy that boost output and employment. A successful transition in the growth strategy centers on the development of policies and strategies that build demand and reduce the current impediments to the increased private investment needed for a strong domestic supply response. To ensure that the program does not simply lead to increased imports or, in an inflationary way, press on internal supply bottlenecks, the Government and donor community have important roles to play in taking complementary actions that will facilitate output responses in the economy. The strategy must be built around an aggressive program that responds to three key elements of demand for goods and services in Burundi: (i) export demand for processed agricultural products and mineral ores; (ii) domestic consumer demand for a wide range of products; and (iii) demand for goods and services associated with increased domestic investment activities.

Early implementation of policies and programs that improve competitiveness in export and domestic markets is important for other reasons as well. Burundi is now a member of the EAC and is committed to further reduction and elimination of a wide range of intra-EAC import tariffs. There is little doubt that Burundi producers will face stiff competition from exporters in the large neighboring EAC member countries. This is likely to be especially the case for a range of agricultural products. A key factor that will determine the competitiveness of Burundi's agricultural products and manufactures vis-à-vis competitors in other EAC member states will be the costs of basic inputs such as electricity and water, the availability and cost of raw materials and supplies, transport costs for imported inputs such as fertilizer, and the costs of communications and business finance. The proposed Infrastructure Action Plan for Burundi is designed to improve the reliability of electricity supplies and lower the cost, improve access to low-cost international communications networks and lower transport costs. Building the competitiveness of Burundi business will also require action on a wide range of other impediments identified in Chapter 1 of this Report, including for example, ease of access to working capital loans from the banking system, access to trade financing for import of inputs, and microfinance.

Prospects for the Mining Industry

The resource base

A key element of the strategy for accelerating development in Burundi that is outlined in this Report is the development of the country's mineral resources, in particular the extensive deposits of nickel. Burundi has significant exploitable mineral resources, but for years the civil war held up their development. The industry is dominated by some 50,000 artisanal producers. There is no large scale production facilities and the industry performs well below its potential A number of international companies have expressed interest in commercial exploration of these resources. The Government has recently undertaken to reform the legal framework for the sector to make these investment opportunities more attractive to major producers. The proposed Action Plan for Infrastructure outlined in this Report would address two of the key concerns associated with the further development of the mining industry - access to reliable supplies of low cost power, and suitable arrangements for the transport of mining supplies into the country and export of mineral products to international markets.

Table 2.1: Estimated Reserves of Metallic and Non-metallic Minerals

Mineral	Main sites		Ore concentration (%)	Status
	Location	Reserves (mill MT)		
Metallic minerals				
Nickel	Musongati Waga Nyabikere Muremura	180 46 35 23	1,62 1,45 1,38 2,64	Recent litigation regarding Musongati has been resolved. Several companies are actively investigating the prospects for developing the site. There is a prospecting agreement with another company for the other sites.
Vanadium		11		There is a prospecting agreement in place with a private company
Gold				Prospect agreements under execution by two private companies. There is also active extraction by small enterprises
Cassiterite				Active extraction by small enterprises
Non-metallic minerals				
Phosphate		0,3		Small reserves, limited commercial opportunites
Kaolinite	Ngozi	16,32		Potential for a substantial ceramics industry
Feldspar	Kayanza	0,73		
Carbonated rock		2,00		Potential for cement production. Further study required.

There is an extensive literature on the exploration and possible development of the metallic and non-metallic mineral resources of Burundi.[13] The main deposits are nickel, cassiterite and columbo-tantalite (coltan), with small amounts of copper, cobalt, phosphates, vanadium and gold. There are also deposits of several non-metallic minerals, including kaolinite and feldspar. Prospecting agreements are in place for vanadium, gold and some of the sites with deposits of nickel ore. Hydro-carbon research operations were conducted in the 1970s and 1980s in Lake Tanganyika and in the Rusizi Plain; hydro-carbon indicators were detected in the depths of the basin. Promotion activities are ongoing to attract companies to pursue exploration in Lake Tanganyika. There is active exploitation of gold, coltan and cassiterite by small enterprises at the present time.[14]

Since colonial times, gold has been exploited on a small-scale basis from alluvial deposits found in riverbeds. Currently, a few small-scale companies exploit gold legally; however, a majority works outside the legal framework of Law 1/015 of 2000, the most recent law dealing with artisanal mining, and related trading and exportation. Gold production represents a significant, but informal, contribution to the Burundi economy. It is clearly an important source of export income. However, these data require qualification. It is not clear whether all the gold being exported by Burundi, formally or informally, is actually produced within the country. There is the possibility that some of the exports are smuggled into the country, especially from Kivu, a gold producing area in the DRC that is on the Burundi border.

Table 2.2 reports on the available data for gold production and exports for recent years. According to the USGS data, production has ranged from two and four metric tons of gold, the value of which has ranged from about $30 to $80 million. These USGS data are broadly consistent with that reported for export. Moreover, the implied unit price of these exports is quite consistent with recent trends in the international price of gold.

[13] See Midende, Gilbert (2009), Etude sur le Developpement Minier du Burundi. African Development Bank Group. Terms of Reference, February 2009, for a comprehensive list of these studies and reports.

[14] Cassiterite is a tin oxide mineral. It is also used as a gemstone when quality crystals can be found.

Table 2.2: Burundi Gold Production and Export Values

	2001	2002	2003	2004	2005	2006	2007	2008
Production data								
Reported by USGS (kg)	500	483	2 855	3 229	3 905	3 900	2 500	
Export data from COMTRADE								
Quantity (kg)	706	365	2 855	3 284	3 883	4 568	2 500	2 166
Value (US$ '000)	6 292	3 327	33 279	43 178	54 611	85 549	53 076	60 998
Average export price (US$ per oz)	253	258	330	373	399	531	602	798
Memo item:								
Quantity (oz)	24 903	12 875	100 707	115 840	136 969	161 132	88 185	76 403

Source: Production data reported by US Geological Survey; trade data from COMTRADE database
Note: The trade quantity for 2007 (6,632 kg) appears to be inconsistent with the value cited for exports. The USGS production data is therefore used as a proxy for the export quantity.

Despite uncertainty about current levels of production and export, there is little doubt that gold mining has a potentially important role to play in the Burundi economy. The Government has therefore been actively promoting the country's potential as a producer of gold and several research and exploration permits have been issued in recent years. As with the nickel project outlined below, it would appear that there is a strong case for more systematic development of small-scale gold mining, perhaps in combination with a larger industrial mining operation. Further work is needed on these possibilities.

Launch of a Nickel Mining Project

National nickel reserves are estimated at about 285 million tons (Table 2.1). The most important nickel reserves are at Musongati, which has estimated reserves of 180 million tons of laterite deposits putting it among the ten largest known deposits worldwide that have not yet been developed. The Musongati field is part of the “nickel belt” that extends from south-central Burundi to north-west Tanzania. The belt contains substantial quantities of both sulphide and laterite deposits.

The Musongati, Waga and Nyabikere fields in Burundi are all lateritic. Muremura is the most important sulphide deposit. Development of these nickel deposits is an important objective of the Government. Over the past 30 years there have been many investigations and proposals for the development of these sites. Prospecting agreements are in place for some of the sites. In the case of Musongati, litigation with a mining company had delayed progress in moving forward with the development of this field. The ligation has been brought to a close and several international companies are actively involved in discussions with the Government about the development of the site. As the discussion in Chapters 3 and 4 indicates, in conjunction with the accelerated development of infrastructure services, this Report includes a Scenario in which the Musongati ore field is developed and brought into production by 2017. Two possible options have been proposed at one time or another for the actual mining operation: one is the export of nickel ore; the other is the export of metal from a refinery at the mine site (Table 2.3).

The first option would involve the transport of some four million tons of ore a year from the mine site to the Port of Dar es Salaam for shipment overseas to a refinery. These large volumes would require access to the rail transport network of Tanzania. This scenario would therefore depend on completion of one of the current options for the proposed public rail extension from Tanzania into

Table 2.3: Mining and Associated Transport Options

Mining option	Rail from Musongati to Dar es Salaam		Road from Musongati to Kigoma & rail to seaport
	via Keza	via Uvinza	
Export ore	Yes	Yes	No
Export refined metal	Unclear	Unclear	Yes

Burundi, and construction of rail spurs to the mine sites. Two possible options for extension of the railway have been proposed. These are discussed in some detail in Chapter 6. One is a line from Isaka in Tanzania to Kigali with an offshoot from Keza to Gitega and on to Musongati. The other option is a rail extension from Uvinza near Kigoma direct to Bujumbura, with an extension from Gihofi to Musongati. The funding needed for Burundi's share of these rail extensions is substantial and it remains to be seen whether the $1.3 billion (at 2007 constant prices) can be mobilized for Burundi within the international private investment community. The other scenario is to refine the ore at the mine site and transport refined metal to the coast for shipment abroad. If the ore is refined at the mine site, the quantities of metal to be shipped are estimated at about 50,000 tons a year. In this scenario, transport of the metal by road to the railhead at Kigoma is seen by industry analysts as the preferred option. Analysis in Chapters 4 and 6 suggests that if the rail extension does not carry the large volumes of ore, the economic feasibility of extensions from Keza or Uvinza is in question. The reason is that the volumes of regular commercial freight that may be carried by rail to and from Burundi are not large enough over the next two decades to justify the investment.

The working assumption used in the Base Case Scenario for the Action Plan outlined in Chapters 3 and 4 in this Report is that nickel and cobalt will be refined at the mine site, and that the mining company ships the refined metal by road to the railhead at Kigoma.[15] Table 2.4 sets out the key parameters used in this Report for the mining operation. The mine would have a life of 45 years, with annual extraction of ore at about 4 million tons a year. This would yield about 50,000 tons of nickel metal and close to 4,000 tons of cobalt each year. Given the price assumptions included in Table 2.4, the gross value of the metals produced would be about $975 million a year at today's prices. It is assumed that the mining operation would begin in 2017, which means that development of the mine site and upgrade of the road to Kigoma would need to begin in about 2014.

The capital cost of mine development, not including power and transport requirements, is estimated at about $1.44 billion. This estimate includes provision for bulk storage near the mine site, along with the development of a town with schools and a hospital. The infrastructure requirements of the mining operation are substantial. The mine would require access to about 75 MW of installed generation capacity. As Chapter 5 indicates, this power would be supplied from the national grid. The power sector program calls for the development of a number of additional hydro sites in the country in the decade ahead. These sites would add sufficient capacity to meet the needs of the mine site. The proposal is the look to the private sector to develop these sites under PPP arrangements. It is possible that the mining company would take the lead under such an arrangement to develop one of the nearby sites, supply the power to the grid under a take-or-pay contract, and then buy power from the grid for the mine site requirements.

The transport and related infrastructure required to support the mining operation includes the

Table 2.4: Key Assumptions for Proposed Mining Operation

Indicator	Value
Reserves of nickel ore (MT mill)	180
Nickel content (%)	1,36
Cobalt content (%)	0,11
Life of mine (years)	45
Annual ore extraction (MT '000)	4040
Recovery rates for metals (%)	
Nickel	91
Cobalt	89
Production of refined metal (MT p.a.)	
Nickel	50000
Cobalt	3883
Mineral prices (US$ per MT)	
Nickel	16000
Cobalt	45000
Value of production (US$ mill)	
Nickel	800,0
Cobalt	174,7
Total	974,7

Source: Estimates of authors.

[15] The detailed feasibility study for the rail extension from Keza to Gitega that was undertaken by Mobility Networks Logistics assumed that the ore would be shipped from the mine. The study includes details about the underlying assumptions used for the mining operation. See Mobility Networks Logistics (2009).

complete rehabilitation of the rail line from Dar es Salaam to Kigoma, and purchase of additional locomotives and wagons to handle the increased freight generated by the mining operations. It would also require some upgrade of facilities at the Port of Dar es Salaam to handle the large volume of imported materials, and the exports of metal. The cost of these improvements in Tanzania is estimated at about $575 million. In addition, the 115 km road from the mining area to Kigoma would need to be upgraded. On the Burundi side the route taken would be RN 3 and RN 11. As Annex Table VIII.1 indicates, the proposed Action Plan for the roads sector already provides about $100 million for the rehabilitation and upgrade of RN 3 during 2010-2012, and about $130 million for the same type of work on RN 11 in 2013-2015. In the event that portions of the roads and bridges need to be further upgraded, the project costing for the mine-related infrastructure includes about $50 million for the additional work, should it be needed. The mine would ship out 50,000 tons of metal a year and ship in 600,000 of sulphur-based chemicals required for the refining operations. After allowing for the construction of a small airport near the mine, the total cost of the infrastructure related improvements is put at about $640 million (not including the rehabilitation of RN 3 and RN 11 that would go ahead regardless of whether the mine is developed).

The implications of these inward freight volumes for the design and upgrade of the road link to Kigoma, and for the locomotive and wagon capacities of the TRC, need further investigation. Moreover, a detailed environmental assessment will be required at an early stage in the process. The refining operation will produce several million tons of waste material each year that presumably has a significant chemical content as a result of the 600,000 of sulphur-based chemicals used by the refinery. The type of program required for the disposal of this waste in an environmentally sound manner requires further investigation to ensure that it does not present any health hazards for nearby populations.

Table 2.5: Annual Mine Income & Operating Expenses (US$ mill)

Item	Amount
Revenues	975
Operating costs	355
Net operating surplus	620
Income tax & royalties	186
Net income	434

Source: Annex Table VI.6.

The benefits that flow from the project would be substantial. As Table 2.5 indicates, gross revenues would be about $975 million a year, with a net operating surplus of about $620 million a year. Taxes and royalty payments to the Government will be the subject of negotiation with the mining company concerned. For the purposes of this Report these are assumed to be a little under $200 million a year. On this basis, the mining operation would have a net income of about $430 million a year. The IRR for the project is estimated at 23 percent - the implied return on equity invested in the operation is likely to be viewed as attractive by potential investors.

The development of mining operations in Burundi offers important new opportunities for the country. But realization of these opportunities will require close cooperation and coordination between Burundi and Tanzania regarding plans for upgrading the existing rail lines and the large increase in the volume of freight to be transported to and from the Port. These discussions would need to be coordinated with parallel discussions with international mining companies that have expressed interest in developing these nickel deposits.

For the purposes of this Report, mining operations are assumed to start in 2017. There are, of course, a number of uncertainties and potential risks associated with the development of the Musongati field. These are listed in Table 2.6. The process for recovery of laterite deposits is not fully proven in operating conditions and it may be more expensive than the development of sulphide deposits such as Muremura, since the technology for extraction of nickel from this type of deposit is proven. However, relatively large changes in the capital cost have only a modest impact on the economic attractiveness of the project. An increase in the total capital cost from $2.24 billion to $2.74 million (an increase of about 22 percent), lowers the IRR to 19 percent.

Table 2.6: Possible Risks and Uncertainties Associated with the Mining Operation

Risk or uncertainty	Alternative	Resulting IRR
Base case		23%
Capital costs may be higher	Higher capital costs will reduce the attractiveness of the project. Example: increase capital costs by 36%	19%
Change in volume of production	Increase production to 70,000 tons p.a. Reduce volume of production to 30,000 tons p.a.	25% 17%
Change in sale price for nickel	Increase sale price to $40,000 per ton Decrease sale price to $10,000 per ton	51% 13%
Timing of Tanzanian rail rehabilitation/upgrade	Lengthy delay in rehabilitation/upgrade of TRC postones start date for mining operation .	-
Change in cost of Tanzanian rail rehabilitation/upgrade	Capital cost increases to $1 billion	19%
Underinvestment in port capacities for mine products	Increase investment in port facilities from $3 million to $6 million	-
Road capacity not sufficient for mine freight	Increase investment in road capacity from $48 million to $60 million	-
Adverse environment impact of mine development and or operations	Increased investment in environmental protection and ot remedial actions	-

Source: Estimates of authors.

Analysis undertaken for this Report suggests that the rate of return on the project is particularly sensitive to changes in the price of nickel. A decline in price from $16,000 to $10,000 per ton lowers the IRR from 23 percent to 13 percent. In that price range, the project would very likely not be attractive to potential investors. The other concern is that the current outlook for the nickel market may not favor quick development of these deposits. With the recent downturn in the global economy, the recent price collapse has had a major impact on nickel supply and a number of projects around the world have been put on hold or cancelled. Output from the Musongati mine of some 50,000 tons would require gaining about three percent of the global market at the current level of world production of 1.46 million tons.

Investment Opportunities in Other Sectors

Agricultural Products for Export and Domestic Markets

The agriculture sector has an important role in providing the foundation for sustained strong economic growth. As the analysis in Chapter 1 indicated, the rural sector will continue to employ the vast majority of the population for many years to come. The challenge, therefore, is to promote rural and agricultural development so that rising incomes reduce the incidence of rural poverty and allow these rural communities to become an important source of domestic demand. Central to this strategy will be measures that support the development of increasingly large marketable food surpluses in agriculture that can be sold to the burgeoning urban population and to export markets. A wide range of policy reforms and investments are needed to boost food production and strengthen the competitiveness of export crops. The main outlines of the strategy required to accelerate development of rural areas in Burundi are described in some detail in a recent World Bank report.[16] The proposed action plan for infrastructure outlined in this Report draws heavily on these World Bank findings.

The central point about the design of strategies that aim to boost Burundi's agricultural output is that increases in production must come from intensified use of existing farm land. Given the high population densities in rural areas, most cultivable land is already in use. The World Bank study concluded that Burundi's agricultural sector has considerable potential for growth, but that this potential is not being realized. Farming systems are still predominantly subsistence-based and for the most part depend on the vagaries of the weather. Increased output from existing cultivated areas requires use of non-farm inputs such as improved planting materials, fertilizers, and where available, water for irrigation. Less than five percent of the area planted to food crops uses improved varieties. The country's considerable irrigation potential remains largely unexploited with less than 10 percent of the 50,000 hectares of irrigable land in use. Use of fertilizer is very limited because of its high cost. Transport and handling costs make up more than 50 percent of the final retail price of fertilizer in Burundi, which, according to the World Bank study, is unusually high by global standards.

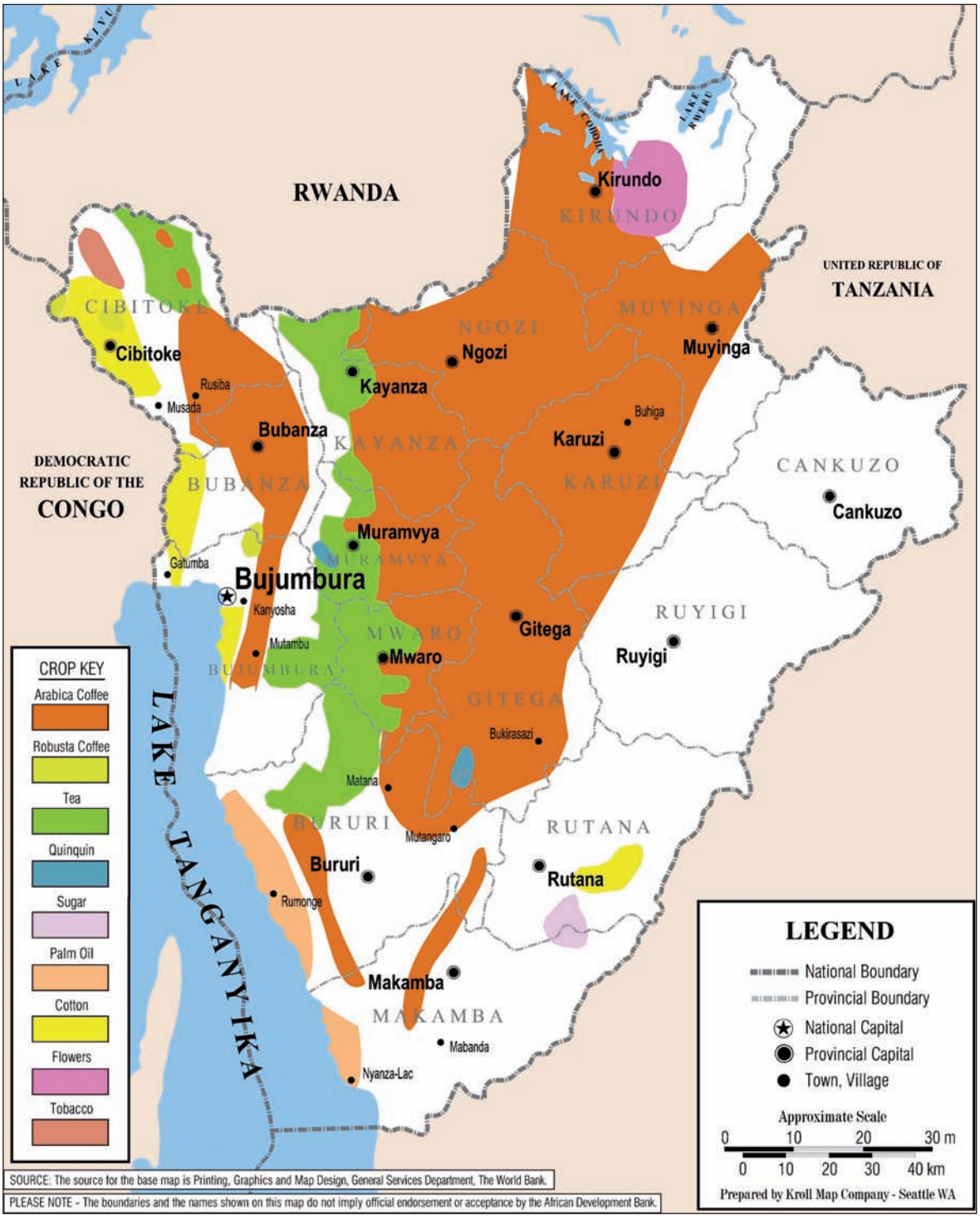
One of the important requirements for successful exploitation of these opportunities is a substantially improved level of infrastructure services. Although it is just one part of the development challenges associated with the revitalization of agriculture, the effects of infrastructure are among the most important. An immediate priority is to strengthen the rural road network to access supplies of agricultural inputs and markets for outputs. Transport costs represent, on average, 35 percent of import prices and 40 percent of export prices of agricultural products in Burundi. Better transport services will increase food crop competitiveness by improving their cost structure and ensuring quality and freshness. A related step is to increase value added in agriculture by developing more processing of food and other agricultural products; but this requires action on such things as the supply and cost of electricity and transport services. Yet another area for further action concerns improved access to communications services. According to the World Bank, incomes of agricultural producers can rise by about nine percent through the use of mobile telephones.[17] Chapter 7 outlines the ongoing program of the Government to build a communications backbone for the country and to improve access to services in rural areas.

Four types of agricultural production are generally seen as the foundation for stronger growth in rural output: coffee, tea and horticultural products for export markets; and for the domestic market, a wide range of food products. The location of the main commercial crops in Burundi is set out in the Map below. The map does not include areas throughout the entire country that are cropped by various food items produced under subsistence farming. Nor does it give the location of marketable surpluses of food that are currently produced.

[16] World Bank (2008), Breaking the Cycle: A Strategy for Conflict-Sensitive Rural Growth in Burundi. Washington DC, World Bank Working Paper No. 147, 2008.

[17] World Bank (2007), Regional Communications Infrastructure Program. Burundi Technical Annex. March 5, 2007.

Agricultural Crop Areas in Burundi



Coffee industry. Coffee is grown on over 70,000 hectares by small-scale producers. Production levels vary considerably from one season to the next because of weather conditions, smuggling to neighboring (ICO), in most years during 2001-2008, suggesting that Burundi coffee can sell at a premium in global markets. However, producer prices are among the lowest in the region. Export earnings have ranged from about $30 to $40 million a year in the past five years (Table 2.7). However, export volumes have declined to less than half of the peak level of export of 28,000 tons in 2003. The decline stems from a sharp decline in yields of coffee, due in part to the age of the coffee trees. A high priority is attached to improving the coffee industry's contribution to growth as a means of enhancing rural incomes and employment. As the World Bank report indicates, the strategy for increased coffee production should target not only commodity markets, but also niche markets. The country benefits from optimal agro-ecological conditions for the production of high quality coffee that is in high demand in fair trade and other niche markets.

Table 2.7: Trends in Agricultural Exports

Product category	2000	2001	2002	2003	2004	2005	2006	2007	2008
Export values (US$ '000)									
Coffee	31 400	21 147	17 374	25 336	32 342	43 587	40 838	35 289	33 006
Tea and mate	3 048	10 990	9 113	10 535	11 246	9 565	10 238	9 925	15 531
Fresh & processed food products	2 240	1 417	2 023	1 654	3 428	1 538	699	7 884	2 647
Other agricultural materials	3 127	1 102	807	1 256	1 792	3 651	4 263	7 558	6 278
Total	39 815	34 656	29 317	38 780	48 808	58 341	56 038	60 656	57 462
Volumes (MT)									
Coffee		18 663	16 956	27 814	20 911	21 412	18 556	18 210	11 093
Tea and mate		8 454	6 509	7 023	7 107	7 600	5 946	6 475	5 406
Unit prices (US$ per kg)									
Coffee		1,13	1,02	0,91	1,55	2,04	2,20	1,94	2,98
ICO weighted coffee price		1,01	1,05	1,14	1,37	1,97	2,11	2,37	2,74
Tea		1,30	1,40	1,50	1,58	1,26	1,72	1,53	2,87
Memo item:									
Agriculture share of exports[1] (%)	93,4	75,4	84,5	52,6	54,1	49,2	39,7	49,5	42,6

Source: Values & volumes for coffee and tea are from the Central Bank of Burundi. Other export values are from Annex Table IV.1.

Tea industry. Tea is produced in five regions by estates and smallholders. Most production, transformation, trade, marketing and regulatory aspects of the industry is handled by the parastatal Office du Thé du Burundi. During 2001-2006, tea production averaged about 7,500 tons a year, two-thirds of which was produced by smallholders and the remainder by state enterprises. The average earning for a Burundian tea grower in 2006 was about $46. According to the World Bank report, the industry faces numerous constraints, including inefficiencies of the tea factories and plantations, poor incentives for smallholders and estate laborers, limited use of fertilizer and other inputs and extension services, and little or no research. These constraints have led to a considerable decline in quality and price of Burundian tea, which trades on the Mombasa tea auction at a considerable discount. The World Bank report includes a range of recommendations for the revival of this important industry.

Horticultural products. The horticultural sector is small and has seen only very limited development. Exports of horticultural products reached a peak of 1,000 tons in 1993, but have since been in the range 100 tons a year. Exports include passion fruit, roses and other ornamental plants. According to the World Bank, the main obstacles to the development of the sector are: (i) lack of market intelligence about opportunities in regional and global markets, especially for high value products such as manioc leaves, apple-bananas, and okra

which are in demand in niche markets for organic and ethnic products; (ii) low awareness of international norms and standards related to quality, sanitary and phyto-sanitary requirements of these markets; and (iii) weak infrastructure, especially cold chains for perishable products and air transport. To export perishables to European and Middle East markets, timely delivery of product is an essential requirement. The only available option at present is use of passenger flights to transport these products. These services are ill-equipped for such trade as they do not have the required equipment for handling and storing perishables to preserve their freshness and appearance.

The World Bank report says that over the medium- and longer-run, Burundi has the potential to become a key supplier of horticultural products in high value-added, fair trade, organic and ethnic markets. A range of actions are required to realize this potential, including adoption of international sanitary and phyto-sanitary standards, rehabilitation of air services, including compliance with ICAO standards and practices to lay the foundations for use of air charter services. But to benefit from these opportunities, the use of air charters requires achievement of a certain critical volume of exports. Strategies for building the role of aviation services are discussed at greater length in Chapter 7.

Increased production for the domestic market. Food crop production for the domestic market has considerable potential, given the expected rapid increase in the urban population and resulting growth in demand for food of 3-6 percent a year in these urban areas. To meet this increased urban demand, there must be substantial development of the various supply chains that allow farm surpluses to reach urban markets in a timely manner and in good condition. Food crop producers in Burundi face a major challenge in dealing with the country's underdeveloped marketing system. Most food crops are characterized by low value-to-weight ratios, making it unprofitable to transport them over long distances, given the high cost of transport in Burundi. Producers must therefore sell their products in their local areas, some of which are far removed from major urban populations. These realities underscore the importance of improved roads and access to local markets. There may also be opportunities to expand raw material supplies. The cotton industry, which went into steep decline in the 1990s, began a slow recovery in 2003, with the export of cotton fibre resuming in 2005, albeit on a small-scale. Production is controlled by two parastatals, the Compagnie de Gérance du Coton (Cogerco) and Coton et Textiles du Burundi (Cotebu), although the latter is in effect insolvent. Without firm action on these supply chains, the risk is that the agriculture supply response will continue to be weak and as a result, continued strong urban demand will spill over into increased imports from within the region and elsewhere. The import of cereals and cereal products, for example, now runs at about $30 million a year, compared with less than $20 million a year earlier this decade (Table 2.8).

The food crop sector in Burundi has long enjoyed a measure of protection against imported foods because of its isolation and the high cost of transport for importers. But this advantage is being eroded as the regional transport corridors are improved and transport costs on these routes come down. Moreover, as noted earlier, membership of the EAC means that tariff protection against imports of food crops from neighboring member countries will decline.[18] Comparative advantage analysis undertaken for the World Bank study concluded that Burundian producers of these commodities will come under severe competitive pressure from producers in neighboring countries .Tanzania, Uganda and Kenya have unused land that can be brought into production at relatively low cost. If producers in Burundi are to remain competitive, they will have to lower unit production costs by raising productivity using intensified cropping systems. This will be a challenge unless the costs of inputs such as fertilizer can be brought down through lower cost transport systems.

[18] For a period, at least, protection will continue for certain products deemed strategic; for example, milk, maize, wheat and wheat flour, rice, tobacco and cotton.

Consumer Goods and Other Manufactures

Agricultural processing dominates the small industrial sector of Burundi, which also includes the production of beverages, cigarettes, consumer goods, textiles and some construction materials for the domestic, and to a limited extent, the regional market. Unsurprisingly, production plummeted across the board because of conflict and regional sanctions during the 1990s, but output has since risen in most sectors. The main decline has been in textiles: blanket production fell from 121,500 in 2001 to zero in 2006, and fabric output declined over the same period. Even where manufacturing output has risen over the last five years, it is often still lower than in 1990.

Import statistics for non-food consumer goods and other manufactures point to a number of opportunities for development of domestic business activities that can draw on raw material supplies within Burundi. Table 2.8 provides details of trends in the import of various consumer goods. Imports of clothing and related personal goods now stands at about $8 million a year, as do furniture, furnishings, and glassware. Imports of manufactures such as paper, textile yarns and fabrics, and glass are in the range of $50 million a year. Further investigation of these markets may also point to emerging new opportunities for domestic manufacture of some of these products. As the discussion below indicates, the proposed growth in infrastructure investment will generate new opportunities for the supply of construction materials through the use of domestic raw materials and fabrication of imported materials such as iron and steel.

Table 2.8: Imports of Consumer Goods (In US$ mill)

Product category	2000	2001	2002	2003	2004	2005	2006	2007	2008
Pharmaceutical products	10,1	12,2	10,4	11,2	15,3	16,4	26,6	25,4	32,0
Food products									
Cereals & cereal preparations	14,3	10,3	8,5	15,0	8,3	9,1	13,6	32,4	17,6
Beverages	0,5	0,2	0,4	0,4	1,1	1,2	59,0	1,8	2,0
Sugar, sugar preparations, honey	1,7	1,0	0,8	2,2	1,7	1,4	5,4	6,2	1,3
Milk, butter, cheese	1,6	2,0	0,8	0,7	0,4	0,9	2,4	2,3	1,3
Vegetables and fruit	0,9	0,4	0,2	0,9	1,0	0,8	0,9	0,1	3,2
Meat & preparations	0,0	0,0	0,1	0,0	0,1	0,0	0,1	0,3	0,5
Miscellaneous food products	1,8	2,6	1,5	1,8	1,7	2,3	8,2	4,0	3,6
Sub-total	20,8	16,6	12,3	21,1	14,2	15,8	89,6	47,0	29,5
Clothing, apparel & other personal									
Apparel, clothing, accessoroes	0,6	0,8	0,8	0,4	0,6	0,8	0,3	2,8	1,0
Perfumes, cosmetics, cleansers	0,7	0,8	0,6	0,8	1,0	2,0	4,5	5,5	5,1
Footwear	0,5	0,7	0,2	0,1	0,2	0,5	1,3	0,8	1,2
Travel goods, handbags etc	0,1	0,2	0,1	1,1	0,3	0,2	1,9	0,4	0,5
Sub-total	1,9	2,4	1,7	2,4	2,1	3,4	7,9	9,6	7,6
Other consumer goods									
Furniture & furnishings	0,6	0,8	0,7	0,7	0,5	2,2	4,8	1,9	5,1
Glassware	0,2	0,5	0,8	1,5	1,4	0,8	3,6	2,9	3,3
Tobacco & manufactures	0,2	0,1	0,0	0,1	0,0	0,0	3,3	0,8	0,8
Sub-total	1,0	1,3	1,6	2,2	2,0	3,0	11,8	5,7	9,2
Total	33,8	32,5	26,0	36,9	33,7	38,6	135,9	87,7	78,3

Source: Annex Table IV.3.

Construction Industry

Growth prospects for the sector. Led by the rapid build-up in donor support for rehabilitation of basic infrastructure, the construction industry has entered a period of expansion in recent years. The impact of this recovery in construction activities has been substantial. The number of new business registrations in the construction sector increased from 34 in 2004 to an average of 77 a year in 2007-2008. There are no up-to-date estimates of the number of these firms that are still in business, or of the employment impact of these increased activities. A very rough estimate suggests that employment in the construction sector may have increased to about 35,000 person years in 2008.

Given the projected levels of investment spending outlined for the Base Case in Chapter 3, there are good prospects for the growth of the domestic construction industry. Strong growth in construction is anticipated in the near term as a result of the ongoing build-up of the donor rehabilitation programs. The projected levels of fixed investment in the economy suggest that construction activities will grow at an average of 10 percent a year in real terms in the decade ahead and slow to about eight percent a year in the following decade. One of the implications is that employment in the construction industry would increase from the current level to about 200,000 or more person years within the next two decades. In the event that at least one of the proposed rail extensions into Burundi is built, the numbers employed in the construction of these extensions would add substantially to these projected levels of employment. As Chapter 3 indicates, the prospect of a large increase in employment of skilled, semi-skilled and unskilled personnel in the construction industry does raise a range of issues related to skills development and, in the case of skilled trades such as electricians, appropriate certification standards and licensing.

Opportunities for replacement of imported construction materials. The sharply higher levels of investment in civil works in Burundi in the past decade have led to large increases in domestic demand for construction materials for infrastructure development and other civil works, such as buildings. Almost all of these materials are imported, as domestic capacities for the manufacture of construction materials are minimal. The import of construction materials was relatively stable at about $15 million a year until 2005, but with the launch of the various donor-funded programs for rehabilitation of infrastructure and facilities, there has been a sharp increase in these imports to about $45 million year in the last two years (Table 2.9). About half of these imports are iron and steel products; the other large item is cement and related materials. Smaller quantities

Table 2.9: Imports of Construction Materials

Product	Actual									Projected		
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2010	2020	2030
Value of imports (US$ mill)												
Iron and steel	3,8	5,5	5,3	6,1	7,4	31,9	12,4	27,0	18,0			
Lime/cement/construction materials	6,1	6,8	8,1	7,5	9,1	11,8	12,0	21,1	21,2			
Building fixtures	0,5	0,4	0,5	0,3	0,4	4,2	10,6	1,1	2,6			
Clay refractory materials	0,3	0,3	0,3	0,3	0,4	0,7	1,2	1,4	1,5			
Total	10,7	12,9	14,2	14,3	17,3	48,6	36,1	50,7	43,2	81,1	109,0	169,8
Quantity of imports ('000 metric tons)												
Cement	41	45	48	56	66	78	82	136	138			
Construction materials	9	7	13	14	11	17	17	21	18			
Total	50	52	60	69	76	95	99	157	156			
Memo items:												
Fixed investment (US$ mill)	53,5	56,7	59,9	63,9	88,1	165,2	238,6	187,8	201,5	360,6	484,3	754,8
Imports as % of investment	19,9	22,8	23,7	22,4	19,6	29,4	15,1	27,0	21,5	22,5	22,5	22,5

Source: Annex Table I.5 and Annex Table IV.3. Note: Historical values are at current prices, whereas projected values are at 2007 constant prices.

of building fixtures and refractory materials are also imported. Investment expenditures under the proposed infrastructure program are projected to rise sharply in the decade ahead. As a result, there will be a further large increase in the demand for construction materials. In the absence of private investment in domestic manufacture or assembly of these materials, imports of construction materials are projected to rise to about $170 million (at 2007 constant prices) by 2030.

A range of possibilities for the local manufacture and or assembly of construction materials bears further investigation, including fabrication of steel and cement products, various building materials and fixtures, and road construction materials that draw on the non-metallic mineral resources of the country. Recent experience with the donor-funded roads programs, for example, suggests that Burundi has substantial supplies of the materials that are needed for the foundations of national highways that are being rehabilitated. The potential for increasing these local sources of supply should be investigated further as these will help contain the capital costs of rehabilitation and will also create additional employment opportunities in quarrying activities. Another aspect of the road construction program that bears further investigation is the case for construction of an asphalt plant in Burundi. The Central Bank reports imports of asphalt at about 6,400 tons in 2008. The proposed road rehabilitation program will increase these quantities substantially in the decade ahead.

The demand for steel products for construction will also increase substantially, which will offer growing opportunities for domestic fabrication of re-bars and related materials; for example, the electrical distribution network to be laid down over the next two decades will involve expenditures of more than $500 million (at 2007 prices). Decisions will be required on whether the 6 kV, 10 kV and 20 kV lines will be carried by steel pylons or reinforced concrete poles. In either case, there are likely to be important opportunities for the development of a domestic industry that can undertake metal and cement fabrication.

The known reserves of carbonated rock (with 40 percent CaO and 2.2 percent MgO) raise the possibility of domestic manufacture of cement. Imports of cement and related products have averaged about $18 million a year in recent years, approximately half of total imports of construction materials. If cement were to continue to account for about half of these requirements, the projections suggest that demand for cement would rise from current levels of about 140,000 tons a year to about one million tons a year by 2030.[19] A feasibility study by AUSTROPLAN several years ago indicated that the known reserves of carbonated rock are sufficient for a cement plant with a capacity to produce 60,000 tons a year for 20 years. A plant of this size would be regarded as small, and it may not be able to compete with the current large volumes of cement imported from Uganda and elsewhere. A key issue therefore is whether Burundi has additional reserves of carbonated rock that would allow for the construction of a much larger plant with lower production costs that would be competitive with imports. Further investigation of this potential opportunity is warranted.

The other areas of potential interest are building fixtures. Over the past four years, imports of these items have averaged about $4.5 million a year. There may be opportunities for domestic fabrication of some of the fixtures that are currently imported. In that connection, an area of potential promise is ceramics. Burundi has substantial deposits of kaolinite and feldspar, the raw materials required for the manufacture of ceramics. Subject to further investigation of the reserves and market requirements, a local ceramics industry may be able to supply domestic and regional market needs for construction materials such as bricks, pipes, and floor and roof tiles, as well as “white wares” such as wall tiles and sanitary ware. Other possibilities

[19] During 2000-2005, the unit value of these imported cement and related materials was remarkably stable at about $150 per metric ton. Applying a somewhat higher average cost per ton to imports in the past three years suggests that total volumes may now be in the range of 140,000 of materials a year. It should be noted that there are apparent discrepancies in the reported quantities of cement imports. The national data reported by the Bujumbura Port Authority suggest that volumes grew steadily until 2005 and then declined. However, these trends are not consistent with the sustained increase in import values.

unrelated to construction activities include tableware and pottery products. Kaolin is also widely used in the making of paper, paint and a range of other products.

Transport Sector

A key driver of growth in the transport services sector will be the increased volumes of freight and passenger traffic into and out of Burundi and the growth of domestic demand for transport services. Given the lack of survey information about domestic freight and passenger movements, the forecasts for freight and passenger traffic used in this Report are confined to international trade and travel.

Transport of imports. At the present time, imports of goods are by far the most important component of international freight movements for the country. Table 2.10 provides estimates of the volume of imports into Burundi in 2008. These estimates are net of the volume of petroleum products that were imported. The total volume of these imports is estimated to have grown at an average of about 15 percent a year during 2004-2008. About 75 percent of Burundi's imports currently come through the ports of Mombasa and Dar es Salaam. The share of imports coming though the Port of Mombasa has been rising sharply and now stands at an estimated 40 percent of total arrivals at these two ports. Imports through the Port of Dar es Salaam have grown at a little over three percent a year. Airfreight into the Bujumbura International Airport accounts for less than two percent of total imports and consists mainly of passenger baggage.

Perhaps the most striking change in the mode of entry for imports concerns the Port of Bujumbura. As recently as 2004, three-quarters of Burundi's total imports came by a combination of rail from Tanzania and then vessel on Lake Tanganyika. As the discussion in Chapter 6 indicates, the deterioration in rail services in Tanzania has resulted in a large shift away from this rail/shipping service to road transport using the Central and Northern Corridors. The Port of Bujumbura now handles only 15 percent of total imports into the country; at this level, less than10 percent of the capacity of the port is in use.

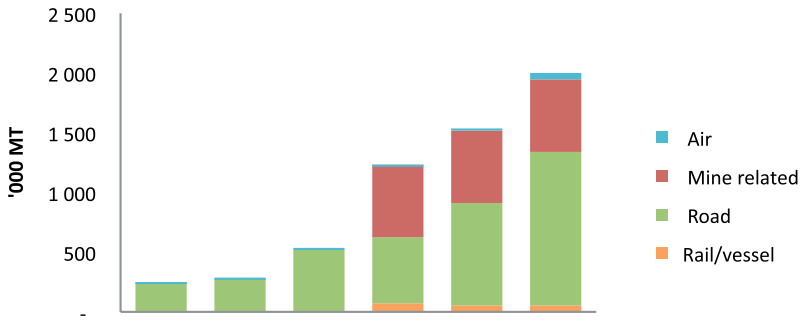
Table 2.10 includes projections of the growth in the future volume of imports into Burundi. In the Base Case Scenario discussed in Chapters 3 and 4, in which the economy grows at a little over seven percent a year over the next two decades, the volume of imports grows by about 8.2 percent a year. The implication is that the total volume of

Table 2.10: Total International Freight Movements by Transport Mode
(In '000 MT)

	2008	2010	2015	2020	2025	2030
Imports						
Rail/vessel	38	29	37	62	54	50
Road	206	257	485	561	863	1 296
Mine related	-	-	-	600	600	600
Air	3	3	7	13	27	54
Total	247	289	529	1 236	1 544	2 000
Exports						
Rail/vessel	2	2	4	6	10	15
Road	31	35	46	60	78	102
Mine related				54	54	54
Air	0	0	1	5	8	17
Total	33	37	50	124	149	187
Total freight	280	326	579	1 361	1 693	2 187

Source: Annex Tables V.4 and V.5.

Chart 2.10: Import Freight by Transport Mode



Source: Annex Tables V.4 and V.5.

imports would be in the range of 1.4 million tons a year by 2030, not including the 600,000 of mine-related imports. As the discussion in Chapter 6 indicates, there are a number of possible scenarios for the development of transport services needed to move this volume of imports.

Exports of goods. The total volume of exports is estimated at about 30,000 MT at the present time, about half of which is coffee and tea. Almost all exports travel out of the country by road, with minor amounts of outbound air freight and small quantities shipped out from Port Bujumbura. This pattern is projected to remain until the proposed nickel mining operation comes on stream in 2017. As Table 2.10 indicates, the volume of refined metal that would be shipped out is projected to be about 54,000 tons a year, all of which would be carried by road to Kigoma and then by rail to Dar es Salaam. Other exports transported by road are projected to increase to about 100,000 a year by 2030, under the assumption that the substantial improvement in basic infrastructure services outlined in this Report result in a strong supply response from commercial farming communities.

Passenger traffic. The only information available on passenger movements is arrivals and departures from the Bujumbura International Airport. There is no survey data readily available for the number of people who enter or depart Burundi via the various border crossings identified in Chapter 1. As Annex Table V.3 indicates, the total number of passengers passing through the airport is about 140,000 a year (excluding transit passengers). Passenger traffic is projected to increase to about 1.2 million a year in the Base Case Scenario outlined in Chapters 3 and 4.

These increases in the volumes of internationally traded goods and passenger traffic point to a period of strong growth in transport services. Value added in the transport sector is projected to grow by about 10 percent a year during 2010-2019 and by about eight percent a year the following decade in the Base Case Scenario. As a result, the transport and communication sector share of GDP rises from about five percent at the present time to about seven percent by 2030. Given the labor-intensive nature of the transport industry, the employment impact of this growth is substantial.

Chapter 3 – An Infrastructure Action Plan for Burundi

The Base Case and Alternative Scenarios

To overcome the current serious deficiencies in the power, transport and communications infrastructure sectors in Burundi that are outlined in Chapter 1, and to take advantage of the development opportunities discussed in Chapter 2, the Action Plan calls for a major step-up in investment in infrastructure over the next two decades. The Base Case outlined in this Chapter includes a Core Infrastructure Program for the power, transport and communications sectors, but does not include either of the proposed rail extensions into Burundi. The Base Case also includes full development of the Musongati nickel deposits. As outlined in Chapter 2, it is assumed that the nickel mining project will begin operations in 2017. Under the Base Case, a total of $4.6 billion would be spent on the development of Burundi's basic infrastructure during 2010-2030, along with $1.2 billion on maintenance of these assets. The capital cost of the mine and associated refinery is estimated at $1.44 billion, while outlays on mine-related infrastructure, including the required upgrade of the Tanzanian rail system, are put at about $640 million. The economic impact and benefits of the Base Case scenario are examined in some detail in Chapter 4.

A large infrastructure program of the kind outlined in this Chapter that is implemented over a twenty year period inevitably faces many risks and uncertainties, large and small, foreseen and unforeseen. The possibilities include major political risks such as deterioration in internal security in Burundi, or civil disturbances in neighboring countries that affect the overall performance of the Burundi economy and its attractiveness as a destination for private investment. There are also risks that stem from the international environment, including sharply higher petroleum or raw material prices that may adversely affect the attractiveness of investments in Burundi.

The risks and uncertainties of most interest at this stage relate to the design, funding and implementation of the proposed infrastructure and mining programs. For the purposes of the analysis in Chapters 3 and 4, it is therefore assumed that internal security in Burundi continues to improve and that there is social and political stability. It is also assumed that the Government continues to adhere to sound macroeconomic policies and, with the help of the international donor community, that Burundi continues to make steady progress in

Table 3.1: Description of Various Scenarios Considered in this Report

Scenario	Description of scenario	Program or Project Included in Scenario				
		Current strategy for national development continues	Infrastructure Action Plan		Nickel mining project	Rail extension into Burundi
			With public investment component	With private investment component		
A	Base Case	Yes	Yes	Yes	Yes	No
B	Core Infrastructure Action Plan implemented	Yes	Yes	Yes	No	No
C	Private funding for Action Plan not available	Yes	Yes	No	No	No
D	Only 50% of public funding available for Action Plan	Yes	Implement 50% of Action Plan	No	No	No
E	Only 20% of public funding available for Action Plan	Yes	Implement 20% of Action Plan	No	No	No
F	Implementation of Base Case with rail extension	Yes	Yes	Yes	Yes	Yes

reducing its vulnerability to debt distress. Against this backdrop, it is assumed that the environment for private investment and business activity continues to improve.

The issues of particular interest for the definition of these alternative scenarios include: (i) the availability of the various types of project funding that are required; (ii) the capacity of Burundi Government agencies to manage the formulation, design and implementation of the proposed program; (iii) the ability of Burundi and other EAC members to reach timely agreement on key aspects of cooperation in the further development of the regional infrastructure networks and services; and (iv) the design and early implementation of programs that will support strong domestic supply responses in input and product markets, thereby contributing to continued macroeconomic stability in an environment in which investment spending is high relative to GDP

For the purposes of this Report, a total of five alternative scenarios have therefore been defined. These are summarized in Table 3.1 above. Chapter 4 assesses the economic impact of each of these alternative scenarios and compares each outcome to that of the Base Case outlined in this Chapter.

The Core Program for Infrastructure

Key principles and objectives

Main elements of the core infrastructure program. The proposed Core Infrastructure Action Plan for Burundi is a comprehensive and ambitious program that aims to upgrade the basic infrastructure of the country over the next two decades and integrate Burundi's power, transport and communications networks with those of other members of the EAC. Key features of the program are as follows:

- Full development of a national power grid that, by 2030, will provide 24 hour electricity to more than 40 percent of the 2.8 million households in the country at that time. It will also provide reliable and low-cost power to all urban-based businesses and for processing and other requirements in the key farming locations throughout the country.
- A national highway system of some 1,950 km that will be fully paved, and for those national routes where traffic densities are high, roads would be upgraded to enhanced standards that can accommodate the increased traffic. The urban road network would be expanded from an estimated 650 km at the present time to about 1,650 km by 2030 to meet the needs of the projected 2.6 million urban residents at that time. The program will also support improvements in the provincial, community and local feeder road networks to facilitate access to product markets at home and abroad, and to key inputs, such as fertilizer, required for production activities. The program includes a major ramp-up in routine maintenance of the network. In the latter part of the 20-year program, new capital spending on the road infrastructure declines while routine maintenance increases. This enhanced road network will lower the costs of transport for the entire economy.
- An international airport in Bujumbura that is expanded and modernized. It would be in full compliance with the ICAO-mandated standards and procedures for international passenger travel and for freight, thereby allowing Burundi to attract major international airlines and air freight companies. Expanded access to international services will open up opportunities for development of tourism and air freight of high value export products to European and Middle East markets.
- Development of a national communications grid of fiber optic cable and digital microwave for all of Burundi that would be linked to the international submarine cable network, thereby giving communities throughout the country access to low cost communications with the rest of the world.
- The proposed program would also provide substantial support for the development of human and institutional capacities in these three key sectors and for a wide range of technical studies that will be required in the early phases of the program.

Program Costs and Funding

Program cost and composition. Table 3.2 provides a summary of the costs of the proposed program for the next two decades. The total cost of the program over the next 20 years is put at about $4.6 billion (at 2007 constant prices). The power program would involve expenditures of about $2 billion, including $465 million of private investment in new generation capacity. The roads program would require about $2.1 billion of development expenditures. The civil aviation program would involve a public-private partnership arrangement under which the upgrade and operation of the airport and related services would be handled by one or more private contractors. The total amount of investment required for the aviation sector is estimated at $260 million over the next $20 years. The program includes about $130 million for the further development of the national communications grid and widespread community access to this grid.

Table 3.2: Development Expenditures for Core Infrastructure Program (US$ millions at 2007 constant prices)

Category	2010-19	2020-30	Total
Public expenditures on development			
Power sector	813	764	1 577
Transport sector			
Roads sector	1 139	989	2 129
Ports program	13	15	28
Civil aviation	11	6	16
Sub-total	1 163	1 009	2 172
Communications	48	28	75
Total	2 024	1 801	3 825
Associated private investment			
Power sector	458	8	465
Civil aviation	190	55	245
Communications	24	33	57
Total	672	96	767
Grand total	2 695	1 896	4 592

Source: Annex Tables VII.10, VIII.3, VIII.5 and IX.1.

The bulk of these development expenditures are for capital outlays on infrastructure assets such as road networks, airport facilities, power stations and transmission and distribution lines, and communications networks. Non-capital outlays include the cost of the wide-ranging program of capacity building initiatives and various technical studies included in the Action Plan. These components account for about three percent ($170 million) of the total development expenditures for the program.

Funding arrangements for the program. The three main sources of funding for the program are the Government of Burundi, including the electricity utility and the airport authority, the donor community, and the private sector. Table 3.3 provides an indicative financing plan for the various program components. The civil aviation program would be financed by the private sector, except for a small amount of donor and government funding for human and institutional capacity building. The Government and donor community each fund major portions of the power program, but the strategy is to look to the private sector to own and operate the new domestic hydro stations that are proposed. In the case of the roads program, the donor community would fund about 80 percent of the program. For the program as a whole, the Government would fund about 27 percent, the donor community about 56 percent, and the private sector about 17 percent.

There are important differences in the timing of the required support from each of the three groups. Because of the current very limited financial resources of the Government, its contribution in the first ten years of the program accounts for about 20 percent of total public expenditures on the program, whereas in the second ten-year period, the Government contributes about $835 million, equivalent to about 46 percent of the total public expenditure program. The improvement in these public funding capacities comes from three sources. First, the financial position of the power utility, REGIDESO, is projected to improve substantially in the coming years as its customer base is built up. The expectation is that the utility will be able to finance about two-thirds of the new capital outlays for the power sector during 2020-2030. Second, the funding capacities of the airport authority would

also be built up through a combination of increased air services and increases in the landing, freight and passenger fees. Third, the Core Infrastructure Action Program is based on the expectation that the mining of ore deposits in the Musongati area would begin in 2017. As Chapter 2 indicates, public revenues from the mining operation in the form of income taxes and royalties are projected to be about $1.9 billion during 2020-2030 (see Table 2.5).[20] With a much stronger financial base, the Government may also be able to draw on long-term loan funding from international development agencies.

The proposed donor funding amounts to $1.60 billion during 2010-2019 and $0.97 billion in the following decade. The requirement for the coming decade is equivalent to an average of about $160 million a year of donor support. According to the African Development Bank (2009), Burundi has been receiving about $450 million a year in aid from all sources. At this level, the proposed infrastructure program would account for about one-third of current aid allocations. Such an allocation for infrastructure in Burundi is not exceptional and would likely find substantial support from within the donor community, given the importance that donors attach to overcoming the infrastructure deficit of the country. In the second decade of the program, the required donor funding averages $100 million a year - equivalent to about 20 percent of the current aid program.

Table 3.3: Funding Arrangements for Core Infrastructure Program (In US$ millions at 2007 constant prices)

	Govemment	Donors	Private	Total	Share (%)
Power	822	755	465	2 042	44
Transport					
Roads	348	1 781		2 129	46
Port	28			28	1
Civil aviation	9	7	245	261	6
Sub-total	384	1 788	245	2 417	53
Communications	47	29	57	132	3
Total	1 253	2 572	767	4 592	100
Share (%)	27,3	56,0	16,7	100,0	

Source: Annex Tables VII.10, VIII.3, VIII.5 and IX.1.

Power Sector Program

Key objectives and benchmarks. The key objectives of the proposed power sector program are to improve business and household access to electricity, reduce its cost and improve the reliability of supply. The proposed program has four key components: (i) through increased investments in domestic and regional generation capacity, ensure that the business community and households have access to reliable power supply 24 hours a day; (ii) establish a national transmission grid within the next ten years that is linked to the regional power grid and extend the backbone distribution network by linking all 13 provincial capitals to the transmission grid within the next five years; (iii) improve demand management and reduce system losses; and (iv) ensure that REGIDESO is built up into an effective and financially sound public utility.

The key benchmarks and indicators for the proposed program for the next two decades are set out in Table 3.4 below. By 2030, REGIDESO would have more than 1.2 million active accounts. The household electrification rate for the country would be about 43 percent. An active ongoing electrification program beyond 2030 would raise the electrification rate in the following decade to about 60 percent. In urban areas, the program would electrify 85 percent of all households by 2020 and all urban business establishments. With the urban program well underway by 2015 and additional supplies of power coming on stream, there would be a major push on rural electrification at that time, beginning with the peri-urban areas and expanding out from there. By 2030, about one-third of rural households would be linked to the grid. At this stage, it is not clear what proportion of the more remote rural households can, in fact, be linked to the distribution network

[20] Judgments about the allocation of these additional revenues between basic services such as education and health and infrastructure are beyond the scope of this report.

Table 3.4: Indicators and Benchmarks for Power Development Program

Indicator	2008	2010	2015	2020	2025	2030
No. of connections (000)						
Households	32	34	145	544	836	1 208
Business	3	3	5	6	9	13
Governement	1	1	1	1	2	2
Total	36	38	151	552	847	1 222
Household electrification rate (%)						
Urban	20	19	40	85	85	85
Rural	0	0	3	15	24	34
National average	2	2	7	24	33	43
Electricity consumption (GWh)	160	153	395	1 733	2 327	3 268
Electricity supply (GWh)						
Domestic supply	103	111	346	1 359	1 481	1 481
Imported supply	96	85	468	911	1 105	2 150
Surplus/deficit	0	0	343	289	-	-
Total supply	200	196	471	1 981	2 586	3 631
Imports as % total supply	48	43	99	46	43	59
System losses (% of supply)	20	22	16	13	10	10
Average electricity tariff (US cents/kWh)	9	11	16	13	10	9
Required generation capacity (MW)	38	37	90	377	439	600
REGIDESO accounts (US$ mill)						
Total revenues	15	17	73	237	242	292
Operating costs	13	19	84	201	242	298
Capital assets	41	96	479	929	1 225	1 603

Source: Various Annex VII tables.

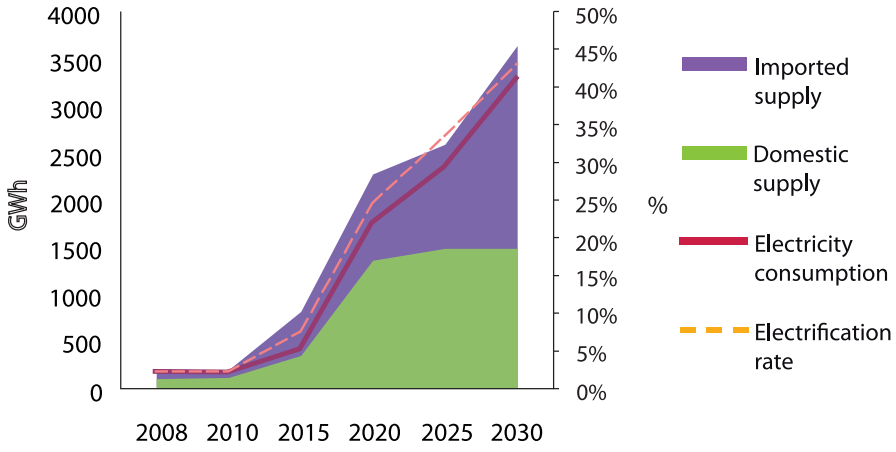
at reasonable cost. Further work is needed to determine which rural communities may be too far from the network and may need to be serviced by local alternatives, such as mini-hydro plants, solar or wind sources of energy.

To meet the projected demand for power, the required generation capacity for Burundi would be about 600 MW by 2030. The particular power plants included in the Core Action Plan would be sufficient to meet the needs of the country until the mid 2020s. A power supply deficit emerges in 2024. The supply deficit would grow to about 1,240 GWh by 2030, assuming no further major mining or power intensive industrial projects are launched. The implication is that Burundi would need an additional 200 MW of capacity - either domestic or via imported power, to meet domestic demand.

The key policy question for the longer-term is whether to investigate other domestic hydro power sites within Burundi and develop these in order to keep dependence on imported power to prudent levels, or whether to allow increased dependence on imported power. If all the additional required capacity was domestic, the share of imports in total consumption would be 25 percent; if all the additional power was imported, the share of imports would be about 60 percent. A potential issue with the continued use of domestic sites is that the cost of the electricity produced may be significantly higher than that imported from Ethiopia via the EAPP grid. This possibility raises issues about a trade-off between the degree of self-sufficiency in power supply and the cost of power and its effects on the competitiveness of Burundi business. In the scenario in which the supply deficit from 2024 onwards is met by importing power, the average operating cost per kWh is lower than for the domestic supply of power. These choices have important implications for the financial position of the power utility and its ability to finance future expansion of the power program. The Core Infrastructure Program outlined in this Chapter assumes that this additional demand would be met from imports of low cost power from Ethiopia via the EAPP grid.

The ongoing financial rehabilitation of REGIDESO is central to its role as a major source of funding for the future power program. With continued prudent financial management the utility would develop into a major corporation by 2030, at

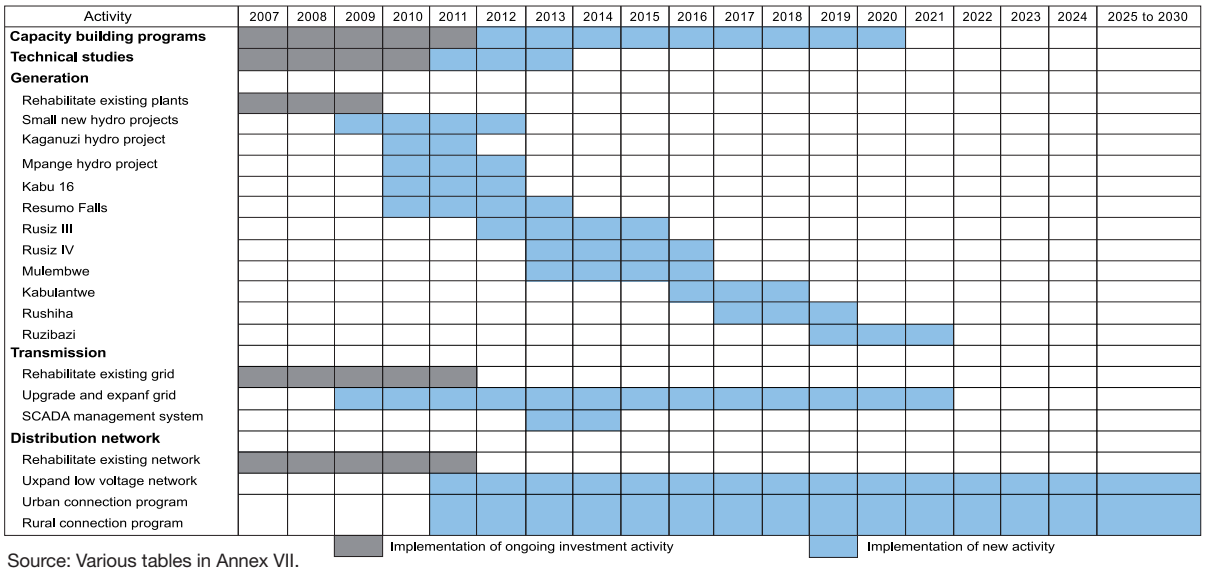
Graph 3.4: Electricity Demand and Supply



Source: Various Annex VII tables.

which time it would have assets of about $1.6 billion and revenues of about $300 million a year (both at 2007 constant prices). From about 2020 onwards, its cash flow would be such that it could fund the bulk of the power development of the country from its own resources and from prudent access to commercial sources of debt financing. At some point in the next two decades, consideration could be given to converting the utility into a public company with publically traded shares sold to domestic and international investors.

Figure 3.1: Summary of Ongoing and Proposed New Investment Activities for the Power Sector



Source: Various tables in Annex VII.

Timelines for program implementation. The timeline for the various activities is summarized in Figure 3.1 above. All but one of the various hydro plants under active consideration at this time are installed and commissioned within the next decade. The main components of the national transmission grid are completed by 2016, coinciding with the completion of the Rusizi IV and Mulembwe hydro stations. The extension of the transmission timeline to 2021 reflects the need to connect the three new hydro stations commissioned in 2018-2021 to the main grid. The distribution network is built up continuously through a series of projects, each of which would be implemented over a five-year period. Phase I of the program would begin in 2011, followed by Phase II which would begin in 2016, and so on. In Phase I of the program, the distribution network would be extended to all 13 provincial capitals to provide a foundation for linking 25 percent of households to the grid by 2020. This program would continue on after 2030 to reach an electrification target of 60 percent by 2040.

Next steps to implement the power program. The proposed program for the power sector for the next five years, 2010-2014, involves new funding commitments of about $330 million. Chapter 5 provides detailed information on these activities. The proposed program requires early action on twenty separate, but closely related, activities: there are eight separate project activities to be launched in 2010 on which decisions are yet to be made and a further six in 2011:

- New capacity building programs. A total of $13.5 million of technical support for capacity building and related activities needs to be launched in 2010 and 2011. A single package of funding by one or more donors for these activities would be ideal as it would ensure consistency in advice and support in closely related areas of capacity building. The major program of technical support for the Ministry of Water, Energy and Mines for the power sector expansion program is a high priority. Also of high priority is technical support for the design of arrangements for Resumo Falls power station and network, including further investigation of possible private sector participation in the generation component of the program. Ongoing donor-funded capacity building programs for REGIDESO come to an end in 2011. The program includes $5 million for technical support to build the capacity of

the utility to manage the rapid expansion of the network proposed for the decade ahead. Early action is also needed on the creation of a regulatory authority for the power sector. The program includes $1.5 million for the provision of technical assistance in the design and launch of this initiative in 2011.

- New technical studies. The Core Infrastructure Program calls for the early launch of $14.5 million of technical studies for priority programs in the power sector. These are primarily feasibility studies and detailed design work for the various new generation projects that are already in the pipeline and are to come on stream in the decade ahead. A high priority should also be given to the development of the Mulembwe site, which may have a rated capacity of 115 MW and could meet part of the electricity demand requirements in the latter half of the decade ahead. The program also calls for the completion of a detailed master plan for the power sector in 2010. The World Bank has already signaled its willingness to fund this important activity.
- Construction of new power generation capacity. As Table 3.4 indicates, the projected rapid growth in demand for electricity will require an additional 200 MW of generation capacity by 2020. If the dependence on imported electricity is to be kept at current levels of about 45 percent, the implication is that an additional 150 MW of installed capacity from domestic hydro stations will need to be in place before 2020. There is considerable urgency in finalizing funding and related arrangements for construction of the Kaganuzi, Mpanda and Kabu 16 domestic power stations that would add about 35 MW of capacity within the next five years. There is equal urgency in finalizing arrangements for construction of the Resumo Falls and Rusizi III regional hydro stations. To meet the projected demand the former needs to be commissioned by 2013-2014 and the latter by 2015. The total amount of funding required for these five projects is estimated at about $193 million, about $120 million of which needs to be mobilized so that construction can begin in 2010.
- Construction of transmission grid. Construction of the transmission line from Resumo Falls to Gitega should begin in 2011 to coincide with the commissioning of the Resumo Falls hydro station in 2013. The $24 million of funding for this line therefore needs to be firmed up as a matter of priority. Construction of the line required to link Rusizi III to the existing transmission grid would need to begin by 2013, and the existing 110 kV line from Gitega to Bujumbura would need to be upgraded to 220 kV, with work scheduled to begin in 2013-2014.
- Expansion of the distribution network and customer connections. The proposed program calls for work to begin on expansion of the existing distribution network in 2011 to coincide with the construction of the Resumo Falls-Gitega transmission line. In parallel with this program, REGIDESO would also launch the first phase of its program to expand its customer base in urban areas throughout the country. A high priority for the first phase of the distribution program would be to link all 15 of the provincial capitals to the main grid of the country by 2015, thus laying the foundations for the connecting 85 percent of the urban population to grid electricity by 2020. Creating these links can be undertaken in tandem with the Resumo Falls Project.

Transport Infrastructure and Services

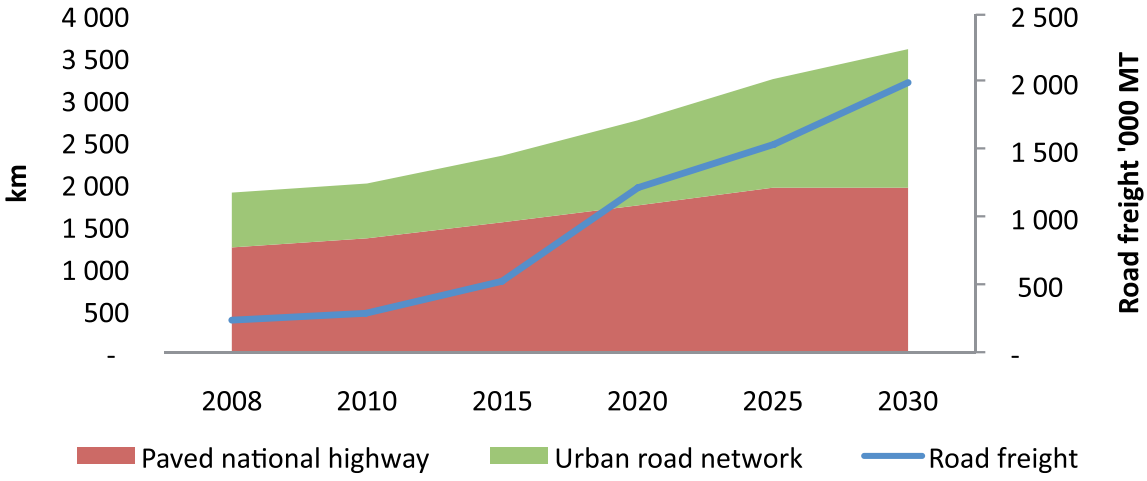
Development of the road transport infrastructure network. The key objectives of the road transport and infrastructure component of the proposed program are to improve service levels for business and communities throughout the country by improving access to transport and lowering its cost. The Core Infrastructure Action Plan is built around the following five key program components: (i) complete the upgrading and sealing of the entire 1,950 km of national roads in the decade ahead; (ii) construct an additional 1,000 km of urban roads to meet the needs of the urban population which is projected to increase to 2.6 million by 2030; (iii) expand support for the rehabilitation and upgrade of the provincial and communal road network; (iv) launch a major

Table 3.5: Indicators and Benchmarks for Road Infrastructure and Transport

Indicator	2008	2010	2015	2020	2025	2030
Registered vehicles						
Motor cycles	3 378	4 240	8 700	13 100	27 000	40 800
Vehicles	5 082	6 160	11 300	16 000	28 600	41 400
Vehicles per '000 persons	0,6	0,7	1,2	1,5	2,3	2,9
Vehicles per km of road	0,4	0,5	0,9	1,3	2,2	3,1
Road network (km)						
National highway						
Paved	1 242	1 350	1 540	1 740	1 950	1 950
Unpaved	708	600	410	310	-	-
Percent paved	63,7	69,2	79,0	84,9	100,0	100,0
Provincial & communal network	2 805	2 805	2 805	2 805	2 805	2 805
Urban road network	650	650	790	1 008	1 287	1 643
Unclassified network	6 917	6 917	6 917	6 917	6 917	6 917
Total network	12 322	12 322	12 462	12 780	12 959	13 315
Road freight ('000 MT)						
Imports, general	206	257	485	561	863	1 296
Imports for mine operation	-	-	-	600	600	600
Exports, general	31	35	46	60	78	102
Exports from mine operation	-	-	-	54	54	54
Total	237	292	531	1 221	1 541	1 998

Source: Various Annex VIII tables.
Note: The total for the unclassified network excludes urban roads recorded elsewhere in the Table.

Graph 3.5: Road freight and Road Infrastructure



Source: Various Annex VIII tables.

program aimed at improving the unclassified road network that is the primary responsibility of local government and councils to improve the access of farming communities to product markets and inputs; and (v) allocate substantially more resources to routine maintenance of the road network and build technical capacities for these maintenance programs.

Key indicators for the road transport services program are set out in Table 3.5. Over the past seven years, the number of registered vehicles and motor cycles increased from a small base by an average of 17 percent a year to about 8,400. Over the next two decades, the vehicle fleet is projected to grow by 10-11 percent a year to about 80,000 motor cycles and vehicles. Even so, the number of vehicles per thousand people and per km would continue to lag behind other African countries. The most heavily trafficked roads, which are in and around Bujumbura, currently carry 2,000 to 3,000 vehicles a day. With the projected tenfold increase in the number of vehicles in the country, traffic flows on the main arteries will increase substantially. The challenge will be to anticipate the serious traffic congestion problems in and around the main cities and on the main national corridors, some of which link to the Northern and Central Corridors to the Mombasa and Dar es Salaam ports.

A key challenge for the program is building human and institutional capacities within Burundi to anticipate the transport requirements of its main cities, the main road corridors that link these cities and the links to the Northern and Central Corridors and the ports of Mombasa and Dar es Salaam. A related issue concerns the extent to which the urban road network will have to be expanded to accommodate the projected 2.6 million city dwellers by 2030. Bujumbura has about 460 km of urban roads that service the needs of about 600,000 people. Other urban centers have about 180 km of roads. The proposed program calls for construction of about 1,000 km of additional urban roads in the next two decades. The objective would be for all urban residents to be within 500 meters of a road that can be accessed by motorized traffic. In planning these investments, the Government will want to have in place clear objectives regarding priorities for spatial development in Burundi. The objective would be to support the development of a number of other major urban centers throughout the country with improved infrastructure and services. A strategy aimed at diversifying urban development can be helped by allocating funds for urban road development to a number of target cities around the country. A heavy concentration on roads (and other public services) in Bujumbura alone will lead to a concentration of the urban population in and around the capital city.

The other emerging issue on which more work is needed concerns policies and programs for public transportation. At the present time, the country has a fleet of only 500 buses that are privately owned and operated. What type of public transport systems should be developed over the next two decades for Bujumbura, Gitega and other major cities to accommodate the needs of the projected 2.6 million inhabitants by 2030? The proposed transport sector master plan to be prepared in 2010 will need to investigate the future role of public transport services in Burundi.

Information on total volumes of freight currently carried by the trucking industry in Burundi is not available. The current volume of import and export cargo that is carried in and out of the country is estimated in this Report at about 240,000 tons (Table 3.5). Given the projected growth rates for the economy, and the development of nickel mining in the Musongati area, the amount of international freight carried on Burundi's main trucking corridors is projected to increase to about two million tons by 2030. The implication is that the number of trucks transiting across Burundi's borders may increase from the current level of 50-70 per day to 500 or more a day. In anticipation of an increased volume of freight traffic, a number of policy issues will take on considerable importance. These include widening the main road corridors in Burundi from 6 to 7 meters, adoption of specific axle load standards for Burundi that are consistent with the EAC requirements, and arrangements for enforcement of these standards. The larger volumes of freight traffic will also require attention to current bottlenecks that increase waiting times and costs at border crossings, such as lack of parking space and storage for transit traffic.

The total cost of the proposed road transport program for the next two decades is estimated at $2.2 billion at 2007 constant prices (Table 3.6). Two-thirds of these outlays are for the complete rehabilitation and upgrade of the 1,950 km of national roads. The capital cost of building the larger urban network over the next two decades is estimated at a little over $600 million at 2007 constant prices, but as noted earlier, more work is needed on the transport service and infrastructure requirements of the rapidly growing urban population. About $70 million is also included for transfer to provincial and local governments for rehabilitation and upgrade of provincial and local government road networks. These funds would complement the resources mobilized at the provincial and local level, including in-kind contributions of communities who are the main beneficiaries of rural and feeder roads.

Implementation of the proposed program for the roads sector requires early action on a number of closely related activities. Chapter 6 provides detailed information on these activities.

Table 3.6: Development Expenditures on Burundi's Road Network (US$ million at 2007 prices)

Program	2010-19	2020-30	Total
Capacity building	26,3	13,0	39,3
Technical studies	31,0	33,0	64,0
Capital works			
National road network	863,2	477,4	1 340,7
Provincial and communal network	29,8	41,4	71,1
Urban network	189,2	424,4	613,6
Sub-total	1 082,1	943,2	2 025,3
Total development spending	1 139,4	989,2	2 128,6

Source: Annex Table VIII.3

- *New capacity building programs.* Ongoing capacity building programs for the roads funded by the African Development Bank and IDA will come to a close within the next few years. There is need for continued technical support for the agencies with primary responsibility for the road transport industry and road infrastructure. The Core Infrastructure Program calls for a new five-year program of capacity building in the amount of $15 million to begin implementation in 2012.
- *New technical studies*. The Program calls for a $15 million program of support for various technical studies, the implementation of which would begin in 2010, as there are no major ongoing donor programs that meet these needs. A high priority is the completion of a detailed master plan for the roads sector in 2010. This plan should cover road infrastructure and the domestic and cross-border road transport industry. The program would support regular traffic counts for the road network, and periodic surveys of the transport industry. It would also provide funding to meet the ongoing needs for feasibility studies, environmental assessments and detailed design work on the rehabilitation and upgrade of the existing national road network, and the proposed expansion of the urban road network. To ensure coordination among donors, consideration may be given to packaging the foregoing $30 million of support for capacity building and technical studies as a single project.
- *Road rehabilitation and new construction.* The program includes some $235 million for road rehabilitation and new construction for the five-year period, 2010-2014. This package would include two major components: (i) about $125 million for continued rehabilitation of the existing national network, consistent with the priorities articulated in Chapter 6; and (ii) about $100 million for improvement and expansion of the urban road network that would begin in 2012, given that the ongoing IDA-funded program of urban road improvement in Bujumbura would be completed in 2011. In addition, the proposed program includes $12 million of national government counterpart funding that will launch the first phase of a decade-long program to rehabilitate the classified and unclassified provincial and communal road network of the country. There may be merit is having a single project of $235 million, with financing from several donors.

Civil aviation services. The immediate objective of the proposed civil aviation program is to build the industry in Burundi to the point where it is in full compliance with all international standards for safety and service. From this base, the program would

Figure 3.2: Summary of Proposed New Investment Activities for the Civil Aviation Sector

Activity	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Capacity building programs		■	■	■	■	■	■	■	■	■	■	■
Technical studies												
Bujumbura airport		■	■	■								
Domestic airports									■	■		
Airport improvement programs												
Bujumbura airport					■	■	■	■				
Domestic airports											■	■

Source: Annex Table VIII.5.

■ Implementation of new activity

build up aviation services in Burundi to meet increased demand for freight services for high value exports, and to support the growth in tourism. To accomplish these objectives the Core Action Plan proposes a four-pronged program: (i) complete a business plan and companion master plans for the development of civil aviation in Burundi; (ii) implement training and other programs that build human and institutional capacities for management and regulation of civil aviation services; (iii) take all necessary steps required to ensure that Bujumbura International Airport is in compliance with ICAO and EAC standards and practices and in so doing, obtain the ICAO "Certification of Aerodromes" that will allow Burundi to attract major international carriers to provide freight and passenger services; and (iv) enter into a public-private partnership agreement with a suitable private contractor who would provide turnkey arrangements of finance, design, construction, operation and ownership of the International Airport for a specified period of time.

Figure 3.2 sets out the timelines for the proposed civil aviation program. The most urgent requirement is the preparation of a business plan for the next five years (2010-2014). An amount of $1 million is proposed for this work. The plan would need to address the following three issues: (i) as the agency responsible for civil aviation in Burundi, outline the evolving role of the RSA with particular attention to measures needed for compliance with ICAO and evolving CASSOA standards and requirements; (ii) set out the training and other capacity building programs required to meet these standards; and (iii) outline a commercial plan for the development of Bujumbura International Airport. The business plan would need to be complemented with an airport master plan and a detailed program for capacity development of staff. A total of $4 million is proposed for early launch of the program to train civil aviation staff to standards consistent with ICAO and EAC requirements.

In parallel with these activities, the RSA would need to build consensus and support for a public-private partnership for the modernization of airport services and facilities in Burundi. The first priority would be the Bujumbura International Airport. Such an arrangement could be done on a turnkey basis with a BOOT type contract that had a life of say, 30 years. Under this proposed arrangement, the private contractor would have full responsibility for finance, design, construction, operational and ownership of the airport. The program also includes $1 million of technical support for the design and negotiation of a PPP arrangement for the airport and $2 million for detailed design work for the proposed new airport. Once the arrangements for Bujumbura airport are operational, attention could then turn to the development of the three other domestic airports that are recognized by the ICAO. The case for development of these domestic facilities will depend heavily on the outlook for traffic growth.

Successful implementation of the foregoing programs to meet ICAO and EAC standards and revitalize aviation services would open the way for sustained expansion of the industry. Table 3.7 includes projections for passenger and freight traffic for the industry. The underlying assumption is that internal security in Burundi will continue to improve and with sustained strong growth in the economy, it will be possible to develop a tourism industry that will lift the

Table 3.7: Projected Civil Aviation Traffic for Burundi

	2008	2010	2015	2020	2025	2030
Passenger traffic ('000)						
International	141,8	140,0	270,0	445,0	715,0	1 150,0
Domestic			1,0	5,0	15,0	50,0
Total	141,8	140,0	271,0	450,0	730,0	1 200,0
Freight ('000 MT)						
Imports	2,5	3,3	6,7	13,4	26,9	54,1
Exports	0,3	0,2	1,0	5,0	7,5	16,5
Total	2,9	3,5	7,7	18,4	34,4	70,6

Source: Annex Tables V.3, V.4, and V.5.

number of international passengers to about one million a year by 2030. Driven mainly by the growth in international arrivals, a revival of domestic air travel is assumed to start in 2015 after the upgrade of the Bujumbura airport is well underway. Freight traffic is projected to grow by 15-16 percent a year. The bulk of the traffic will continue to be imports, including passenger luggage. However, full compliance with ICAO and EAC standards, and development of high value agricultural products for export to niche markets (flowers, fruits, and other specialty products) as discussed in Chapter 2, would lead to the growth in chartered air freight services. To support this business, the rebuilt International Airport would include chilled and refrigerated storage for specialty products.

At this stage, the estimated total cost of the development program for civil aviation of about $260 million (at 2007 constant prices) is somewhat notional. The business plan and master plans would be expected to develop more refined estimates of the costs involved. For the purposes of this Report, the cost of training and other capacity building programs is put at $7 million, and preparation of business and master plans at $1 million. The capital costs for modernization of the International Airport are put at $175 million (at 2007 constant prices), based on somewhat dated information about the capital costs of developing international airports in Botswana and Malawi some years ago.

Extension of oil pipeline from Kenya. Following the award of a contract in 2007, construction of a 352 km extension of the existing Western Kenyan Pipeline to Kampala is expected to be completed by end-2010. The proposed program includes $750,000 for a feasibility study of a possible extension of the oil pipeline from Kampala to Bujumbura via Kigali, a likely distance of about 660 km. The African Development Bank is already investigating arrangements for funding by the NEPAD IPPF for this study. As Chapter 6 indicates, the volume of fuels imported by Burundi for the transport sector is growing rapidly, having doubled to about 60,000 tons within the last four years. The projected growth in vehicle registrations of 11 percent a year to 40,000 by 2030 suggests that fuel imports would grow to about 600,000 tons within the next two decades.

Port services. Until recently, the Port of Bujumbura played a major role in Burundi's international trade. It handled about 75 percent of Burundi's import and export cargo as recently as 2000. Shipment by lake vessels to and from Kigoma and by rail between Kigoma and Dar es Salaam was the preferred route for many importers and exporters because of lower freight rates available for rail transport. However, the deterioration in the performance of the Tanzania Railways Corporation since 2000 has resulted in a major diversion of freight to the trucking industry. Freight passing though the Port is now down to about 50,000 tons a year, which is about 15 percent of total import and export cargo for the country as a whole.

There is a degree of uncertainty about the future role of the Port, the resolution of which will be shaped by the following considerations:

- The prospect for an early revival of the rail transport services available from TRC. Tanzania, like other countries in the region, has contracted the operation of its rail services to a private concessionaire. The contractor is taking steps to rebuild the quality of the services. It remains to be seen how long this will take and whether the improvements are sufficient to induce exporters and importers to reallocate their business away from the trucking industry. An early revival of the rail services would likely result in some reallocation of freight back to the rail. In this case, Bujumbura Port

would need to make a number of investments to upgrade equipment and facilities. The Core Action Plan includes $15 million of capital replacement outlays for the period 2011-2013 on the assumption that the rail service is improved, and a second allocation of $15 million the following decade.

- Possible construction of a rail extension from the TRC network into Burundi. As the discussion in Chapter 2 indicates, there are two options for these extensions. If one of these was to go ahead and the quality of the rail services was satisfactory, it is likely that exporters and importers would ship freight by rail direct between Dar es Salaam and Burundi, rather than transship cargo in Kigoma to lake traffic.
- A possible third scenario for the port would involve an enlarged role based on other business opportunities that centered on lake traffic. In this connection, there is need for further investigation of the opportunities for increased traffic between the DRC and Burundi that is carried by vessel rather than road. The proposed transport master plan to be completed next year will need to investigate these issues.

Upgrading the Communications Network

Improved regional access to the global communications network. The decade ahead will usher in a major improvement in access to modern communications throughout the EAC, including Burundi. It will include widespread access within Burundi and other EAC members to the global network of submarine cables. Improved access to domestic and international networks, at reasonable cost, in combination with the elements of the Core Infrastructure Action Plan, will further transform the economic outlook for the country. These links are of great significance, as East Africa is the only heavily populated region of the world that does not have access to the long-established international system of submarine cables that provide low cost transmission of data and voice communications.

This transformation is made possible by a number of initiatives that have been taken in recent years. The October 2007 Heads of State Summit meeting in Kigali concluded that there should be a major push to expand access to telecommunications services throughout Africa and strengthen connectivity to the rest of the world by 2012. The East Africa Submarine Cable System is under implementation and is expected to be operational in 2010. This 10,000 km fiber optic cable will provide all of East Africa with access to the global communications network. It is funded by the World Bank and a consortium of private investors. At the same time, a regional fiber optic network is being laid within the EAC. This includes lines into Burundi from Tanzania, and from Kenya via Uganda and Rwanda. The latter is well advanced. Kigali is expected to have access to the cable before end 2009, and the extension from Kigali to Bujumbura is expected to be completed by June 2010. In parallel with this initiative, IDA approved a $424 million Regional Communications Infrastructure Program in 2007 for high speed connectivity in East and Southern Africa. The $20 million allocated to Burundi under this program will help fund the completion of a 913 km fiber optic network within Burundi. The network will link all the provinces to the submarine cable via the lines from Rwanda and Tanzania.

Improving access to communications with Burundi. As noted in Chapter 7, access to communications in Burundi is extremely low and it is expensive. There are only two mobile telephone subscribers per 100 people in Burundi, compared with 14 per hundred for Sub-Saharan Africa and for all low income developing countries. The price of internet services is three time the cost for Africa as a whole.

The objective of the Core Infrastructure Action Plan is to build on the ongoing program by laying down a national communication grid that is linked to the global network. There are no formal targets for the longer-term for the communications sector in Burundi. Table 3.8 therefore sets out some possibilities that can flow from the creation of the proposed nation network. These indicative levels of access would match or surpass the current levels

Table 3.8: Indicative Growth in Access to Communications

Indicator	2007	2010	2020	2030
Operators with access to network (number)	-	4	8	10
Telephone access (per 1,000 people)				
Fixed mainlines	4	5	25	60
Mobile subscribers	19	25	60	150
Households with TV (%)	14	15	20	35
Computers and internet (per 1,000 people)				
Personal computers	7	8	40	100
Internet users	7	8	30	80
Memo items:				
Total population ('000)	7,80	8,49	11,03	14,05
% of population with electricity	2,1	2,1	24,5	42,9

Source: Table 7.2.

prevailing in Sub-Saharan Africa and would be comparable to existing levels in many lower middle income countries. The key elements of the program within Burundi are as follows:

- Complete the ongoing fibre optic links to the East African submarine cable by 2010.
- Complete the installation of the national fibre optic and digital microwave network by 2011.
- Promote the entry of additional service providers into Burundi.
- Expand institutional access of government, schools, universities and hospitals to the network.
- Develop a range of applications, including e-government, e-commerce, e-schools, and e-health.
- Complete the ongoing work on the legislative framework and its corresponding regulatory framework, including e-security, fraud, privacy, data protection, and intellectual property rights.
- Expand the ongoing capacity building program for those agencies responsible for oversight and regulation of the communications industry, including the transition to a neutral regime with respect to regulation of technology and service.
- Develop and launch a series of programs designed to build the supply of ICT skills available to government and business.

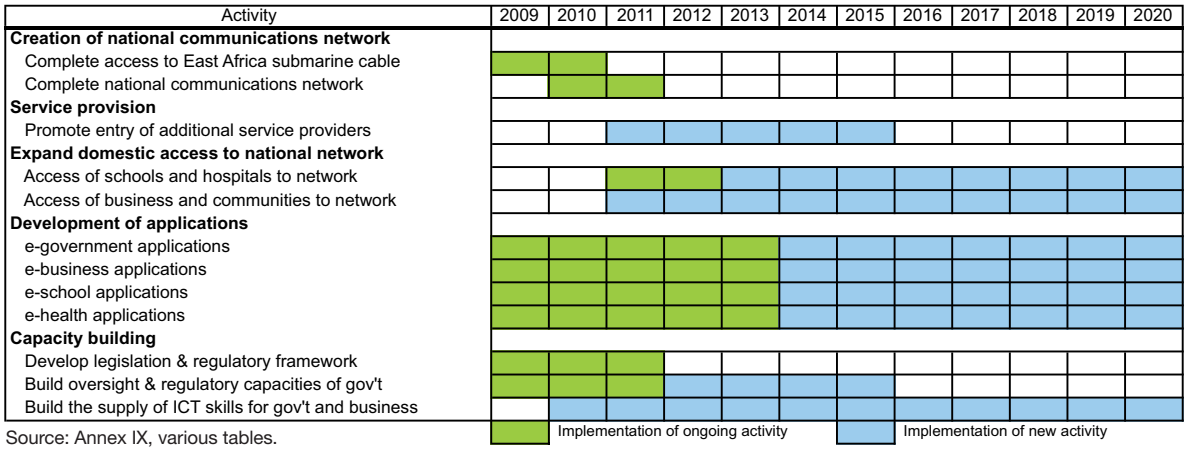
As Table 3.2 indicates, the total communications program for the next two decades would involve development outlays of about $130 million at constant 2007 prices. The program calls for an additional $3 million of technical support to build capacities within the Government for oversight and regulation of the communications industry. These capacities will be required to meet the challenges that emerge within the next five years from the increased provision of communications services by private suppliers. The program also includes some $60 million of new investment in service facilities by existing and new operators. At this stage, this estimate of likely new private investment is indicative, subject to discussions with existing and potential new entrants into the Burundi market, and the extent to which the existing small landline system would be expanded.

The timeline for the various activities to be undertaken in the ongoing and proposed communications program is set out in Figure 3.3. The immediate priority is to complete the links to the international communications network and the national backbone grid. In parallel, work is underway on building the required new legislative and regulatory framework for the sector. A modest amount of work is being undertaken to develop pilot applications for e-government and others. The proposed new program will expand these efforts, and build a modern communications network in Burundi within the next 5-10 years.

Proposed Rail Extension into Burundi

In addition to the foregoing Core Infrastructure Action Program, this study has also reviewed the options related to the two proposed extensions of the Tanzanian railway into Burundi.

Figure 3.3: Ongoing and Proposed New Development Activities for the Communications Sector



Source: Annex IX, various tables.

Recommendations from the master plan and subsequent feasibility study. A Master Plan for the East African Railways was completed for the East African Community Secretariat in June 2008. The study indicated that after many years of decline, the railway sector and associated rail marine services can play a potentially important role in the future development of the EAC, particularly for long-distance freight and bulk transport, but also for urban transport in major cities and for medium-distance intercity passenger transport. The Master Plan recommended creation of detailed guidelines and steps needed to implement the EAC Treaty provisions that apply to the railways of the member states. The thrust of the strategy in the short-term is to use public-private partnerships to pull the railways back from collapse by restoring a minimal level of acceptable, reliable service on the trunk lines (Mombasa-Kampala, Dar-es-Salaam-Mwanza and Dar-es-Salaam-Zambia). The medium-term strategy is to improve the level of service on the trunk lines, to extend the network to Rwanda/Burundi and to carry out feasibility studies for the other proposed extensions. The long-run strategy is to achieve best-in-class performance on the trunk lines, successful commercial operations on the Rwanda-Burundi and other medium-term lines and further extend the network.

The Master Plan proposes two possible rail extensions into Burundi. One is an offshoot from the proposed main line from Isaka to Kigali. The extension into Burundi would begin at Keza and would run through to Gitega, and perhaps on to the Musongati mining area. The other option put forward in the Master Plan is an extension from Uvinza to Bujumbura, with a possible extension to Musongati. Subsequent to the Master Plan, a detailed feasibility study was completed for the Isaka-Kigali line and extension from Keza to Musongati.

Economic feasibility of the proposed extensions. Implementation of the rail extension program and development of the mining industry in Burundi raises a number of important issues for joint consideration by Burundi and Tanzania. The feasibility study for the extension from Keza indicates that the investment results in a very attractive economic rate of return of about 40 percent. However, this assessment of benefits is based on the assumption that the nickel mining operation would proceed and that in excess of four million tons of ore would be exported by rail each year for refining elsewhere in the world. As a result, the freight volumes for the rail service are large and, not surprisingly, the economic returns for the rail expansion into Burundi are very attractive. As Chapter 2 indicates, however, it appears that potential investors are interested in

refining the nickel at the mine site and exporting the metal by road to the railhead at Kigoma. The analysis in Chapter 6 examines the economic feasibility of the extensions into Burundi in the absence of the mine-generated freight. The conclusion is that the volume of non-mine export and import freight over the next two decades, at least, is not sufficient to produce acceptable economic rates of return for the rail expansion into Burundi. If the extension were to go ahead without the mine freight it is very likely that large public subsidies would be required for the operation. In these circumstances, it may be difficult to attract private investors for a PPP-type arrangement.

A possible scenario for the rail extension. In the event that the mining investors decide to export nickel ore rather than refined metal, the prospects for moving ahead with the rail extension may improve. The above mentioned feasibility study includes estimates of the capital cost of the proposed Keza-Musongati extension. Burundi's share of these project costs is estimated at $1.44 billion, including some $670 million for the rail link from Musongati to the four mine sites (Nyabikere, Mukanda, Waga, and Muremura). A small amount of public investment would be required for various studies and for capacity building within the government for oversight and regulation of the rail services. It is assumed that the mine operator would meet the cost of the extension lines from Musongati. For the purposes of this Report, it is assumed that the rail network will incur some additional capital costs during 2020-2030 that are not provided for in the feasibility study. The investment cost of the public rail system is therefore put at $765 million. A PPP-type arrangement would be used to fund and operate the service. As Table 3.9 indicates, the total cost of the rail extension, including the spurs to mine sites is estimated at $2.89 billion.[21]

There are important qualifications to this estimate of capital costs. In the event that the nickel mine was exporting four million tons of ore a year, it is possible that the existing single track to Dar es Salaam via Isaka or Uvinza would not be sufficient to handle these large amounts of ore, along with increased volumes of general freight from Rwanda. There are no reliable estimates for the required expansion of rail capacities in this scenario. Nor is there any estimate for the cost of the facilities required for loading ore for shipment abroad. A substantially larger capital outlay for rail and port services would be a matter of considerable importance for Tanzania. A potentially important issue for the two countries, therefore, is the extent to which Tanzania would benefit directly from the development of the mining operation in Burundi and the manner in which this might take place. It might, for example, involve the use of cross subsidies between the private contractors that operate the rail networks in each country. Such an arrangement would have to be drawn up by the Burundi and Tanzanian authorities and its implementation monitored by both countries. Much more work is needed on the cross-country issues raised by the combination of rail extension and mine development.

A second issue of importance is the timetable for construction of the extension. The Master Plan and Feasibility Study do not contain detailed timelines for the implementation of these projects, except that the Feasibility Study uses 2014 as the start-up year for mining operations in the Musongati area. Nor do these studies draw any specific conclusions as to which rail extension option would be the most attractive from a Burundi viewpoint. In the absence of firm

Table 3.9: Development Expenditures for the Rail Extension Option (US$ millions at 2007 constant prices)

Category	2010-19	2020-30	Total
Public investment	8	-	8
Private investment (public network)	600	165	765
Private investment (mine access)	670	-	670
Total railways	1 278	165	1 443
Grand Total	2 556	330	2 886

Source: Annex TableVIII.6.

[21] This cost estimate is based on the findings of the feasibility study for the 197 km extension from Keza to Gitega. It should be noted that the extension from Uvinza to Bujumbura would be about 300 km. The additional 100 km for the latter option may add substantially to the capital cost to be met by Burundi.

Figure 3.4: Indicative Timeline for Rehabilitation of Existing Line to Isaka and Construction of Extensions into Burundi

Activity	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Technical studies												
Option 1: Construct the Isaka-Kigali extension line												
Rehabilitate existing TRC line to Isaka (970 km)												
Isaka-Keza section of Isaka-Kigali line (308 km)												
Keza-Gitega-Musongati line (197 km)												
Construct lines to mines (43 km)												
Option 2: Construct the Uvinza-Bujumbura extension line												
Rehabilitate existing TRC line to Isaka (970 km)												
Construct Uvinza-Bujumbura line (300 km)												
Construct lines to mines (60 km)												

Implementation of new activity

Source: Information contained in CPCS Master Plan (2008) modified by authors.

information on these points, some simplified assumptions about a possible timetable were made for the purposes of this Report, the most important of which is that the rail service should begin operations in 2017, the proposed start date for the mining operation. The resulting schedules are set out in Figure 3.4 above. The key points about the assumed timeline for the proposed rail extension program are as follows:

- Option 1. The rehabilitation of TRC and the existing line to Isaka could begin as early as 2012. If so, the two preceding years (2010-2011) would be required for preparation of a detailed program for rehabilitation that would be required to mobilize the funding for this program.[22] It is assumed that the TRC rehabilitation program would be completed in five years (i.e., by 2016). With this indicative timetable the Isaka-Keza extension would be constructed during 2013-2015, and the extensions from Keza to Gitega and the mine sites would be completed in 2016.
- Option 2. The alternative scenario is that the extension into Burundi from Uvinza would proceed. (In this case, the Isaka-Kigali line, or the Keza-Musongati extension would not materialize during 2010-2030.) The timeline for this scenario is essentially the same as for Option 1.

A major concern with this timetable is the macroeconomic implications of the resulting large surge in investment spending during 2012-2017 for the rail extension and mine development. As indicated in Chapter 2, the cost of mine development is estimated at $1.44 billion, and as noted above, the rail extension is put at $2.89 billion - a total capital outlay of some $4.3 billion for these two projects. Private investors, in particular, providers of debt financing, will be concerned about sovereign risk issues in the light of Burundi's continued vulnerability to debt distress. As a result, it is not at all clear that Burundi would be able to mobilize such a large amount of private investment in international markets within the next three to four years. Furthermore, even if the funds could be mobilized, investment spending on these two programs alone would be equivalent to more than 40 percent of GDP during 2013-2017 - a level of investment spending that would likely have a severe macroeconomic impact that included inflationary pressures and crowding out of other private investment.

In the light of these concerns and questions about the economic viability of the rail project in the absence of ore exports, the position taken in this Report is that it is not practical to move forward with the Core Infrastructure Program, the mine development and the railway extension in the decade ahead. Choices will have to be made about the priorities. Given that potential mine investors appear to favor the export of refined metal, the Base Case Scenario includes full implementation of the Core Infrastructure Program and the mining operation. Investment in a possible railway

[22] It should be noted that the estimated cost of the TRC rehabilitation program relates to the existing network. As noted above, the capacity of the existing network may need to be increased to accommodate the large volume of ore to be shipped.

extension is deferred to some later date when the volumes of non-mine freight are sufficient to justify the investment.

Key Elements of the Infrastructure Action Plan

Technical support for the program

Technical studies. Successful implementation of the Core Action Plan will require substantial outlays on a variety of technical studies, especially in the next five years when much of the detailed planning and design work will need to be completed. As Table 3.10 indicates, the proposed program calls for about $90 million of technical support in the form of studies and surveys, the bulk of which is for the road and power sector programs.

Most of these studies involve prefeasibility, feasibility and detailed design work for the projects and programs included in the Core Action Plan. In the case of the roads sector, there is also a substantial allocation of funds for a variety of studies of the road transport industry. These include regular traffic counts on national and other roads to provide information for budget allocations for maintenance and possible further upgrading of road capacities. The program also includes funds for annual surveys of the trucking industry active in Burundi. Such surveys would provide information on vehicle operating costs, transport costs and the cost of transport services to consumers. Another important study is the proposed survey of all bridges on the national road network. The study would assemble information on the number, location and length of bridges, and their load capacities, for use in developing specific programs for bridge rehabilitation and maintenance. The program includes funding for detailed work on the various options for the design of public-private partnership arrangements for the development of domestic sources of power generation in Burundi and the upgrade of the international airport. The studies include support for tender processes under which these business opportunities would be promoted internationally. No additional technical studies are anticipated at this time for the ports sector. A small amount of funding is included for technical studies related to the aviation sector. These would include

Table 3.10: Expenditures on Capacity Building & Studies
(US$ millions at 2007 constant prices)

	2010-19	2020-30	Total
Capacity building			
Power	17,4	0,5	17,9
Roads sector	26,3	13,0	39,3
Aviation	8,5	5,5	14,0
Ports	-	-	-
Communications	5,0	-	5,0
Total	57,1	19,0	76,1
Technical studies			
Power	17,5	-	17,5
Roads sector	31,0	33,0	64,0
Aviation	2,0	-	2,0
Ports	-	-	-
Communications	4,9	-	4,9
Total	55,4	33,0	88,4
Total technical support	112,5	52,0	164,5

Source: Annex Tables VII.9, VIII.3, VIII.5, VIII.6, and IX.1

periodic surveys of passenger and freight traffic and, in due course, assessments of the scope for building up the various domestic airports.

Choice of standards for infrastructure. There are no specific technical standards currently in place in Burundi for key components of the infrastructure system. There is a strong case for adoption of an internationally accepted set of standards for the national road network. With an established set of standards, donors who provide funding for road rehabilitation can then be asked to ensure that the roads are rehabilitated to the required standard. As part of the process of setting these standards, an important issue will be the degree of conformity with standards of other members of the EAC. For example, Burundi's two lane paved national roads are six meters wide, while those of Kenya are seven meters. Another aspect of standards for the transport sector concerns axle loads. Overloaded freight vehicles and poor enforcement of axle load regulations lead to deterioration in the road network and reduce road life spans. The EAC has adopted regulations to a limit of three axle-35 ton rules for trucks. To date, the legal axle weight has not been enforced along all the corridors. Unlike the other countries traversed by the North Corridor in which there are limits on axle loads, Burundi has no weight restrictions on road traffic.

Prior to the launch of the proposed major expansion in access to electricity, there may also be need for review of standards for household connections and wiring. The proposed master plans for power, and transport infrastructure to be prepared in 2010 with funding from the African Development Bank and the World Bank should include detailed assessments of the appropriate standards for these two sectors, consistent with the evolving requirements of the EAC.

Building Capacities Within the Government

The proposed program includes about $75 million of support for building the human and institutional capacities within agencies responsible for various aspects of the infrastructure network and services (Table 3.10). The proposed program calls for capacity building in four broad areas:

- Project design and implementation. There is provision for a large amount of technical support in the roads sector, along with small programs for the power and aviation sectors. The required support includes training and institutional capacity building for the review of technical studies and detailed design work, environmental and other assessments required for particular projects, development of procurement strategies for each sector that include measures to promote domestic capacities to supply materials and services such as contracting and consultancy, and for site supervision of construction activities to ensure compliance with the required construction standards.
- Oversight and regulation. The capacity of government agencies for oversight and regulation in the power, transport and communications industries will need to be strengthened. The proposed regulatory body for the power sector has not yet been established, and in the case of civil aviation, there is an urgent need for training programs that are related to compliance with ICAO standards and procedures. In the case of communications, private sector companies, both domestic and international, will increasingly be the main service providers. The role of the government will evolve in the direction of oversight and regulation of land line and mobile service providers. The introduction of a technology and service neutral regulatory regime will require substantial support for institutional and human capacity building. There is currently no oversight or regulatory capacity within the government for the rail sector. If the proposed rail extension does proceed, such capacities will have to be developed.
- Collection and analysis of survey data. In each of the transport modes there is need to build capacities for analysis of the above-mentioned surveys of the transport service providers to provide basic information about the evolving amounts of passenger and freight traffic, and

the costs of service provision and prices of services offered to the public. These analyses will be important input in policy formulation and assessments of future investment needs in additional facilities and services. Analysis of the surveys of road traffic volumes is also required for assessments of evolving road maintenance and upgrading requirements.

- Formulation of public-private partnership arrangements. The Core Infrastructure Program calls for PPP arrangements for civil aviation and for private investment in power generation. There is currently only very limited capacity within the relevant government agencies for the formulation of strategies for these partnerships and for negotiation with potential investors. The requirements in this area are discussed below.

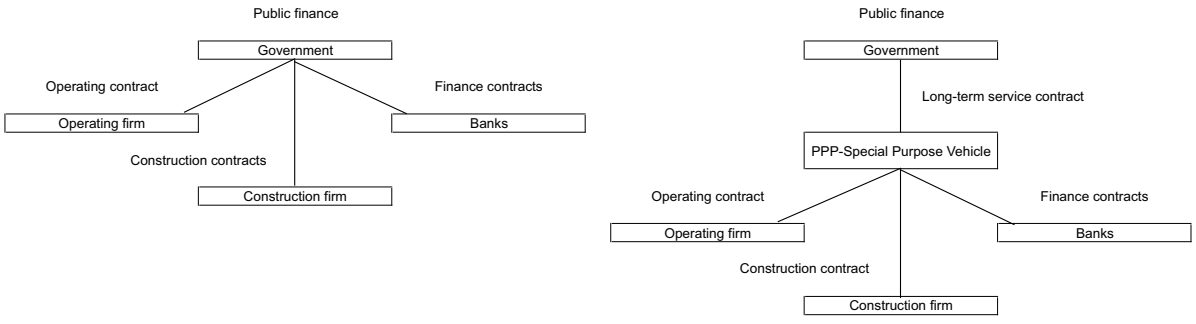
Role of Public-private Partnerships

In the past few decades, an increasing number of governments have turned to PPP arrangements to promote the private sector supply of infrastructure assets and infrastructure service. In general, these types of arrangements allow governments to avoid or defer spending on infrastructure without foregoing its benefits. To manage the risks associated with the proposed PPPs and ensure that they provide high quality infrastructure services in an efficient manner, the Government will need to give careful attention to three broad sets of concerns: (i) the legal framework governing the PPPs; (ii) the processes for selecting and implementing PPPs, including the roles played by relevant government agencies; and (iii) the contractual obligations on which PPPs are based that directly determine the fiscal risk incurred by the government.[23] The fundamental difference between PPPs and standard public procurement is the structure of the contracts involved, as illustrated in Figure 3.5.

The contributions from private investors for the power program and civil aviation are predicated on the assumption that it will be possible to form public-private partnerships for each of these operations using a BOT, BOOT or some comparable technique. A total of $710 million of private funding would be needed for PPPs in these two sectors (Table 3.2).[24] The bulk of the private funding for these programs is required in the coming decade.

These PPP-type arrangements typically involve the use of substantial amounts of debt financing by the private contractors. The issue that will arise in these circumstances is the manner in which lenders for these types of projects will be protected

Figure 3.5: A Comparison of the Structure of Standard Government Procurement and of PPPs



Source: Brixi et.al. (2005).

[23] For a brief discussion of the role and design of PPP arrangements, see Bernardin Akitoby, Richard Hemming, and Ger Schwartz, Public Investment and Public-Private Partnerships. International Monetary Fund, Economic Issues Series No. 40, 2007.

[24] In the event that the rail option were to move forward an additional $750 million would be required for the public component of the program that would be operated on a PPP basis.

from sovereign risk.[25] This is a particularly important issue for Burundi, in view of the fact that it is one of 40 countries that make up the group of Heavily Indebted Poor Countries (HIPC). Burundi has benefited from this program and has been able to reduce its debt burden. However, analysis under the Debt Sustainability Framework (DSF) of the World Bank and IMF suggests that Burundi continues to face the risk of debt distress. An issue that may therefore arise in the course of discussions about possible PPP arrangements is the likelihood of some forms of guarantees related to sovereign risk by one or more of the multilateral financial institutions.

The design of these arrangements will require substantial work over the next five years. Burundi will need access to experienced legal and technical services for the work involved. The proposed programs include $8 million to support this work. The list of issues to be addressed in formulating such programs typically includes some or all of the following: (i) analysis of project viability and assessment of key risks; (ii) choice of the PPP vehicle; (iii) legal structures and contractual agreements; (iv) security arrangements and related issues; (v) insurance issues; and (vi) a financing plan and credit agreements.[26]

Programs to Generate a Domestic Supply Response

An important point that emerges from the discussion in Chapters 1 and 2, and elsewhere in this Chapter, relates to the complementary actions that must be taken by the Government, with the support of the donor community, to ensure that there is, in fact, a strong domestic supply response to the opportunities created by the Core Infrastructure Action Plan. If there are large flows of donor funding for the Program into procurement contracts for overseas supply of consulting and construction services and supply of construction materials, the new business opportunities created by the Program will be largely confined to the transport sector and to import agent services in Burundi. Moreover, in the absence of programs to support development of domestic business investment in the supply and manufacture of food products and other consumer goods, the second round impact of the Action Program via the wages and salaries paid in the construction and transport sectors will continue to spill over into increased imports.

Assessment of market opportunities. Table 3.11 provides a rough decomposition of the proposed expenditures of the Action Plan by the type of expenditure for each sector and sub-sector. A number of useful insights about the nature of the business opportunities that stem from the Action Program emerge from this analysis. Total spending on labor services amounts to $1.16 billion during 2010-2019 and $1.14 billion in the following decade. Assuming about 20 percent of these skill requirements must be met with internationally recruited personnel, about $1.85 billion of these expenditures over the 20 year period would be paid to skilled and unskilled labor from the domestic market. This will represent a large injection of wage income into the economy. If 30 percent of this income is spent on imports, some $1.3 billion would go into the domestic economy. As discussed earlier, this feature of the program provides a major opportunity for the further development of the domestic consumer goods industry. If the domestic supply capacities are weak, imports may account for a much larger share of expenditures from this income.

In the case of capacity building and technical studies, the program will require about $165 million of technical services, about $130 million of which would be services supplied by international and domestic consultants. The remainder would be for office supplies, communication, transport, and so on. Procurement regulations for the appointment of consultants generally require some

[25] Sovereign risk usually includes risk of default, breach of covenants, availability of foreign exchange or convertibility, expropriation, and other factors outside the control of the parties to the project.

[26] A large amount of international experience has been developed over the past three decades with these types of mechanisms. An early example was the award of a concession in 1986 to build and operate the Eurotunnel System for a period of 55 years. The winning bid was that of CTG-FM Eurotunnel System who proposed a $2.6 billion twin bore rail system.

Table 3.11: Composition of Sectoral Expenditures by Type of Expenditure
(In US$ millions at 2007 constant prices)

Sector	Capacity building & technical services		Capital expenditures			Maintenance	
	Technical services	Goods & equipment	Civil works		Equipment	Spare parts & supplies	Services
			Materials	Services			
Power	80%	20%	30%	25%	45%	33%	67%
Total for 2010-2019	27,9	7,0	370,7	308,9	556,1	70,1	187,5
Total for 2020-2030	0,4	0,1	231,4	192,8	347,0	140,2	374,9
Roads	80%	20%	50%	40%	10%	50%	50%
Total for 2010-2019	45,8	11,5	541,1	432,9	108,2	52,3	52,3
Total for 2020-2030	36,8	9,2	471,6	377,3	94,3	80,1	80,1
Ports	80%	20%	10%	10%	80%	70%	30%
Total for 2010-2019	-	-	1,3	1,3	10,4	3,1	1,3
Total for 2020-2030	-	-	1,5	1,5	11,6	3,9	1,7
Civil aviation	80%	20%	40%	27%	33%	70%	30%
Total for 2010-2019	8,4	1,7	76,0	50,7	62,7	25,1	10,8
Total for 2020-2030	4,4	1,1	22,0	14,7	18,2	57,8	24,8
Communications	80%	20%	50%	30%	20%	50%	50%
Total for 2010-2019	7,9	2,0	31,0	18,6	12,4	6,4	6,4
Total for 2020-2030	-	-	30,3	18,2	12,1	16,7	16,7
Total							
Total for 2010-2019	90,0	22,1	1 020,1	812,4	749,8	157,0	258,3
Total for 2020-2030	41,6	10,4	756,7	604,4	483,2	298,6	498,2

Source: Annex Tables VI.8, VII.9, VIII.3, VIII.5, VIII.6, and IX.1.
Note that the percentages given in the table refer to the allocation between the components of each of the three main types of expenditures (capacity building & technical services, capital outlays, & maintenance) included in the Table.

form of prequalification and quality based selection with the weighting for quality higher than price. This gives scope for the appointment of consultants who are experienced in and committed to the use of local resources. To lay the foundation for such strategies, the Government, with help from donors, needs to establish a list of qualified national firms and consultants. Where appropriate, consultancy contracts can also require the transfer of technology skills to local firms and individuals. A desirable objective for development of the local consultancy industry would be for local consultants to provide at least 10 percent of these services in the coming decade and perhaps 20 percent in following decade. The implication would be at least $17 million in contracts or sub-contracts for the local consultant industry over the next two decades.

The proposed program calls for $4.42 billion of capital expenditures, consisting of about $1.78 billion for construction materials, $1.23 billion for equipment and $1.42 billion for services, most of which will be skilled and unskilled labor required for the civil works program. The bulk of the required equipment will be imported, but there should be important opportunities for the supply of construction materials. As discussed in Chapter 2, there may be opportunities for the development of a domestic cement industry, an asphalt plant, and fabrication plants for rebars, concrete poles, and ceramics for floors, walls and fixtures. Another area is the supply of domestically quarried materials for road and other construction activities. The proposed outlay of $1.42 billion for labor services offers a major opportunity for developing a range of skills in the labor force as well as providing substantial amounts of employment for unskilled workers.

The third important opportunity concerns the increased levels of spending on maintenance programs, especially in the power and roads sectors. Over the 20 year period, the Core Action Plan calls for $1.2 billion of new spending on maintenance, some $450 million of which would be on supplies, such as fuel and spare parts (especially for the power sector), and $760 million would be for the provision of skilled labor (e.g.,

electricians required for the maintenance of the power network, including household connections), as well as large amounts of unskilled and semi-skilled labor for road and other maintenance work.

Programs to support a strong supply response. A range of initiatives can be taken to improve the business environment and information about business opportunities that stem from government and donor contracts. A detailed investigation of these various initiatives is beyond the scope of this Report. Given their importance for a successful outcome to the Action Plan, Table 3.12 below lists examples of the kinds of activities that might become part of a comprehensive action plan to promote the development of local business capacities. Such a program, in combination with improved access to basic infrastructure services and lower costs for these services, would make a substantial contribution to improving the competitiveness of local business and to capacities to respond to opportunities created by the Core Infrastructure Action Plan. In all the areas listed in Table 3.12, successful programs have been designed and implemented in other developing countries. This cross-country experience can be drawn upon for programs in Burundi.

Policies and programs for small business. A range of initiatives can be taken to promote and develop business entities in Burundi. A widely used approach in other developing countries is a network of business development centers (BDCs) throughout a country. These centers provide training and support for small and medium business entities to bid on and implement construction and or maintenance contracts. The training and support programs conducted by these centers would typically include preparation of tender documents, support for preparing applications to the banking sector for working capital loans, arrangements for the lease of equipment, bookkeeping and record keeping, and other skills required for management of a business.

Another initiative to be considered is the creation of leasing companies that can make equipment available to small- and medium-sized businesses who do not have the volume of work or financial capacity to justify purchase of major items of

Table 3.12: Components of a Program of Business Development Initiatives to Complement the Infrastructure Action Plan

Policy issue or concern	Proposed action	Proposals for donor support
Build capacities of domestic businesses	Create a business development center (BDC) in the capital of each province. Each BDC would provide training for businesses that includes basic bookkeeping, how to prepare bids for government contracts, how to apply to banks for working capital loans, etc.	Propose a project of 13 BDCs for implementation starting in 2010. Project to include a train-the-trainers component.
Improve the operating environment for business	Reduce the number of procedures and time required for compliance for key business environment indicators, including (i) starting a business; (ii) registering property; (iii) enforcing contracts; and (iv) obtaining construction permits.	Request a donor with strong private sector business credentials (e.g., IFC) to complete a comprehensive review of procedures and design a detailed action plan, including training programs.
Improve access of SMEs to construction equipment needed for execution of contracts	Create one or more equipment leasing pools and or leasing companies in key locations through the country. Encourage formation of private companies, or if need be, a government-owned leasing company operated by a private contractor under a five-year management contract.	Ask IFC for assistance in attracting private investors to establish a leasing company, or if there is no interest, ask donors to transfer ownership of equipment from completed infrastructure projects to a government owned leasing company.
Improve access of SMEs to working capital loans for business activities	Create credit facilities funded by donors for on-lending by local banks to SMEs. Launch a program whereby SMEs that win government contracts for construction or supply of services or goods can use the contracts as collateral for working capital loans from banks.	Approach the donor community for support for a line of credit and technical support for the design of a program that allows use of government contracts as collateral for working capital loans.
Increase the supply of skilled labor for construction and maintenance activities	Adopt a three-pronged program of action: (i) establish specific standards required for licensing of tradespersons such as electricians, surveyors, plumbers, etc; (ii) promote the development of training institutions that can teach these skills to standards that conform to the license requirements; (iii) introduce a certification program for training institutions and registration program for skilled tradespeople who graduate from such training programs.	Approach the donor community for technical assistance and funding for a skills development program for the country.
Improve information available to the business community about forthcoming government and donor contracts to be tendered	For government contracts, prepare procurement plans for key activities for a six month period and make these lists available to the local business community, chambers of commerce, the proposed BDCs, and so on. These six-month procurement plans would be updated twice yearly (for example, in June and December each year). Encourage donors to release similar lists for contracts that they will fund.	Request donor assistance to draw up procurement plans for key government and donor funded activities that require supply of goods or services. In the design of such plans, due attention would be paid to to capacity of local firms to supply such goods and services and the appropriate size of contracts.

equipment such a heavy trucks, earthmoving equipment, and so. A variety of techniques are available for the formation of one or more leasing companies; for example, in some donor-funded construction contracts, ownership of construction equipment may remain with the donor when the contract comes to an end. Such a donor may then donate the equipment to the government, who then uses the equipment to form a leasing pool or as the equity needed to form a publicly owned leasing company. An international contractor may then be retained to operate the leasing company under say, a five-year contract, after which the leasing company can sold by the government to a private investor.

An action plan along the foregoing lines could be complemented with more in-depth analysis of the composition of imports to determine the extent to which the farming community can supply local manufacturers the required raw materials for various products at competitive prices. Promising product areas might provide the basis for promotional activities with the domestic business community via the BDCs and potential foreign investors in joint venture arrangements.

Development of technical skills in the labor markets. The proposed program of infrastructure development will generate substantial demand for a wide range of skilled and semi-skilled workers, as well as creating employment opportunities for a large number of unskilled workers. Large numbers of equipment operators will be required in the construction industry, as well electricians, welders, mechanics, and others.

Key issues for policy formulation and execution are the manner in which these numbers of people will be trained, by whom, and at what cost. Training and skills development will likely take several forms. In the case of heavy equipment operators, on-the-job training is common in many countries where large construction companies recruit and train people to their requirements. Information on the extent of such training in Burundi was not available at the time this Report was prepared, but an assessment of the extent of this type of training is needed. Successful implementation of the Core Action Plan will require large numbers of people able to operate heavy equipment, trucks, and so on. Do the existing local firms have the capacity to undertake this type of on-the-job training? Do international contractors operating in Burundi train large numbers of people in these areas? What additional actions might be taken in the event of possible shortages of these skills as implementation of the Action Plan gathers momentum. The concern here is to ensure that demand for large numbers of additional skilled people could have an inflationary impact through increased wages in some sectors.

To meet the demand for skilled tradespeople such as electricians and welders, action will be needed on the development and accreditation of suitable training facilities, curriculum development for such programs, and licensing of successful trainees by professional bodies or accredited training institutions. An assessment of current arrangements for training and certification of skilled tradespeople is beyond the immediate scope of this study, but it should be undertaken on a priority basis. The range of issues involved with such an assessment usually includes the numbers and types of institutions that provide skills training, whether there are specific standards that a successful trainee electrician, for example, must meet to become licensed, whether these standards are consistent with international practice or standards already in place within the EAC, and whether such standards form the basis of the training programs given. Closely related to these concerns is the process for accreditation of those training institutions whose programs do conform with agreed standards for the industry. Technical support may be needed for the agencies that have responsibility for policy and practice in developing such skills in the market place.

Contracts for works and materials and promotion of local content. The examples given in Table 3.12 are not intended as a comprehensive list of possible actions. The Table does not, for example, include the need for a well-designed program that increases the domestic content of goods and services tendered under Government and donor procurement plans. Increasing the input of local labor, goods and services in the delivery of the infrastructure projects outlined in the Core Action Plan could make a significant contribution to

economic growth in Burundi. International experience indicates that policies to promote local content vary among countries, but the objectives of such policies typically center on some or all of the following:

- Increasing employment opportunities throughout the construction supply chain.
- Creating opportunities for local consultants.
- Increasing work for local contractors.
- Creating market openings for locally produced materials and components.

In each of the key sectors, there will be need for clearly articulated procurement strategies and plans for the works and materials needed for execution of the programs and projects.[27] Procurement policies will need to address a range of issues, including the following:

- The choice of standards for civil works and goods and materials. To what extent can local materials be used and do their technical specifications comply with contract requirements?
- The number, size and types of contracts to be tendered. To what extent will the size and content of procurement packages be geared to the capacities of the local market?

The foregoing objectives, taken together, can constitute the elements of a national policy for promoting local content in public infrastructure procurement. At this stage, Burundi does not have a clear policy for the promotion of local content in infrastructure. As a result, de facto policy is made by the donors who fund individual infrastructure projects. Anecdotal evidence suggests that a large part of donor-funded programs rely on large contracts that are well beyond the capacities of domestic business. Consistent with donor commitments under the Paris Declaration, there is a strong case for closer attention to the design of contracts and the use of these contracts to promote domestic business opportunities; for example, under the proposed infrastructure program, there will be a substantial build-up in public outlays on routine maintenance of the road network. This trend offers opportunities to promote the development of domestic contractors. As Chapter 6 indicates, larger, more manageable contracts are needed to implement routine maintenance on the main parts of the national road network. Consideration could therefore be given to the award of multi-year "period" contracts for routine maintenance of individual sections of the core national network and urban roads. The full program could be phased in over a period of say, five years. Each contract could, for example, cover an average of not less than 100 km. When the program is fully operational, this would result in about 25 contracts with an average value of $175,000 per contract per year (at 2007 constant prices). This would introduce a degree of competition in the industry and provide valuable information about the capacities of individual firms. As the capacity of domestic contractors grows, the size of some of the period contracts could be increased. Longer-term contracts, the size of which are increased over time, will reduce unit costs for road maintenance, permit contractors to purchase necessary equipment, and locate staff close to the road sections rather than operate only from larger towns. Contractors could be required to use local communities for appropriate activities such as clearing drains and vegetation.

[27] See, for example, Wells, Dr. Jill and John Hawkins (2008), Increasing Local content in the Procurement of Infrastructure Projects in Low Income Countries. Institution of Civil Engineers, London, November 2008.

Chapter 4 – Implications for the Burundi Economy

Economic Impact of the Base Case

The prevailing conditions in the Burundi economy will play an important role in shaping the economic outlook for the near-term. Given the substantial amount of preparatory work required for the successful launch of the proposed program, including mobilization of donor and private funding, several years will pass before the full economic impact of the initiative is felt. In considering the economic impact of the proposed program, it is therefore useful to distinguish between the near-term outlook for the economy and the effects of the program in the longer-term.

Economic Outlouk for the Near-term

The African Development Bank and the International Monetary Fund have recently published forecasts of economic growth for Burundi for the near-term. The AfDB outlook for 2009 and 2010 is somber. GDP growth is estimated at only 3.2 percent in 2008, and is projected to remain at about three percent a year in real terms during 2009 and 2010 (Table 4.1). The IMF puts growth at 4.5 percent in 2008 and projects a drop in growth in 2009 to about 3.2 percent in real terms. The reasons given for the decline include a reduced demand for exports, a decline in world coffee prices, and lower private transfers and foreign direct investment. The IMF then projects a steady recovery in growth to 4.8 percent a year by 2012.

The position taken in this Report on the outlook for the next few years differs somewhat from these forecasts. As the discussion in Chapter 1 indicates, the encouraging recovery in economic growth in the Burundi economy in the past three years has stemmed, in part, from the substantial increase in donor support for rehabilitation of infrastructure and related services in the economy. Since export earnings account for only eight percent of total demand in the Burundi economy (see Table 1.1), the domestic impact of the current decline in the global economic activity is likely to be limited. The ongoing 10 percent contraction in world trade, if it were to apply to Burundi, would have only a small impact. It is the level of domestic demand that will largely determine the growth performance over the next few years. Even if no additional domestic policy initiatives were to be taken, there will be further sharp increases in public investment expenditures until 2011 because of the ongoing program of infrastructure rehabilitation funded by the AfDB, European Union and World Bank. These ongoing projects will push the aggregate investment level to about 25 percent of GDP during 2010 and 2011 (Table 4.2). However, these various projects come to a close by about 2014, and as a result, spending under these programs declines sharply from 2012. In the absence of any new investment initiatives, such as the proposed Infrastructure Action Plan, the investment rate would then decline again to about 16 percent of GDP by 2014.

Analysis of the impact of the ongoing infrastructure rehabilitation program undertaken for this Report suggests that GDP growth will be in the range of

Table 4.1: Alternative Projections of GDP Growth for the Short- and Medium-Term
(Percent per annum at constant prices)

Source	Estimate	Projected				
	2008	2009	2010	2011	2012	2013
African Development Bank	3,2	2,9	3,0			
International Monetary Fund	4,5	3,2	3,6	4,2	4,8	
Report scenarios						
A. Base Case	4,5	4,6	5,8	6,5	6,0	7,1
E. No Infrastructure Action Plan	4,5	4,4	4,7	5,1	4,0	3,8

Source: Annex I and Annex VI.

Table 4.2: Outlook for Investment and Growth Without New Infrastructure Initiatives
(US$ millions at 2007 constant prices)

	Estimate	Projected					
	2008	2009	2010	2011	2012	2013	2014
Public investment							
Donor infrastructure program							
Ongoing	53,5	61,6	94,3	102,7	42,1	16,3	-
Other	111,5	112,9	115,9	117,1	119,4	120,2	121,1
Sub-total	164,9	174,5	210,2	219,8	161,5	136,5	121,1
Private investment							
International	5,1	5,5	6,0	6,6	7,2	7,8	8,5
Domestic	50,8	55,4	60,4	65,8	71,8	78,2	85,3
Sub-total	55,9	60,9	66,4	72,4	79,0	86,0	93,8
Total	220,8	235,4	276,6	292,2	240,5	222,5	214,9
Memo items:							
GDP	1 024	1 069	1 119	1 176	1 223	1 269	1 317
GDP growth rate (% p.a.)	4,5	4,4	4,7	5,1	4,0	3,8	3,8
Fixed investment (% of GDP)							
Public	16,1	16,3	18,8	18,7	13,2	10,8	9,2
Private	5,5	5,7	5,9	6,2	6,5	6,8	7,1
Total	21,6	22,0	24,7	24,8	19,7	17,5	16,3

Source: Annex Tables VI.2 and VI.7.

four percent in real terms in 2009 and that it would increase to about five percent a year in 2010 and 2011. As the ongoing infrastructure program phases down after 2011, economic growth could decline to about four percent a year in 2013-2014. At these levels of GDP growth, pressures would likely re-emerge in the job market. Serious delays in implementing the ongoing donor-funded program could result in slower economic growth in the immediate future.

The key point that emerges from this assessment of the economic outlook for the near-term is that a strong push to improve the basic infrastructure services can sustain economic growth in the near-term and lay the foundations for an extended period of strong economic growth over the next two decades.

Impact of the Base Case in the Longer-term

The Base Case Scenario includes the Core Infrastructure Program outlined in Chapter 3 and the nickel mining project outlined in Chapter 2. The aggregate amount of additional public investment that is required over this 20-year period is about $3.4 billion. About $770 million of private investment would need to be mobilized for the proposed investment in power generation, civil aviation, and the communications network. The development of the nickel mine would require an additional $1.44 billion.

As Table 4.3 indicates, GDP grows in real terms by about 7.1 percent a year over the next two decades in this Scenario. The Burundi economy expands from the current $1 billion to a $4.6 billion economy (at 2007 constant prices) by 2030, roughly comparable to the current economies of Benin and Madagascar. The size of the domestic market for a wide range of goods and services is sufficient to open up an increasingly large range of business opportunities for domestic and offshore investors. GDP per capita increases by 4.6 percent a year to about $325 by 2030 (at 2007 constant prices). Sustained growth of incomes in this range begins to have a significant impact on the incidence of poverty in the country, with a substantial number of people at or just below the poverty line moving out of "official" poverty, although many of these people would still be vulnerable to downturns in the economy due to droughts or other disruptions.

Table 4.3: Economic Impact of Full Implementation of the Base Case Scenario
(In US$ at 2007 constant prices)

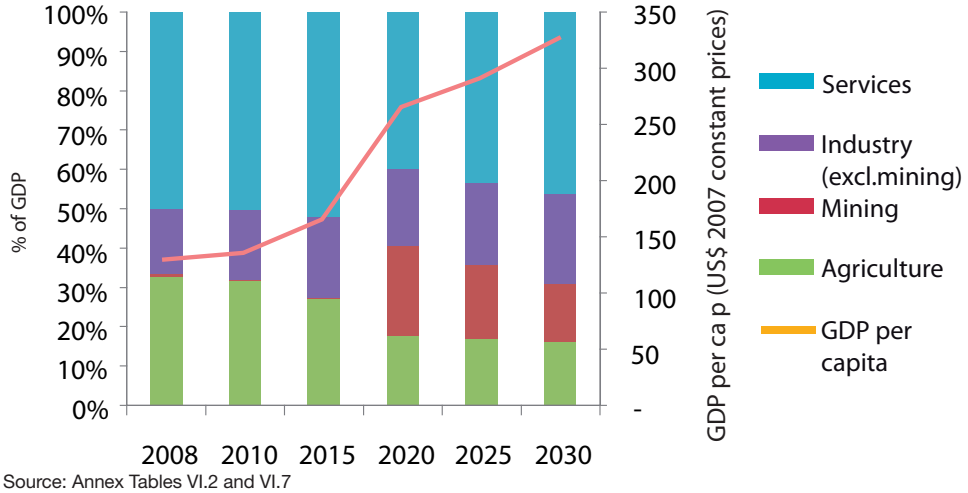
Indicator	2008	2010	2015	2020	2025	2030	Growth % p.a. 2010-2030
Population (mill)	8,04	8,49	9,70	11,03	12,48	14,05	2,6
GDP (US$ mill)	1 024	1 132	1 581	2 904	3 603	4 560	7,2
GDP per capita (US$)	127	133	163	263	289	324	4,6
Composition of GDP (%)							
Agriculture	32,9	31,6	27,0	17,5	17,0	16,1	
Mining	0,5	0,5	0,4	23,1	18,7	14,8	
Industry (excl. mining)	16,7	17,6	20,8	19,6	20,9	23,0	
Services	49,9	50,4	51,8	39,8	43,4	46,1	

Source: Annex Tables VI.2 and VI.7

The sustained strong economic growth is accompanied by significant changes in the structure of the economy that, in turn, have important implications for employment and the provision of basic services such as health and education:

- The agricultural sector is projected to grow at an average of 3.6 percent a year in response to opportunities for sale of fresh and processed products in the increasing large domestic market, made possible by the improved market information and access, and lower transport costs for inputs and outputs, that flow from implementation of the Core Infrastructure Action Plan. The implication is that a growing number of rural families are producing marketable surpluses for the increasingly large urban market. With these opportunities, average productivity in agriculture begins to rise after some twenty years of stagnation.
- The mining sector accounts for more than 20 percent of GDP in 2020, but with an unchanging level of output, its share declines gradually to about 15 percent of GDP by 2030. However, the industrial sector emerges as an important source of economic growth for the economy. By 2030, the mining and other industrial activities account for 38 percent of GDP.

Graph 4.3: Economic Impact of Base Case Scenario



Source: Annex Tables VI.2 and VI.7

- The services sector continues to account for close to half of GDP with sustained strong growth in transport and financial services and wholesale and retail trade.

This structure would move Burundi towards the prevailing composition of output for Sub-Saharan Africa as a whole. According to the World Bank (2008), agriculture accounted for 15 percent of GDP in Sub-Saharan Africa in 2006, while industry accounted for 34 percent in the same year.

The immediate challenge in moving ahead with the Base Case Program will be the mobilization of the required amounts of public and private investment. As Table 4.4 indicates, in the decade ahead (2010-2019) a total of $1.95 billion will be required for the Core Infrastructure Program, $250 million of which has been mobilized under the ongoing donor-funded support for infrastructure discussed in Chapter 3. To this must be added some $670 million of private investment required for the power, civil aviation and communications programs, and $1.44 billion for the development of the nickel mine. At the peak of the program, when the mine site is being developed (2014-2016), total investment averages about 65 percent of GDP. Excluding the mine development, total investment is about 35 percent of GDP.

As the discussion in Chapter 3 indicates, realization of these high levels of investment will require close attention to three particular aspects of the program: (i) mobilization of the public and private investment funds; (ii) building capacities for effective implementation of the program; and (iii) effective management of the macroeconomic impact of the program, including, for example, early action to develop the required skills in the labor force.

Economic Benefits of the Program

The economic benefits that accrue to Burundi as a result of the proposed Action Plan and associated mine development are substantial. They include: (i) sustained growth of the domestic economy that creates employment opportunities and increases incomes; (ii) improved access to infrastructure services and lower costs for these services that improves the business environment and international competitiveness; and (iii) increased tax revenues and expanded public services.

Employment creation. For the purposes of this Report, rough estimates of the sectoral composition of employment were prepared for 2008. Projections of employment for the Base Case (and the other scenarios) were then prepared. (See Annex III for a discussion of the manner in which these employment estimates and projections were prepared.) The employment numbers generated by this exercise may be subject to large margins of error, but they do provide useful insights about the extent to which

Table 4.4: Base Case Fixed Investment for the Decade Ahead
(In US$ millions at 2007 constant prices)

	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fixed capital formation												
Public												
Core infrastructure program	53	157	206	185	224	202	238	215	180	165	185	170
Other public investment	111	116	117	119	120	121	124	128	131	134	138	141
Total	165	273	323	304	344	323	362	342	311	299	323	312
Private investment												
Core infrastructure program	-	21	30	62	78	93	165	111	73	23	16	16
Nickel mine development		-	-	-	-	431	719	287	-	-	-	-
Other private investment	56	66	72	79	86	94	102	111	121	132	144	157
Total	56	87	102	141	164	618	986	509	194	155	160	173
Total investment	221	361	426	445	508	941	1 349	852	506	455	483	484
Investment as % GDP												
Public	16,1	24,1	26,8	23,8	25,2	22,1	22,9	20,3	12,2	11,2	11,6	10,7
Private	5,5	7,7	8,5	11,0	12,0	42,2	62,4	30,2	7,6	5,8	5,7	6,0
Total	21,6	31,8	35,3	34,8	37,1	64,3	85,3	50,5	19,9	17,0	17,4	16,7
Memo item:												
GDP (US$ millions)	1 024	1 132	1 206	1 278	1 368	1 464	1 581	1 686	2 547	2 669	2 783	2 904

Source: Annex Tables VI.2 and VI.7. Note: These investment expenditures exclude development outlays on capacity building and technical studies.

Table 4.5: Employment Creation Under the Base Case Scenario

Employment indicator	Value						Growth rate (% p.a.)	
	2008	2010	2015	2020	2025	2030	2010-20	2020-30
Total employment ('000 person-years)								
Agriculture	3 547	3 785	4 127	4 376	4 692	4 972	1,4	1,3
Mining	34	35	39	46	51	56	2,8	2,0
Industry (excl. mining)	118	132	197	309	372	467	9,9	3,8
Services	409	447	611	820	1 057	1 352	6,2	5,1
Total	4 107	4 399	4 974	5 551	6 171	6 848	2,4	2,1
Share of employment (%)								
Agriculture	86,4	86,0	83,0	78,8	76,0	72,6		
Mining	0,8	0,8	0,8	0,8	0,8	0,8		
Industry (excl. mining)	2,9	3,0	4,0	5,6	6,0	6,8		
Services	10,0	10,2	12,3	14,8	17,1	19,7		
Total	100,0	100,0	100,0	100,0	100,0	100,0		
Value added per laborer (US$ at 2007 constant prices)								
Agriculture	95	94	104	116	130	148	2,1	2,5
Mining	150	149	149	14 630	13 270	12 041		-1,9
Industry (excl. mining)	1 450	1 509	1 666	1 839	2 030	2 242	2,0	2,0
Services	1 250	1 275	1 340	1 409	1 480	1 556	1,0	1,0
Average	249	257	318	523	584	666	7,6	2,4
Memo items:								
Urban labor force ('000)	447	504	665	857	1 094	1 396	5,5	5,0
Urban employment								
Total ('000)	424	479	632	814	1 039	1 327	5,5	5,0
As % of non-farm employment	75,7	78,0	74,6	69,3	70,3	70,7		

Source: Annex Table III.1 and III.3 and Annex Table VI.7. Note1: The urban unemployment rate is assumed to be 5%.

the Action Plan can create jobs and the way in which the labor market in Burundi may evolve as a result of the proposed program. More detailed investigation of the current status of employment in the country is needed before any definitive judgments can be made about the impact of the program.

As Table 4.5 indicates, the number of people employed in agriculture is estimated at about 3.55 million in 2008, equivalent to about 86 percent of total employment. Value added per laborer in the sector is estimated at $95 at 2007 constant prices, which compares with the World Bank's estimate of $80 in 2001-2003 (in 2000 dollars).[28] Employment in industrial activities, including mining, is estimated at about 150,000 person years in 2008, with the bulk of the jobs in manufacturing, handicrafts and construction and small-scale mining (mainly gold mining). Employment in services is estimated at about 410,000 person years in 2008, including about 75,000 in the public sector. A substantial number of people in the services sector are very likely engaged in low productivity employment along with large amounts of under-employment. The urban labor market of some 450,000 is estimated to account for about three-quarters of non-farm employment in the country.

The Base Case provides a clear demonstration of the impact of sustained high economic growth on the labor market. Employment in the non-farm sector grows at about six percent a year. Over the next two decades, about 1.3 million jobs are created in the non-farm sector, mainly in urban areas - equivalent to almost 50 percent of the 2.7 million entrants into the labor force in this period. The important employment outcome stems from the expected strong business grow in urban areas as a result of more reliable and lower cost power, improved transport and communications services and lower costs for these services.

The share of employment in agriculture declines steadily to about 70 percent of the work force by

[28] See World Bank (2007).

2030. By 2030, the industrial sector, including mining, is projected to account for almost 10 percent of employment, while the services sector is projected to account for about 20 percent.

Value added per worker increases by about two percent a year in each of the three sectors, but average value added for the entire workforce grows more rapidly. The reason for the latter is the large numbers of people that migrate from low productivity employment in agriculture into higher productivity employment in urban areas. As a result, average labor productivity rises steadily in agriculture to $150 in 2030 (at 2007 constant prices). The 60 percent increase in farm productivity over these two decades will have a significant impact on the incidence of rural poverty. As discussed in Chapter 2, the sustained improvement in farm productivity comes from intensification of agriculture made possible by the improved access and lower costs that stem from the Core Infrastructure Action Plan.

Business development, cost reductions and competitiveness. A substantial number of new business opportunities will emerge as the Program is implemented. As noted in Chapter 1, it would appear that about 2,000 small- and medium-business establishments are registered in Burundi. The projections for the power sector in Chapter 5 assume that the number of new business accounts with REGIDESO will grow by about seven percent a year to a total of about 6,000 by 2020 and 12,000 by 2030 - in other words, the Base Case Scenario would lay the foundations for the emergence of a substantial small- and medium-business community within Burundi. Early attention to the design and implementation of a comprehensive program of support for local businesses, along the lines outlined in Chapter 3, would complement and reinforce activities carried out under the Core Infrastructure Action Plan, and help ensure that there is a strong domestic supply response.[29]

The proposed program of infrastructure development would also improve access to these basic services throughout the entire country, as illustrated by the following examples drawn from this Report:

- The number of electrical connections would increase from about 36,000 at the present time to about 1.2 million by 2030.
- Some 2.6 million urban dwellers would be within 500 meters of a road accessible to vehicles.
- The number mobile phone subscribers would increase from about 150,000 at present to more than 2 million by 2030.
- The number of households with access to TV would increase from 200,000 at present to about one million by 2030.

The substantially higher level of investment in basic infrastructure over the next two decades will lower costs of electricity, transport and communication and in so doing improve international competitiveness of business activities - small and large. As noted in earlier Chapters, lack of power, for example, has severely affected development of the commercial and industrial sectors, with adverse consequences for economic growth, employment and exports.

Improved public revenues. The extended period of strong economic growth under the Base Case would also make a major contribution to government revenues. At the present time, total revenues of the Government are about US$200 million a year (at current prices), equivalent to about 19 percent of GDP. The long-term projections of the IMF imply revenues of about 21 percent of non-mining GDP in the 2020s. Table 4.6 applies these ratios to the projected GDP for the Base Case. Should the nickel mine

go ahead in 2017 as proposed, the Government's subsequent revenue position would improve substantially; it would be in the range of $1 billion a year by 2030 (at 2007 constant prices). An analysis of the implications for budget and national debt management are beyond the scope of this Report, but clearly, the combination of strong

[29] As discussed in Chapter 2, implementation of a program to develop and rationalize small-scale business activity in gold mining could add substantially to the number of small business establishments that are registered.

Table 4.6: Estimated Tax Revenues for the Government of Burundi (In US$ millions at 2007 constant prices)

Indicator	2008	2010	2020	2030
Total revenues before nickel project	190	210	446	816
Taxes and royalties from nickel			186	186
Total revenues	190	210	632	1 002
Memo items:				
Revenues as % of GDP	18,6	18,5	21,8	22,0
GDP	1 024	1 132	2 904	4 560

Source: Various IMF country reports & Annex Tables VI.6 and VI.7

economic growth and the start-up of the mining operation have very significant implications for the revenue position of the Government. The prospect of some $640 million of revenues (at 2007 constant prices) by 2020 may allow Burundi to overcome its current vulnerability to debt distress. If that were possible, it would have a very important impact on the ability of the country to access international capital markets and move forward with the various PPP arrangements that require private funding.

Economic Viability of Program Components

The economic rates of return on these proposed investments appear to be attractive. To illustrate the economic benefits that can flow from the proposed Action Plan, an internal rate of return (IRR) was calculated for the Base Case. The estimates are based on the incremental investment cost of the program relative to Scenario F in which the Core Infrastructure Program is not implemented and the nickel mining project does not proceed. The incremental value added in GDP for the Base Case was used as a proxy for the various benefits that would flow from the program. The resulting IRR for 2010-2030 was 27 percent.

Analysis of the sectoral components of the program also point to attractive returns on these investments. The proposed major rehabilitation of the road network will result in substantial savings in transport costs. According to the World Bank, the average cost of road freight from Tanzania to Burundi and other landlocked countries is 13.5 US cents per ton km (see Table 6.27). If these costs are reduced to say, 8 US cents per ton km, in line with freight costs in neighboring EAC countries, the benefits for the Burundi economy would be large. For an average haul of 1,700 km from the coast, the freight cost per ton would decline from $230 per ton to $135 per ton (at 2007 constant prices). Applying these savings to the projected international road freight of Burundi, as reported in Annex Table V.5, gives an internal rate of return of about 21 percent.[30]

The ongoing donor-funded program of rehabilitation in the power sector is also expected to yield significant benefits. The physical benefits from these investments that have been quantified stem from the incremental electricity supplied to consumers following increased generation and expected reduction of technical losses from rehabilitation of the severely dilapidated network. The AfDB and World Bank have estimated economic and financial rates of return for their respective projects (Table 4.7). The economic rate of return for each of these projects is in the range of 13-15 percent. The financial rate of return for the AfDB project was estimated at about 11 percent. The EIRR is particularly sensitive to variations in investment cost, delays in completing generation investments, and to assumptions regarding reductions in technical losses. Benefits from improved reliability and quality of service have not been quantified in the economic analysis and represent added benefits brought by the projects.

Table 4.7: Rates of Return on Power Projects

Indicator	AfDB project	IDA project
Economic return (EIRR)	14,8	13,3
Financial return (IRR)	10,6	n.a.

Source: AfDB (2008) and World Bank (2008).

[30] In this calculation, 20 percent of the total cost of the national highway rehabilitation and maintenance program was included in the calculation. (The main national roads that carry international road freight account for 16 percent of the total cost of the national program.)

Alternative Scenarios for the Next two Decades

As the discussion in Chapter 3 indicates (see Table 3.1), a program of this size and complexity necessarily faces a wide range of risks and uncertainties. For the purposes of this Report, five alternative scenarios have been investigated. These essentially relate to the availability of public funding for the program, the willingness of private investors to take on exposure in Burundi, and the capacity of the Government, with assistance from donors, to design and implement the program. The key scenarios are as follows:

- Scenario B, in which the Core Infrastructure Program is implemented in full, but the investment in nickel mining does not materialize.
- Scenario C, in which the mining project does not proceed, Burundi is not able to mobilize any private funding for the infrastructure program, and there is no additional public funding to compensate for this shortfall. As a result, there are substantial delays in building up the required power generation, the upgrade of the international airport is deferred, and the expansion of the national communications grid is delayed.
- Scenario D, in which there is no private funding for the infrastructure program, the mining project does not proceed, and the available donor funding is only half of what is required for Core Infrastructure program.
- Scenario E, in which there is no private funding for the program and only 20 percent of the required public funding is available. This scenario is reflects a situation in which there is no sustained effort to improve infrastructure services, and there is only minimal donor support for such a program.
- Scenario F, in which the Base Case is implemented in full, and one of the rail extensions into Burundi is completed. In this case, the rail network is extended to the mine sites.

Given the current low levels of domestic savings and limited government budget resources, the availability of donor funds and private investment is crucial for the successful implementation of the proposed program. As the analysis below indicates, shortfalls in funding result in slower economic growth over the next two decades that mean less progress in creating productive employment opportunities and larger numbers of people whose livelihoods continue to depend on low productivity employment in agriculture

The Nickel Mining Project Does Not Materialize

In this scenario (Scenario B), the Core Infrastructure Action Plan is fully implemented, but private investors do not go ahead with the nickel mining project. GDP grows at an average of 6.4 percent a year over the next two decades. This is almost a full percentage point lower than the Base Case. By 2030 GDP stands at $3.9 billion, compared with $4.6 billion in the Base Case.

The key point about this scenario is that with the absence of the mining operation, the main losses are government revenues of $186 million a year and export earnings of $975 million a year (both at 2007 constant prices). The latter loss will result in a large increase in the trade deficit of the country. The immediate impact in the labor market is small, because the mine is assumed to employ only 3,000 people once it is in operation. The second round effects of this loss of income are also small as the total personnel costs are put at $30 million. Assuming that a large part of these are payments to expatriate technicians who remit income abroad, the domestic impact is likely to be modest. Moreover, the bulk of the $310 million of inputs required for mine operations would be imported.

Table 4.8: Economic Impact of Lack of Investor Interest in the Nickel Mining Project
(In US$ at 2007 constant prices)

Indicator	2008	2010	2015	2020	2025	2030	Growth % p.a. 2010-2030
Population (mill)	8,04	8,49	9,70	11,03	12,48	14,05	2,6
GDP (US$ mill)	1 024	1 132	1 581	2 239	2 938	3 895	6,4
GDP per capita (US$)	127	133	163	203	235	277	3,8
Composition of GDP (%)							
Agriculture	32,9	31,6	27,0	24,0	20,8	18,9	
Mining	0,5	0,5	0,4	0,3	0,3	0,2	
Industry (excl. mining)	16,7	17,6	20,8	26,8	25,7	26,9	
Services	49,9	50,4	51,8	48,8	53,3	54,0	

Source: Annex Tables VI.2 and VI.7

Private Investment for Infrastructure is not Available

This scenario (Scenario D) assumes that the private investment required for the Core Infrastructure Program is not forthcoming. Under the Base Case, about $770 million of private investment is required for full implementation of the Program, including $465 million for investment in power generation plants in Burundi to supply the national grid, $245 million for the proposed PPP for the international airport, and about $60 million for the communications sector. The economic impact of this cutback in investment lowers the economic growth rate to an average of 6.2 percent a year (Table 4.9). There are close to 100,000 fewer productive jobs in the industry and services sectors, and a corresponding increase in the number of people who would continue to depend on low productivity employment in agriculture.

To compensate for the loss of additional domestic generation capacity, Burundi would need to import all the additional power it requires from Ethiopia or other low cost sources via the EAPP grid to sustain economic growth at 6.2 percent a year. The main concern here is that the degree of dependence on imports rises rapidly. By 2020, imports account for about 80 percent of total supply and by 2030 the dependence on imports increases to more than 90 percent of supply. The Government has already indicated that this degree of dependence on electricity imports is not acceptable. In the absence of private investment for the additional domestic generation capacity, one option would be to approach the donor community for the $465 million of funding required. The other option would be to cut back sharply on the targets for electrification by

Table 4.9: Economic Impact of Lack of Private Investor Interest in Burundi Infrastructure
(In US$ at 2007 constant prices)

Indicator	2008	2010	2015	2020	2025	2030	Growth % p.a. 2010-2030
Population (mill)	8,04	8,49	9,70	11,03	12,48	14,05	2,6
GDP (US$ mill)	1 024	1 129	1 504	2 112	2 800	3 745	6,2
GDP per capita (US$)	127	133	155	191	224	266	3,6
Composition of GDP (%)							
Agriculture	32,9	31,6	27,7	24,9	21,6	19,7	
Mining	0,5	0,5	0,4	0,3	0,3	0,2	
Industry (excl. mining)	16,7	17,6	20,5	26,6	25,3	26,5	
Services	49,9	50,4	51,5	48,1	52,7	53,5	

Source: Annex Tables VI.2 and VI.7

2020 and 2030 and in so doing, reduce demand. The latter would almost certainly have second round effects not captured in the above projections because it would constrain the growth of business and employment creation. Lack of private funding for the upgrade of the international airport would probably result in delays in full compliance with ICAO requirements that, in turn, would undermine efforts to develop tourism, as well as high value exports that would require access to airlines with major capacities for airfreight.

Donor Funding for the Program is Less Than Required

This Scenario assumes that the total amount of donor funding available for the infrastructure program is cut by about 50 percent. The implication is that donor support for the program stands at about $1.6 billion in this scenario, compared with $3.4 billion in the Base Case. With this sharp reduction in investment, the economic growth rate drops to an average of 5.6 percent a year. Compared to the Base Case, an additional 300,000 people remain employed in low productivity agricultural pursuits and there is a corresponding decline in non-farm employment opportunities.

In the face of these kinds of funding constraints, the Government would have little choice but to cut back sharply on all the main elements of the Core Infrastructure Program, including slower progress with electrification of the country, deferment of upgrading and paving the national road network, and reduced emphasis on infrastructure needed for urban areas. In the event that people continue to move out of agriculture, looking for work in urban areas, urban unemployment may rise and urban settlement areas may be poorly serviced with basic infrastructure.

The Infrastructure Program is not Implemented

This Scenario assumes that only minimal action is taken to improve Burundi's infrastructure and that integration with the networks of neighboring countries proceeds at a slow pace. The economy grows at an average of 4.8 percent a year over the next two decades - more than two full percentage points lower than the Base Case. Investment levels remain in the range of 18-19 percent of GDP for most of the next two decades. Compared with the Base Case, more than half a million additional people remain in the agricultural sector because there are fewer productive employment opportunities in the non-farm sector of the economy. There will be a serious risk of rising unemployment in these circumstances, especially among people in the 15-24 year age group.

In this scenario, average labor productivity in agriculture remains below $100 a year for another decade and by 2030 increases to only $120, compared with $150 in the Base Case. GDP per capita increases to only a little over $200 compared with $325 in the Base Case (all at 2007 constant

Table 4.10: Economic Impact of Lack of Donor Funding for the Infrastructure Program
(In US$ at 2007 constant prices)

Indicator	2008	2010	2015	2020	2025	2030	Growth % p.a. 2010-2030
Population (mill)	8,04	8,49	9,70	11,03	12,48	14,05	2,6
GDP (US$ mill)	1 024	1 123	1 416	1 911	2 496	3 313	5,6
GDP per capita (US$)	127	132	146	173	200	236	3,0
Composition of GDP (%)							
Agriculture	32,9	31,7	28,5	26,0	23,1	21,4	
Mining	0,5	0,5	0,4	0,3	0,3	0,2	
Industry (excl. mining)	16,7	17,5	20,1	26,1	24,7	25,7	
Services	49,9	50,3	51,0	47,5	51,8	52,6	

Source: Annex Tables VI.2 and VI.7

prices). At this relatively low growth rate for the economy, the continued rise in the share of services suggests the possibility of increased levels of poverty in both rural and urban areas. Given the high and rising population densities, people will likely continue to move out of farming activities into low productivity urban and rural service activities.

The main implication of this scenario is that there would, at best, be only a modest reduction in the incidence of poverty. Even though the share of the population below the poverty line may decline somewhat, the total number of people in poverty would increase because of the continued rapid population growth. For the number of people in poverty to remain at the current level of 6.5 million, the incidence of poverty would have to decline from the current level of about 80 percent to 46 percent by 2030. With an increase in GDP per capita of only 2.2 percent a year in real terms, this is extremely unlikely. In the event that there was no reduction in the incidence of poverty, about 11 million people would be below the poverty line in 2030.

This Scenario underscores the fundamental importance of improving the growth performance of the economy over the next two decades. A major expansion of public and private investment in the infrastructure of the country is perhaps the most effective way currently available to Burundi to achieve this important objective. A key objective in the near term, therefore, is prompt action to launch the first phase of the Core Infrastructure Action Plan that will lay the foundations for an extended period of strong economic growth.

The Rail Extension is Implemented

In this Scenario, the Base Case is implemented along with the construction of one of the two proposed rail extensions into Burundi. The economic impact of the proposed rail investment is modest. Full implementation of the Base Case and one of the proposed rail extensions into Burundi gives a GDP growth rate of 7.4 percent a year over the next two decades, which compares with the growth rate of 7.2 percent for the Base Case (Table 4.12).

The limited economic benefit from the rail investment stems from the working assumption used in this Report that nickel would be refined at the mine site rather than exported as ore and therefore, the freight volumes associated with the mining operation would be substantially smaller than that posited by the Master Plan for the railways network (see Chapter 2). In the absence of large quantities of ore exports, the quantities of non-mine freight are not sufficient for the rail investment to have a substantial economic impact, at least within the next two decades. As Chapter 6 indicates, the IRRs for the two extension proposals are low in the absence of the ore exports (Table 6.30). If one of the extensions were to go ahead in the absence of mine-generated traffic, it is likely that its operation would require substantial public subsidies. The Government of

Table 4.11: Economic Outlook with no Implementation of the Infrastructure Program
(In US$ at 2007 constant prices)

Indicator	2008	2010	2015	2020	2025	2030	Growth % p.a. 2010-2030
Population (mill)	8,04	8,49	9,70	11,03	12,48	14,05	2,6
GDP (US$ mill)	1 024	1 121	1 396	1 746	2 220	2 868	4,8
GDP per capita (US$)	127	132	144	158	178	204	2,2
Composition of GDP (%)							
Agriculture	32,9	31,7	28,9	27,7	24,7	23,0	
Mining	0,5	0,5	0,4	0,4	0,3	0,3	
Industry (excl. mining)	16,7	17,5	19,1	21,4	21,9	23,4	
Services	49,9	50,3	51,6	50,5	53,2	53,3	

Source: Annex Tables VI.2 and VI.7

Burundi faces difficult policy choices in deciding on these transport options in collaboration with potential investors.

Another concern about this scenario is the very large build-up in investment in 2014-2016, in the event that the rail extension was to be implemented in conjunction with the development of the nickel mining operation. Burundi's share of the capital cost of the proposed rail extension is estimated to be about $600 million in the decade ahead. As a result, aggregate investment in Burundi averages 75 percent of GDP during 2014 through 2016, with investment peaking at 95 percent of GDP in 2015. As noted elsewhere in this Report, the macroeconomic impact of such a large investment built-up would need to be taken into account by the Government in its consideration of these various investment options.

Table 4.12: Impact of Implementing the Base Case and the Rail Extension into Burundi
(In US$ at 2007 constant prices)

Indicator	2008	2010	2015	2020	2025	2030	Growth % p.a. 2010-2030
Population (mill)	8,04	8,49	9,70	11,03	12,48	14,05	2,6
GDP (US$ mill)	1 024	1 133	1 625	3 021	3 743	4 721	7,4
GDP per capita (US$)	127	133	167	274	300	336	4,8
Composition of GDP (%)							
Agriculture	32,9	31,6	26,7	18,0	16,5	15,6	
Mining	0,5	0,5	0,4	23,2	18,0	14,3	
Industry (excl. mining)	16,7	17,6	20,9	20,8	21,3	23,4	
Services	49,9	50,4	52,0	38,0	44,1	46,8	

Source: Annex Tables VI.2 and VI.7

PART B

Action Programs for the Power, Transport and Communications Sectors

Chapter 5 – Improving Access to Electric Power

Overview of the Energy Sector in Burundi

Major Challenges and Emerging Policy Issues

Lack of access to electricity and unreliable supply. Despite a very dense hydro-graphic network which provides Burundi with a hydro-electric potential of about 1,200 MW and a potential energy supply of 6,000 GWh/year, the country faces a chronic shortage of electricity. These supply difficulties stem from the unfavorable climatic effects of recent years and recurrent social conflicts and unrest that resulted in substantial damage to the electrical system and subsequent deterioration because of lack of maintenance. The situation was compounded by the trade embargo of its neighbors from 1996 to 1999, which led to problems of supply, transport surcharges and delays in the importation of oil products for electrical equipment. During the civil conflict, the electricity access rate in connected areas halved as the urban population doubled, while the number of customers of the power utility remained unchanged. Only two percent of households currently have electricity service in their homes. At 20 kWh per capita per year, the average consumption of electricity in Burundi is among the lowest in Africa.

As the subsequent discussion indicates, the current severe capacity constraints that limit the amount of electricity available to the business community are expected to continue for several more years. Until these power shortages are overcome, it is likely that consumption of power by the business community will remain at the current levels.

Immediate priorities for the sector. The Government recognizes that provision of improved electrical services is critical for the economic development of the country. Development of the energy sector and in particular, an accelerated program of electrification, is therefore a priority. Improved electricity services will play a crucial role in accelerating industrial and commercial activity and hence contribute to the country's economic growth, while simultaneously contributing to the well-being of the population. The immediate priorities for the sector are the rehabilitation of existing infrastructure, building the capacity of institutions to plan and regulate, promoting rational use of energy products, formulating a framework for monitoring domestic energy and improving access to electricity. In the short-term, the Government's program gives priority to emergency infrastructure rehabilitation actions and building the production capacity; and in the medium-term, the program entails: (i) completing the rehabilitation of the power system through actions to improve safety and reliability; (ii) increasing generating capacity; and (iii) extending the supply and transmission network.

Policies for the longer term. The country's energy policy emphasizes the growth of the national capacity to provide quality energy in sufficient quantity and at least cost by opening the sector to private investment and creating the conditions conducive to the development of its hydro-electric potential. A key element of the strategy is to increase the country's electrification rate from the current level of two percent to 25 percent in 2020. The Government's plan for an accelerated program to electrify the country is based on developing national resources, creating conditions that will foster the development and management of private firms and the public electricity service, stepping up the utilization of peat, and institution-building and effective management of the sector's public services. The Government also attaches a high priority to regional integration of energy supply programs for sharing adequate and reliable sources of supply at least cost. It is strongly committed to initiatives that facilitate integration of its infrastructure facilities with those of neighboring states.

Institutional Arrangements for the Energy Sector

Responsibilities within Burundi. The Ministry of Water, Energy and Mines (MWEM) is responsible for Burundi's energy sector. The mission of the Ministry is to formulate and implement energy policy, as well as consolidate and manage the energy sector. The policies and programs are implemented

through the General Directorate of Water and Energy (DGEE) and the General Directorate of Water and Rural Energies (DGHER). The DGEE is responsible for preparing sector policy and legislative and regulatory texts. It plans and coordinates the sector's activities, defines priorities, formulates investment programs, controls operation of the power utility, oversees the permanent secretariat of the national energy commission, and prepares tariff policy. The DGHER is responsible for coordinating non-governmental organizations (NGOs) operating in the sector, rural electrification, biomass and alternative energies.Other government agencies have responsibilities for particular aspects of energy policy in Burundi. [31]

Decrees and laws enacted in 1968 and 1969 established a monopoly for the production and supply of electricity nationwide by creating the Régie de Production et de Distribution d'Eau et d'Electricité, known as REGIDESO, which is responsible for the public electricity and water service in urban areas. REGIDESO is a public utility with autonomous judicial and financial status that operates under the supervision of the Ministry of Water, Energy and Mines. [32]

To improve service quality and financial sustainability, and with strong support from the donor community, the Government has been engaged in institutional reform of the electricity sector for several years. A decree issued in 1997 clarified the responsibilities of the DGHER and REGIDESO. The DGHER is responsible for the provision of electricity and water in rural areas, leaving REGIDESO responsible for serving urban areas. In August 2000, the Government adopted a law liberalizing and regulating electricity. It allowed for the establishment of a regulatory and control entity for energy and a development fund for the sector. It also abrogated the 1968 Order in Council that granted REGIDESO a monopoly over public drinking water and electricity supply. According to this new law, the production, supply and distribution of electric energy are industrial and commercial public services under the responsibility of the Government. Along with the DGHER, REGIDESO became a delegated public service provider operating under the control and authority of the regulatory body to be established. In the absence of a corresponding regulatory framework, the law has yet to be fully applied.

In addition to the creation of an appropriate regulatory body for the power sector the Government would like to restructure the energy sector by merging the electricity activities of DGHER with REGIDESO, and encourage private sector participation in electricity production. One of the important features of the 2000 law is that it defines the principles, forms and conditions for private sector intervention in the electricity sector. It opens the sector to public or private bodies, by laying down the relevant organic provisions. The Government can entrust management of public electricity service through delegation to one or several public or private persons. Electricity services in secondary centers and in isolated areas can be provided by the main operator or any other independent operator subject to conditions of the law.

By virtue of the same law, tariffs for the supply of electric energy are determined by the articles of the

[31] These include the National Peat Authority (Onatour), which is responsible for the use of biomass. The Ministry of Land Use Planning and the Environment is in charge of managing forest resources and environmental protection in the production of wood for energy. The Burundi Centre for Alternative Energies conducts applied research and popularizes alternative energies especially solar, wind and biomass.

[32] REGIDESO is administered by a Board of Directors comprising nine members; five represent the Government including the Managing Director (MD), and three represent consumers, industries and the staff of REGIDESO. The chair and Vice-Chair of the Board are appointed by presidential decree on the proposal of the MWEM. The Board meets at least once six-monthly. Day-to-day management is the responsibility of the MD appointed by presidential decree and assisted by five directorates: Administrative and Financial; Electricity; Water; Trade; and Human Resources. The MD is helped by one technical adviser and four regional managers who cover the entire national territory. Periodic management committee meetings are held with the participation of the regional managers to review the company's administrative and operational matters.

delegation contract. Tariffs are made known to users by the delegatee following approval of the inspection and regulation organ. The average tariff must cover electric energy production, transmission and supply costs. Moreover, the law provides for the preparation and signing of orders and decrees aimed at setting out the technical conditions that the installation of the electric equipment and utilization of electricity must meet to guarantee the safety of persons and goods, the integrity of the network and the proper running of the entire public service.

Institutional arrangements at the regional level. There is a history of cooperation between Burundi, Rwanda and the DRC with the creation of the International Electricity Company of the Great Lakes Countries (SINELAC). The three countries signed several commitments to develop electrification in the region. In 1974, the association for the study of the Electrification of the Great Lakes Region (EGL) was created. The head office of the EGL is in Bujumbura. The EGL's activities include production and transmission issues, load forecast studies and design of new power stations. In 1976, the Economic Community of the Great Lakes Countries (CEPGL) was created. In 1980, the responsibilities of the EGL were extended to cover all energies and it became a part of the CEPGL.

Recently, the Nile Basin Initiative (NBI) has begun to play an important role in facilitating regional integration in the power sector. The member countries of the NBI are Burundi, DRC, Egypt, Kenya, Rwanda, Sudan, Tanzania and Uganda. The main objectives of the NBI are: (i) to develop the Nile Basin water resources in a sustainable and equitable way to ensure prosperity, security and peace in the region; (ii) to ensure competent management of water and the optimal use of resources; (iii) to foster cooperation and joint actions among the riparian countries to achieve gains beneficial to all; and (iv) to eliminate poverty and promote economic integration to enable the transformation of activities planned by the program into concrete actions. All the member countries are confronted with development challenges that stem from the relatively small size and lack of diversification of their respective economies, their landlocked nature and high energy costs that require public subsidies. The average electricity tariffs (expressed in U.S. cents per kWh) are 8.5 cents in Burundi, 9.4 cents in Kenya, 10 cents in Uganda, 7.1 cents in DRC and 20 cents in Rwanda, compared to an average of 2.3 cents in Egypt and 6 cents in Ethiopia. National electric energy access rates are low, ranging from two to 17 percent. Addressing these constraints through new production plants and the interconnection of the electric networks is one of the objectives of the economic partnership established by the NBI member countries.

An important part of the push towards increased integration of power systems and enhanced regional trade in power is the NEPAD infrastructure Short-Term Action Plan (STAP). The STAP lays special emphasis on the interconnection of power grids as a key option for increasing access to electricity on the continent. A detailed analysis of the growth and distribution of electric energy in each of the countries points to the existence of unmet demand. The current situation is characterized by load-shedding and a cutback on the connection of new consumers. However, limited power trade exists between the networks of Uganda and Kenya based on loose electric energy supply agreements. This trade corresponds to the current surplus from Kenya to Uganda (up to 20 MW); and from East DRC to Burundi and Rwanda (around 4 MW in 2007).

Electricity Demand and Electrification in Burundi

Current Trends in Energy Consumption

The African Development Bank estimated final energy consumption in Burundi at 2.19 million tons of oil equivalent (toe) in 2003. [33] It corresponded to an average consumption of 295 Koe/capita,

[33] African Development Fund (2006), Republic of Burundi: Electricity Infrastructure Rehabilitation and Extension Project. Appraisal Report, December 2006.

compared to an average of 470 Koe per capita for the entire African continent. The distinguishing feature about energy use in Burundi is the widespread use of wood and charcoal by households. These two products account for 97.5 percent of the final energy consumption. Rural consumption of wood and charcoal is about three kg per person per day. Electricity and oil products account for 2.5 percent of energy consumption and peat, which is used exclusively by some public services, for only 0.04 percent. Households are the main consumers of energy in the country, accounting for 94 percent of total consumption. Their needs are met by wood (89 percent), charcoal (10 percent), electricity (0.3 percent), and oil products (0.4 percent). The transport and industry sectors use mainly oil products and account for about 2.8 percent of total energy consumption. The trade sector and institutions absorb about 0.14 percent of the total consumption.

The agriculture and energy needs of the large rural population exert strong pressure on the wood resources of the country. Moreover, Burundi's plant cover has been seriously affected by large concentrations of persons displaced during more than a decade of socio-political conflict. As a result, the main sources of energy – wood and charcoal – are over-used. The pace of deforestation for domestic consumption and for timber is faster than that of renewal. Varied and urgent measures are being taken to address this situation. Several donors are providing support by funding watershed and marshland development, and environmental protection projects with particular focus on reforestation. Accelerating the development of the

Table 5.1: Number of Electricity Connections

Type of connection	2003	2004	2005	2006	2007	2008
REGIDESO connections						
Households						
Bujumbura	23 079	24 448	24 589	26 031	26 573	27 423
Other	3 376	3 593	3 652	3 886	4 010	4 160
Sub-total	26 455	28 041	28 241	29 917	30 583	31 583
Government						
Bujumbura	1 019	1 057	1 011	991	1 000	1 020
Other	183	187	189	175	177	180
Sub-total	1 202	1 244	1 200	1 166	1 177	1 200
Business sector & other						
Bujumbura	2 690	2 862	2 756	2 842	2 744	2 787
Other	475	505	486	502	484	492
Sub-total	3 165	3 367	3 242	3 344	3 228	3 279
Total						
Bujumbura	26 788	28 367	28 356	29 864	30 317	31 230
Other	4 034	4 285	4 327	4 563	4 671	4 832
Total	30 822	32 652	32 683	34 427	34 988	36 062
DGHER connections			2 800	2 900	3 000	3 142
Total connections	30 822	32 652	35 483	37 327	37 988	39 204
Memo items:						
Total households ('000)						
Urban			131	139	146	156
Rural			1 361	1 395	1 430	1 468
Total			1 492	1 534	1 576	1 624
Electrification ratio for households (%)						
Urban			21,5	21,6	20,9	20,2
Rural			0,2	0,2	0,2	0,2
Average			2,1	2,1	2,1	2,1

Source: REGIDESO, Trade Planification Service.The DGHER connections for 2005-2007 are estimates.

electric power network and access to it, is seen by the Government as an essential step in stemming the damage caused by excessive use of dwindling timber resources.

A key feature of the power sector in Burundi is the very low level of electrification. Total connections to the REGIDESO network have increased by about 10,000 since 2000 and now stand at about 36,000 – an average increase of almost five percent a year. Assuming that all the DGHER connections are rural households, only 34,700 households have access to electricity – that is, only two percent of the 1.6 million households in the country are currently electrified (Table 5.1). Moreover, almost 80 percent of the households that do have access to electricity are located in Bujumbura. Only 8,000 households in the rest of the country are electrified.

In the past decade, almost all of the growth in REGIDESO connections came from households. The number of government connections has remained constant at about 1,200, while business and other connections increased by about two percent a year to the current level of almost 3,300 accounts (Table 5.1). The lack of growth in the latter is indicative of the limited progress with new business formation in Burundi in the past decade. As the discussion Chapter 1 indicates, lack of electricity and its unreliable supply, have been major deterrents to private investors. Consumption of electricity has increased at an average of about six percent a year; but almost all of this growth stemmed from the increased number of connections. As Table 5.2 indicates, average annual consumption of electricity per connection remained essentially unchanged at about 4,000 kWh during 2000-2008. A likely reason for this is that the bulk of the power sales were to households whose average consumption was stable over time. Average household consumption was about 2,500 kWh in 2007 – a level that is comparable to urban household consumption in other low income developing countries.

These data also suggest that consumption per business connection has not grown during 2000-2008, which, along with the minimal change in the number of connections, points to weak growth in business activity. As a result of persistent load-shedding by REGIDESO, electrical outages average 12 days a month – in other words, firms in Burundi experience power outages about 40 percent of the time in a typical year (Table 1.12). A large percentage of firms in Burundi have their own back-up generator, or share access to one. Back-up generators typically cost US$0.40 to US$0.50 per kWh to run, cutting into business profits and reducing the ability of local business to compete in regional and international markets.

Table 5.2: Trends in Electricity Consumption in the REGIDESO Network

Indicator	2000	2001	2002	2003	2004	2005	2006	2007	2008	Increase 2000-08 (% p.a.)
Consumption (MWh '000)										
Households								75 156		
Government								15 865		
Business & other								51 804		
Total	99 461	122 153	118 877	124 093	125 769	119 792	113 042	142 824	160 264	6,1
No. of connections										
Households	21 881	23 413	24 459	26 455	28 041	28 241	29 917	30 583	31 583	4,7
Government	1 295	1 333	1 226	1 202	1 244	1 200	1 166	1 177	1 200	(0,9)
Business & other	2 863	2 370	3 097	3 165	3 367	3 242	3 344	3 228	3 279	1,7
Total	26 039	27 116	28 782	30 822	32 652	32 683	34 427	34 988	36 062	4,2
Average consumption (kWh)										
Households								2 457		
Government								13 479		
Business & other								16 048		
Average[1]	3 820	4 505	4 130	4 026	3 852	3 665	3 284	4 082	4 444	0,3

Source: Annex Tables VII.2 and VII.3.The growth rate for 2000-08 uses the averages of 2000-2001 as the base year, and 2007-2008 for the final year.

Programs to Improve Demand Management

To address the pressures caused by the increasing demand for electricity, the Government has launched a loss reduction and fraud prevention campaign, along with a number of demand-side management measures. Several ongoing donor-funded programs are providing support for this program, including the African Development Bank and the World Bank. The World Bank program of $1 million includes demand-side initiatives that focus on energy savings by households, public institutions, industrial and large commercial customers. A key component of the efforts to bridge the current supply/demand gap is geared towards reducing consumption through the promotion of energy-efficient technologies and policies. The program includes:

- *Installation of pre-paid meters.* The number of pre-paid meters in use in 2008 was 5,100 (equal to about 14 percent of the number of connections). The program would increase this to 10,000 by end 2009, and gradually increase the number of installed pre-paid meters to 40,000 by 2013.
- *Distribution and promotion of compact fluorescent lights (CFL).* The program is financing the distribution of 200,000 CFLs to REGIDESO clients to replace existing incandescent bulbs. These would all be installed by end 2011. Increased use of CFLs is expected to save approximately 5 MW of peak power consumption when completed. The CFL roll-out program is being coordinated with the introduction of pre-payment meters installed in households that improves the ability of REGIDESO to monitor daily consumption.
- *Utility energy audit.* The component provides technical assistance to REGIDESO to complete an Energy Audit of the electricity supply system to identify scope for efficiency improvements. The focus of the audit is on: (i) technical loss reduction in the electricity grid; (ii) efficiency of pumping systems used by the utility; and (iii) losses occurring from low power factor loadsgenerated by larger industrial consumers.[34] A small investment program will be designed based on the recommendation from the Audit to capitalize on potential efficiency gains.
- *Promotion of energy efficiency (EE) investments by large consumers.* The program is funding technical assistance to promote EE technology and build local capacity to provide EE advice to large public institutions, commercial and industrial consumers. The services focus on activities and technology that have a potential for quick financial returns, including institutional solar water heating installations for hotels, university dormitories and other major users.

Projected Growth in Demand for Power

The Government's strategy for the power sector calls for 25 percent of the population to have access to electricity by 2020, compared with the current level of two percent. This report outlines an ambitious program of electrification that is designed to achieve this target (Table 5.3). The program consists of three distinct phases:

- In the first phase, 2009-2010, there would be no significant expansion in access to power. It is only in 2011 that a series of new power plants begins to be commissioned, the first of which would be the Kaganuzi hydro-plant (5 MW). In the interim, the working assumption is that REGIDESO would continue to make a small number of new household connections each year, and to the extent necessary, continue with load-shedding to accommodate these

[34] Low power factor loads increase losses in a power distribution system and result in increased energy costs.

Table 5.3: Projected Electrification Rates and Aggregate Demand for Electricity

Indicator	2007	2010	2015	2020	2025	2030	Growth rate (% p.a.)	
							2007-10	2010-30
Electrification program								
Total number of households ('000)								
Urban	146	177	233	301	384	490	6,7	5,2
Rural	1 430	1 538	1 723	1 920	2 124	2 328	2,5	2,1
Total	1 576	1 715	1 957	2 221	2 508	2 818	2,8	2,5
Electrification rates (%)								
Urban	20,9	19,0	40,0	85,0	85,0	85,0	(3,2)	7,8
Rural	0,2	0,2	3,0	15,0	24,0	34,0	-	29,3
Average	2,1	2,1	7,4	24,5	33,3	42,9	-	16,3
Households with electricity ('000)								
Urban	31	34	93	256	326	416	3,1	13,4
Rural	3	3	52	288	510	792	-	32,2
Total	34	37	145	544	836	1 208	2,9	19,0
Electricity consumption								
Consumption per household (kWh)								
Urban	2 457	2 400	2 706	2 988	3 299	3 642	(0,8)	2,1
Rural	250	250	271	299	330	364	-	1,9
Total electricity consumption (GWh)								
Households	75,2	81,5	266,7	849,9	1 244,6	1 805,1	2,7	16,8
Business sector	51,8	55,0	109,8	211,4	407,0	783,6	2,0	14,2
Mining sector	-	-	-	650,0	650,0	650,0	-	-
Government	15,9	16,4	19,0	22,1	25,6	29,6	1,1	3,0
Total	142,9	152,9	395,5	1 733,4	2 327,1	3 268,3	2,3	16,5
System losses								
Percentage of production (%)	24,4	22,0	16,0	12,5	10,0	10,0	(3,4)	(3,9)
Total losses (GWh)	45,9	43,1	75,3	247,6	258,6	363,1	(2,1)	11,2
Total supply (GWh)	188,8	196,0	470,8	1 981,0	2 585,7	3 631,5	1,3	15,7
Generation capacity								
Required capacity	36	37	90	377	492	691	1,0	15,8

Source: Annex Table VII.4.

new connections. The extent of the load-shedding will be influenced by ongoing donor-funded programs aimed at reducing technical and non-technical losses, and improving demand management. System loses declined from 24.4 percent in 2007 to an estimated 19.7 percent in 2008 and as a result, REGIDESO sales jumped by about 12 percent to 160.3 GWh.

- In the second phase, 2011-2015, new capacity in the amount of 104 MW would be commissioned. [35] This substantial increase in capacity will lay the foundations for a sharp acceleration in the electrification program for the country. As a first priority, the proposed electrification program would concentrate on laying down a network of distribution lines throughout the country that will connect all 13 provincial capitals to the national transmission grid by 2015. The electrification rate in urban areas would double to 40 percent by 2015 at which time almost 100,000 urban households would have access to electricity. The provision of reliable and less expensive power supply in major urban centers throughout the country would also lay the foundations for a surge in urban-based business activities. Growth in business demand for power is projected to be about 14 percent a year. The growth would come from two sources: a sustained increase in the number of business connections of about seven percent a year and growth in demand for power from individual businesses of about seven percent a year. As a result, the number

[35] This includes Kaganuzi (5 MW) in 2011, Mpando (10.4 MW) in 2012, Resumo Falls (20.5 MW) and Kabu 16 (20 MW) in 2013, and Rusizi III (48.3 MW) in 2015.

of business and other private sector connections would rise to at least 5,300 by 2015, compared with about 3,300 in 2008.

- In the third phase, 2015-2030, the electrification of urban areas would rise to 85 percent by 2020 and remain at this level for the following decade. By 2030, about 420,000 urban households would have access to electricity. At the same time, there would be a sustained push to link rural households to the national grid. Priority would be given to rural communities that are in close proximity to the distribution network. More remote rural communities would have to be serviced from a variety of renewable energy sources such as mini-hydro plants, solar, and wind. The electrification rate in rural areas would rise from three percent in 2015 to 15 percent by 2020, at which time, the national goal of 25 percent electrification would be realized. By 2030, the number of rural households with access to electricity would rise to almost 800,000. The national electrification rate would then be about 43 percent.

Even with the foregoing ambitious program for electrification, about 1.6 million households would still be without access to reliable sources of electricity in 2030. The implication is that the program outlined here would need to continue for at least another decade if a majority of the populations to have access to reliable supplies of power.

As the discussion in Chapter 2 indicates, Burundi has substantial mineral reserves, the scale of which would justify one or more major mining operations. The demand projections make provision for supply of 650 GWh of power for mining operations from 2017, which is when the first large scale mining operation is assumed to begin.

Current Production and Supply of Electricity in Burundi

Burundi's Energy Resource Base

Burundi has a considerable and varied energy potential. National resources that can be developed include firewood, charcoal, peat, hydrocarbons, alternative energies and hydroelectricity. The Burundi forest covers an area of 180,000 hectares, or six percent of the national territory. Dendro-energy accounts for more than 6.4 million cubic meters of wood per annum, 76 percent of which is absorbed by rural communities. Peat reserves are estimated at 100 million tons of which 57 million tons are usable economically. Development of the peat reserves offers economic and environmental advantages. However, utilization remains limited to a few public institutions. Attempts at making it known to households and craftsmen have not been successful because it is difficult to use in its natural state.

Annual production of combustible peat stood at more than 10,000 tons in the 1990s, but it has been declining since 1999 and is now less than 3,900 tons. The prospects for it to replace oil products are yet to materialize and the production of peat-based fertilizers is marginal.

All oil products are imported and almost all these imports are consumed by the transport sector, industrial consumption being insignificant. The oil sector occupies an important place in external trade; over the past four years it has accounted for an average of 10 percent of total imports. The import and distribution of petroleum products is by road and is the occupation of about ten companies. The country has two storage depots, one of 14,000

cubic meters in Bujumbura and the other of 20,500 cubic meters in Gitega; this small storage capacity makes the product vulnerable to supply contingencies.

The country's hydro-electric potential is estimated at 1,200 MW (of which only nine percent is tapped), which could supply about 6,000 GWh a year. Almost all the electric energy produced in Burundi comes from the use of these hydro resources. Utilization of alternative sources of energy and biogas is marginal. There are very few biogas and solar energy installations in the country and over 70 percent of these are out of order, either because they have been vandalized or they lack maintenance. Development of alternative energy sources like wind and solar is also constrained by the low purchasing power of much of the population, especially those in more remote locations.

The Government's policy for the development of these resources emphasizes renewable energy, such as hydroelectricity. The Government also recognizes that thermal power production may need to be utilized in the short-term to bridge the gap between demand and supply. In the absence of additional generation capacity from renewable energy sources in the next few years, the ongoing

Table 5.4: Existing Utilization of Generation Capacity Utilization and Electricity Production

Production plants	Installed capacity (MW)	Electricity production (GWh)						
		2002	2003	2004	2005	2006	2007	2008
Domestic supply								
Regideso stations								
Bujumbura thermal plant	5,50							
Rwegura	18,00	68,08	48,71	42,32	49,27	35,82	59,89	55,33
Mugere	8,00	44,37	44,47	38,24	42,89	51,22	47,35	42,37
Ruvyironza	1,27	2,84	3,61	1,16	2,33	-	2,55	1,99
Nyemenga	1,44	5,43	4,47	3,85	3,42	4,39	1,60	1,54
Gikonge	0,85	1,28	1,05	0,97	0,82	-		1,52
Kayenzi	0,85	1,23	1,05	0,96	0,59	0,51		0,24
Marangara	0,24	0,89	1,05	0,73	0,63	0,75		0,40
Buhiga	0,24				0,63	0,19		
Total national production	36,39	124,13	104,42	88,23	100,58	92,89	111,40	103,40
Remote DGHER plants	0,47	0,64	7,98	1,51	23,40	6,19		
Private plants	0,65							
Total domestic capacity	37,51	124,77	112,39	89,74	123,98	99,08	111,40	103,40
Imported supply								
Rusizi I	28,00	27,65	26,13	29,43	20,96	16,74	25,13	24,13
Rusizi II	12,30	12,25	30,89	44,68	49,96	42,08	52,28	72,03
Total imports	40,30	39,90	57,03	74,10	70,92	58,82	77,41	96,16
Total supply	77,81	164,67	169,42	163,85	194,89	157,90	188,80	199,56
Memo item:								
Share of imports in total (%)	51,8	24,2	33,7	45,2	36,4	37,3	41,0	48,2
Capacity utilization (%)								
Domestic capacity		38,0	34,2	27,3	37,7	30,2	33,9	31,5
Import capacity								
Rusizi I		11,3	10,7	12,0	8,5	6,8	10,2	9,8
Rusizi II		11,4	28,7	41,5	46,4	39,1	48,5	66,9
Average for imports		11,3	16,2	21,0	20,1	16,7	21,9	27,2
Average for total capacity		24,2	24,9	24,0	28,6	23,2	27,7	29,3

Source: Annex Table VII.1.

use of high cost, back-up diesel plants in the private sector will continue to result in reduced competitiveness for business and add to the burden on the economy and the environment.

Domestic and Regional Power Generation Capacities

Current power generation capacities. Electricity supplied by REGIDESO is generated almost exclusively through eight hydroelectric plants with a combined installed capacity of 30.9 MW. In addition, DGHER operates eight small and micro hydro plants in rural areas while non-governmental organizations (NGOs) and others operate another twelve micro hydro plants. The REGIDESO plants account for 82 percent of Burundi's total installed capacity of 37.5 MW. The two main plants operated by the utility, Rwegura and Mugere, have capacities of 18 MW and 8 MW respectively. During 2002-2008, they delivered 87 percent of the national supply. In addition, REGIDESO owns a diesel power plant located in Bujumbura (5.5 MW). It was acquired in 1995. Until recently, the plant has been used sparingly as back-up in case of hydropower production failure becauseof lack of funds to pay for the high cost fuel.[36]

Burundi also imports electricity from two regional hydro plants, Rusizi I and Rusizi II. The former is owned by Société Nationale d'Electricité (SNEL), the national electricity company of the DRC, and Rusizi II, is owned by SINELAC. [37] The latter was established as a joint venture by Burundi, Rwanda and the DRC to develop international electricity projects. As Table 5.4 indicates, imports typically account for 30-40 percent of total supply. The high dependence on regional generation resources poses difficulties for Burundi as these plants offer little flexibility to bridge sudden supply interruptions. Moreover, the operation of the plants hasbeen problematic owing to complex ownership issues related to the maintenance and payments for power delivery.

The utilization of these hydro plants is low. In the case of the domestic plants, the available capacity has been about 38 percent of the installed capacity (Table 5.4). In the case of Rusizi I, available capacity has only been about 10 percent of the 28 MW rated capacity; however, the performance of Rusizi II has improved steadily over the last seven years, culminating in a utilization rate of almost 70 percent in 2008. There are a number of reasons for these low rates of capacity utilization. There was destruction of equipment during the civil war in the 1990s, and subsequently there has been severe lack of funds for rehabilitation of equipment and for staff training and procedures to deal with faults. Existing equipment is obsolete, but because of the crisis it was neither serviced nor maintained periodically which affected output availability and reliability. In more recent years, the level of Lake Kivu – the reservoir of the Rusizi I and II stations – dropped to an all time low because of poor rainfall, thus affecting the quantities of energy available for import. Recently, load-shedding has been reduced due to improved rainfall leading to increased output from both national plants and Rusizi II. The closing of some state-owned companies also led to a reduction in peak demand and the energy supply deficit.

[36] The average cost of thermal (diesel) electricity is approximately US$ 0.33/KWh, while REGIDESO's average sale price was equivalent to US$ 0.075 (88.5 FBu/KWh) in 2007.

[37] The International Great Lake Countries Electricity Board (Société Internationale des Pays des Grands Lacs) is known as SINELAC.

Bridging the Gap Between Supply and Demand

Despite recent progress, Burundi's available electricity generation capacity is severely constrained and is likely to remain so for several more years. The supply deficit currently varies between 13 MW during the wet season and 23 MW during the dry season when the country's main hydropower plants are running at reduced capacity. Peak demand occurs during the evening hours and emanates mainly from household lighting needs, but the shortage of generation capacity and resulting load-shedding is having a major impact on economic growth and business activity. Demand for electricity is expected to continue to rise steadily as the economy improves, returning refugees re-establish themselves, and standards of living increase. With the rehabilitation of the electricity networks and their extension to Bujumbura's suburbs and areas in the country's interior, the deficit may worsen and may reach 30 MW by 2011, at which time the 5 MW Kaganuzi hydro-project would be commissioned, followed by Mpanda (10.4 MW) in 2012, and Resumo Falls (20.5 MW) in 2013. In the interim, the direct consequence is a continued constraint on economic activity.

The shortfall in available power is exacerbated by technical and non-technical losses, caused in part by lack of maintenance. In 2007, these losses were estimated at 48 GWh, equivalent to a supply loss of some 24.4 percent. Technical losses make up a large portion of these losses, given the poor condition of the network, the high and medium voltage stations, and the low voltage distribution posts. The number of power interruptions is high, both on low voltage and on the high and medium voltage backbone network.The quality of the electricity delivered suffers from poor frequency and significant voltage deviations estimated to be in excess of the normal 10 percent below and above 220 volts. The above-mentioned programs of the AfDB and World Bank are addressing these problems through the rehabilitation and expansion of production facilities and networks and the optimization of operations and maintenance practices with the appropriate and efficient use of human resources and equipment.

In the face of the increasing supply deficit, the Government recently decided to operate the thermal plant as a complement to insufficient hydropower supply, and to assist REGIDESO in meeting the plant's high operating expenses. Measures include the exemption of taxes on fuel purchases, the authorization for an average 27 percent increase in electricity tariffs. The ongoing World Bank program of support for the power sector includes support for the operation of the existing thermal generation plant, which will add 5.5 MW to the system during peak hours, by providing $7.9 million of funding to procure diesel fuel and associated parts. The subsidy is sized for an average eight hours per weekday operation over three years. Due to the high variability of the available hydro-generation, the use of the thermal plant will fluctuate from month to month based on the existing demand deficit. However, to avoid depletion of the allocated fuel during the dry season, a maximum operation of 12 hours a day, using subsidized fuel, has been agreed upon. The three-year period will allow REGIDESO to address a substantial part of the supply/demand gap while it develops the country's hydropower capacity in the short- to medium-term through the development of small run-of-the-river hydropower plants. The funding for thermal plant operation is in the form of a declining yearly subsidy for fuel purchase (100 percent in the first year, 75 percent in the second year, and 50 percent in the third year). Implementation of this program has begun and is helping to alleviate the current acute peak load problems of the network.

Following the cessation of the civil war, REGIDESO and DGHER have both benefited from donor support for reconstruction and rehabilitation of generation and transmission facilities. Rehabilitation and strengthening of production was to cover construction of the Bujumbura thermal station, doubling the capacity of the hydro-electric stations of Buhiga and Nyemanga, and the overhaul of existing stations. The donor activities included: the European Union-financed Program for Rehabilitation of Burundi; the IDA-financed Economic Recovery Credits; social funds and the IDA Public Works and Employment Creation Project; and emergency activities conducted by the International Committee of the Red Cross and UNICEF. In 2003, the Chinese Government

financed the rehabilitation of the Mugere hydroelectric power plant (8 MW), and in 2005 it financed the rehabilitation of Ruvyironza (1.28 MW) and Gikonge (0.85 MW), all of which have been completed. In August 2007, AfDB approved a $10.8 million project that focuses on emergency investments for the rehabilitation of hydropower generators and parts of the distribution system in coordination with, and complementary to, this operation. In 2008, the World Bank approved funding for a $29.5 million program of rehabilitation in the power sector.

A Program to Accelerate Electricity Supply

Proposed New Domestic Power Generation Program

The demand projections set out above, suggest supply requirements of about 3,600 GWh by 2030, which translates into required available capacity in the range of 700 MW. Over the next 20 years, Burundi will therefore need access to an additional 650 MW of new capacity, either domestic or in the form of imported electricity. The Government has opted to develop the country's domestic hydro potential and is planning the construction of the Kaganuzi (5 MW), Mpanda (10.4 MW) and Kabu 16 (20 MW) plants as a matter of priority. As Table 5.5 indicates, the current plans call for the commissioning of these three plants during 2011-2013.

Kabu 16 Hydroelectric Development will be on the Kabulantwe River 16 km above confluence with Rusizi, 50 km north of Bujumbura. The Kabu 16 hydropower station was identified in the Nile Basin SSEA study of regional power generation options to be among the most suitable sites to meet the medium-term energy needs. The site has been designed for run-of-the-river operation. The project would comprise a small conventional gravity dam in the main river channel with live storage equal to two hours of plant output. Power facilities would include intake above the dam, a 3,400 meter power tunnel and penstock, and a two-unit powerhouse with an installed capacity of 20 MW.

To minimize the need for expansion of costly thermal generation capacity to supply the short- and medium-term demand growth, the Government is taking a number of additional initiatives to improve further the supply of power. These include discussions with a private company to develop 1.2 MW of wind power around Bujumbura under a PPP arrangement, and the rental of a 15-20 MW thermal plant from Rwanda in the new future, depending on agreement on financing and related issues. In addition, the Government is pushing ahead with further development of small size run-of-the-river hydropower plants. These offer credible low-cost alternatives to bridge some of the expected medium-term supply deficit before larger hydro developments, such as Kabu 16, Rusizi III and Resumo Falls, can be made operational. A 1983 study identified 14 sites suitable for run-of-the-river operations with a total installed capacity of about 7.5 MW. [38] The ongoing World Bank project includes $1.5 million for pre-feasibility and feasibility studies of potential hydropower sites in sizes between 1 and 7.5 MW that could be connected to the grid at reasonable cost. Since the plants would be run-of-the-river type, they would not require any major dam works and could be realized in approximately two years with limited environmental impacts.

For the medium- and longer-term, the Government plans to push ahead with development of a number of domestic hydro power sites. Subject to further investigation of these sites, the plan is to develop Makembwe (115 MW), Kabulantwe (67 MW) Rushihi (15 MW) and Ruzibazi (7 MW). As Table 5.5 indicates these four sites would add another 204 MW of domestic supply, thereby keeping dependence on imported electricity at prudent levels. For the purposes of this Report, the working assumption is that these plants would be developed under PPP arrangements with private investors. Kabu 16 and Mpanda are already slated for development under

[38] See Lahmeyer International, Etude du Développement des Ressources Hydro-Electriques du Burundi. February, 1983.

Table 5.5: Characteristics and Costs of Planned New Generation Projects

Plant	Commission date	Capacity (MW)			Energy supply (GWh)		Capital cost (US$ mill)		Generation cost (US$/kWh)
		Installed	Firm	Firm as % of installed	Average annual	Firm	Feasibility	Develop-ment	
REGIDESO									
Kaganuzi	2011	5,0	3,3	65	28	17	0,3	10,0	
Private									
Mpanda	2012	10,4	6,8	65	58	35	0,5	20,0	
Kabu 16	2013	20,0	13,0	65	111	67	1,5	50,0	0,0443
Mulembwe	2016	115,0	74,8	65	640	384	3,0	220,0	
Kabulantwe	2018	67,0	43,6	65	373	224	2,0	130,0	
Rushiha	2019	15,0	9,8	65	83	50	0,5	30,0	
Ruzibazi	2021	7,0	4,6	65	39	23	0,3	15,0	
Sub-total		234,4	152,4	65	1304	783	7,8	465,0	
Regional[1]									
Resumo Falls	2013	20,5	18,3	89	134	103	2,2	38,0	0,0316
Rusizi III	2015	48,3	47,7	99	246	246	2,5	75,0	0,0286
Rusizi IV	2016	87,0	86,1	99	442	442	3,0	100,0	
Sub-total		155,8	152,1	98	823	791	7,7	213,0	
Total		395,2	307,7	78	2155	1591	15,8	688,0	

Source: World Bank (2008), Multi-Sectoral Water and Electricity Infrastructure Project, and estimates by authors.
Note: Capacities, energy supply and capital costs included here are one-third of the planned total.

PPP arrangements; if all four of the above sites were also developed under PPP arrangements, this would bring the total privately operated stations to about 234 MW within the next decade. It would involve the mobilization of some $420 million of private investment for these plants within the next five years if all plants are to be commissioned on the schedule set out in Table 5.5 above, which is designed to achieve the electrification target of 25 percent by 2020. The mobilization of this amount of private support and related negotiations of the PPP arrangements will present a major challenge for the Government. The proposed Infrastructure Action Plan includes an amount of $5 million of funding for the Government to retain the requisite legal and technical expertise for the design and negotiation of these arrangements. A successful outcome on this front will reduce substantially the need for donor funding for the further development of these domestic resources.

Table 5.6: Electricity Supply and Demand Balance

	2007	2010	2015	2020	2025	2030
Installed domestic capacity (MW)						
Existing plants	35,2	39,1	39,1	39,1	39,1	39,1
Proposed new REGIDESO plants						
Kaganuzi		-	5,0	5,0	5,0	5,0
Other small hydro plants		0,3	0,3	0,3	0,3	0,3
Sub-total	-	0,3	5,3	5,3	5,3	5,3
Proposed new private plants						
Mpanda			10,4	10,4	10,4	10,4
Kabu 16			20,0	20,0	20,0	20,0
Mulembwe				115,0	115,0	115,0
Kabulantwe				67,0	67,0	67,0
Rushiha		-	-	15,0	15,0	15,0
Ruzibazi		-	-	-	7,0	7,0
Sub-total	-	-	30,4	227,4	234,4	234,4
Total	35,2	39,4	74,8	271,8	278,8	278,8
Installed regional project capacity (MW)						
Rusizi I	28,0	28,0	28,0	28,0	28,0	28,0
Rusizi II	12,3	12,3	12,3	12,3	12,3	12,3
Resumo Falls			20,5	20,5	20,5	20,5
Rusizi III			48,3	48,3	48,3	48,3
Rusizi IV				87,0	87,0	87,0
Total	40,3	40,3	109,1	196,1	196,1	196,1
Total installed capacity (MW)	75,5	79,7	183,9	467,9	474,9	474,9
Available capacity (MW)						
Existing domestic plants	15,7	16,0	16,8	16,8	16,8	16,8
Proposed new domestic plants		0,2	23,2	151,2	155,8	155,8
Existing regional projects	8,8	9,7	10,1	10,1	10,1	10,1
Proposed new regional projects		-	95,4	286,0	286,0	286,0
Total	24,5	25,9	145,5	464,1	468,6	468,6
Electricity balance sheet (GWh)						
Supply	188,8	196,0	814,2	2 269,5	2 392,0	2 392,0
Demand	188,8	196,0	470,8	1 981,0	2 585,7	3 631,5
Surplus/deficit	0,0	0,0	343,4	288,5	(193,8)	(1 239,5)

Source: Annex Table VII.1 and Annex Table VII.5.

Kabu 16 and Mpanda are already slated for development under PPP arrangements; if all four of the above sites were also developed under PPP arrangements, this would bring the total privately operated stations to about 234 MW within the next decade. It would involve the mobilization of some $420 million of private investment for these plants within the next five years if all plants are to be commissioned on the schedule set out in Table 5.5 above, which is designed to achieve the electrification target of 25 percent by 2020. The mobilization of this amount of private support and related negotiations of the PPP arrangements will present a major challenge for the Government. The proposed Infrastructure Action Plan includes an amount of $5 million of funding for the Government to retain the requisite legal and technical expertise for the design and negotiation of these arrangements. A successful outcome on this front will reduce substantially the need for donor funding for the further development of these domestic resources.

Policy Towards Dependence on Imported Electricity

Consistent with the long-term strategy of maximizing hydropower generation, a number of regional hydroelectric projects are at an advanced stage of preparation. Burundi is participating in the Resumo Falls and Rusizi III regional hydropower development (61.5 and 82 MW respectively) and expects to participate in the Rusizi IV project (270 MW). The Resumo Falls project is located on the border between Rwanda and Tanzania, close to Burundi, on the Kagera River. The project is strategically

placed in the region to strengthen the backbone electricity transmission system, which is necessary for an equitable distribution of benefits from regional power planning, and meet the new loads from the mines in the Kagera District, Tanzania, that are being implemented. Power facilities would include intake above the dam, a 460 meter power tunnel and a three unit powerhouse with an installed capacity of 61.5 MW. The project would increase downstream flows in dry periods, and potentially improve the viability of the Kakono hydro-project and the Kyaka irrigation project. A power sharing agreement between Burundi, Rwanda and Tanzania will have to be negotiated.

The Rusizi III project is to be located on the Rusizi River, which forms the border between Rwanda and the DRC, 25 km downstream from the outlet of Lake Kivu. The project would be located downstream of the existing Rusizi I and II plants, and flows would be nearly completely regulated by Rusizi I operation of Lake Kivu as a reservoir. Power facilities would include intake in the dam, a 340 meter power tunnel and penstock, and a three unit powerhouse with an installed capacity of 145 MW, one-third of which would be available for use by Burundi. The European Union has agreed to provide the funding for the development of the Rusizi III and IV plants.

Implementation of the three major domestic power projects and the Resumo Falls and Rusizi III projects during 2010-2015 will increase Burundi's electricity supply to about 814 GWh by 2015, thereby providing a modest amount of reserve capacity. As Table 5.6 indicates, the commissioning of the proposed Mulembwe, Kabulantwe, Rushihi, and Rusizi IV plants during 2015-2019 would ensure that Burundi could supply the needs of the proposed nickel mining project, while still having a small amount of surplus capacity available. For the decade ahead, full implementation of the proposed program in the decade ahead would add almost 400 MW of capacity to the Burundi network.

Analysis of production capacities, future development programs, and the projected supply and demand confirm that the region would have adequate supply up to 2020, particularly hydroelectricity, to cover overall needs. The commissioning in 2012 of Bujagali (250 MW) in Uganda, of Rusizi III (145 MW) at the Burundi, Rwanda and DRC border; of Karuma (200 MW) in Uganda in 2014 and of Resumo Falls (80 MW) at the Burundi, Rwanda and Tanzania border in 2013, and of Rusizi IV (270 MW) in 2016, as well as the development of production from methane gas from Lake Kivu in Rwanda (about 200 MW in 2017) will enable the region to have exportable national surpluses for several years, at least. [39] Table 5.7 sets out the main components of the generation program for the NBI countries for 2009-2020. Full implementation by 2020 would add about 3,370 MW to what would then be an integrated power grid.

Beyond 2020, the EAC region will have to start importing energy from Ethiopia and/or the East and Southern African Energy Pools. The above-mention AfDB-funded transmission project for the NBI countries will supplement ongoing energy transmission projects as well as those planned for the future in the region, namely: the development in Ethiopia of Gibe III (1,800 MW), the interconnection between Ethiopia and Djibouti, the interconnection between Ethiopia and Sudan, as well as the interconnection between Ethiopia and Kenya. The operation of all these projects will provide incentives to countries in the region for a common regional approach in the planning and development of energy production capacities, which will ultimately help to develop a regional energy market for productive and domestic uses. In the longer term, the development of the Inga Hydropower site in the eastern part of the DRC could add substantially to generation capacity in Sub-Saharan Africa. According to a recent AfDB report, comprehensive development of the Inga valley could result in an additional 39,000 MW of generation capacity.[40]

[39] The area around Kivu Lake contains significant methane gas deposits. These are currently being developed on a pilot basis for power generation by Rwanda..

[40] See African Development Fund, Study on the Development of Inga Hydropower Site and Associated Power Interconnections. Board Memorandum, September 2006.

Table 5.7 : Power Generation Plan of the Nile Basin Countries, 2009-2020

Country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Burundi	-	-	5,0	30,9	20,0	-	48,3	202,0	-	67,0	15,0	-	388,2
DRC	-	15,0	15,0	-	-	-	48,3	87,0	15,0	-	-	-	180,3
Kenya	-	70,0	-	-	70,0	60,0	-	140,0	140,0	210,0	150,0	150,0	990,0
Rwanda	-	15,0	15,0	20,5	48,3	-	-	87,0	15,0	-	-	-	200,8
Tanzania	190,0	60,0	60,0	20,5	53,0	-	358,0	-	-	-	-	422,0	1 163,5
Uganda	-	-	-	250,0	-	-	-	-	200,0	-	-	-	450,0
Total	190,0	160,0	95,0	321,9	191,3	60,0	454,6	516,0	370,0	277,0	165,0	572,0	3 372,8

Source: Annex Table VII.7.

In the particular case of Burundi, a deficit in power supply emerges in 2024. By 2030, assuming no further major mining or power intensive industrial projects are launched, the supply deficit would grow to about 1,240 GWh. The implication is that Burundi would need an additional 200 MW of capacity – either domestic or via imported power to meet domestic demand. The key policy question for the longer-term, therefore, is whether to investigate other domestic hydro power sites within Burundi and develop these in order to keep dependence on imported power to prudent levels, or whether to allow increased dependence on imported power. If all the additional capacity was domestic, the share of imported power in total consumption would be 25 percent; if all the additional power was imported, these supplies would account for about 60 percent of total consumption by 2030.

A potential issue with these and other possible domestic sites is that the cost of the electricity produced may be significantly higher than that imported from Ethiopia via the EAPP grid. This possibility raises issues about a potential trade-off between self-sufficiency in power supply and the cost of power and its effects on the competitiveness of Burundi business. More work is needed on these power supply options for Burundi beyond 2020. The proposed Power Sector Master Plan to be prepared in 2010 will need to address these concerns in some detail.

Transmission Grids and Regional Intergration of Networks

The existing transmission grid. Burundi has access to and shares part of a 383 km main transmission line that links Rwanda to the DRC. This line comprises 110 kV, 70 kV and 35 kV sections. SNEL has owned the structures on Burundi soil since colonial times. These include the 70 kV Rusizi 1–Bujumbura line and the 70 kV transformer plant of Bujumbura. The original transformer plants, including SNEL's 70 kV plant, are equipped with a single transformer, or operate with blocked socket chargers so the secondary voltage cannot be adjusted and customers are exposed to selective power cuts. The 110 kV switches are all very old. Spare parts are not available for much of the installed equipment, as most of the switchgear is of a product generation that has long since been phased out from manufacturing. Owing to the lack of spare parts, several plants operate without cut-out switches on the transformer bay, triggering protective relays and causing dangerous operating conditions for REGIDESO equipment and staff. Repairs of key switchgear have been made by stripping parts from stand-by equipment for needed seals, gaskets, etc. This move has enabled REGIDESO to re-establish the needed functionality, but it will not sustain the system for more than a short period of time.

The total length of the main transmission lines located in Burundi is about 265 km, including the line to Rwegura and the 110 kV line from Bujumbura to Gitega. Supply reliability in this grid is also hampered by severely dilapidated equipment. During the 1990s, the 110 kV and 70 kV switchgear equipment was damaged by technical malfunction, and in some cases, direct hostilities. The rehabilitation of this network is ongoing. It will provide basic supply security from the main substations that channel power from the hydro sites into the key load centers around Bujumbura.

However, the absence of key system protection and control functions in this network make outages more frequent and take longer to address.

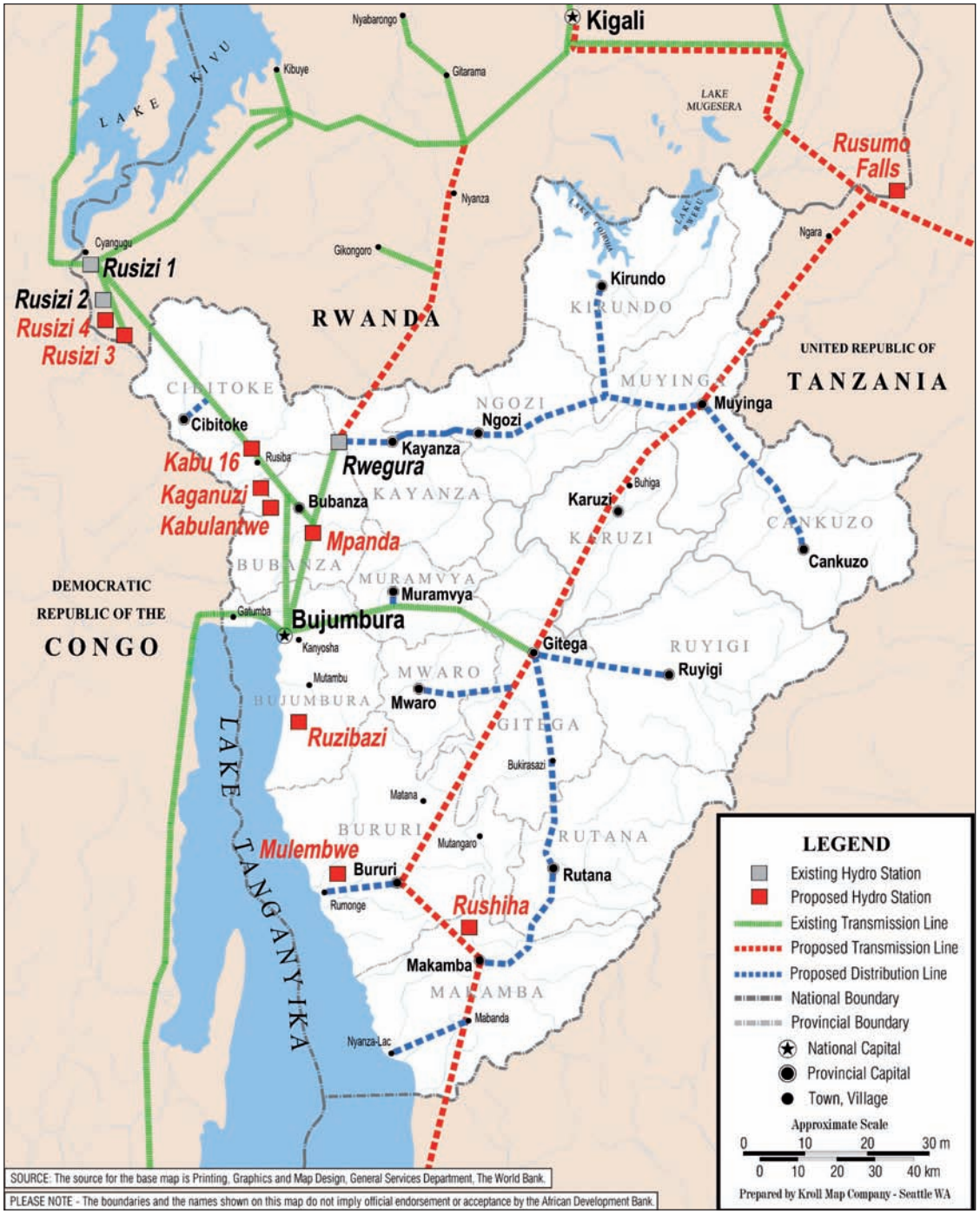
Expansion of the transmission grid. A number of specific initiatives aimed at strengthening regional trade in electricity are already under way. The African Development Fund (ADF) recently approved a program of loans and grants in the amount of $163 million to finance the interconnection of electric grids among the five Nile Equatorial Lake countries.[41] By interconnecting the grids of the five countries, the project will contribute to the regionalization of electricity production. This project includes a component to finance the upgrade of the Burundi, DRC, and Rwanda portion of the existing Nile Basin country grid. It includes constructing and upgrading a total of 262 km of transmission lines, as follows: upgrade the current line from Goma station to the Rusizi I station in DRC from 70 kV to 220 kV; upgrade the line from Rusizi I station to Bujumbura in Burundi from 70 kV to 110 kV; construct an extension from Bujumbura to Kiliba in DRC; construct a 110kV line from Kibuye station to Gisenyi station in Rwanda; and construct a line from Gisenyi station in Rwanda to Goma station in DRC. The project includes construction and reinforcement of a number of transformer stations, including one in Burundi. It also includes programs aimed at building the operating and technical capabilities of these networks. The total cost of this component was estimated at $58.6 million at the time of appraisal. Burundi's share of the cost of this component was put at about $25 million equivalent at that time. Voltage upgrade from 70 kV to 110 kV for the Burundi–DRC–Rwanda Transmission Line would enable Burundi to benefit from power trading and regional transmission integration with the neighboring countries (including Uganda and Kenya when the planned transmission link is completed).

By the time the Resumo Falls Project comes on stream in 2013, the main transmission grid for Burundi would be in place. The accompanying map indicates the location of the existing and proposed new power grid for Burundi. It also gives the locations of existing and new generation stations. The key features would be a 220 kV network with the following linkages:

- A 220 kV line of some 200 km from Resumo Falls to Gitega where it would link with the existing transmission line from Gitega to Bujumbura. At an estimated cost of $120,000 per km (at 2007 prices), construction of this line will require about $24 million. Separate transmission lines from Resumo Falls would also link to the Rwanda and Tanzania grids. These lines would link Burundi's network with the national networks of Rwanda and Tanzania, thereby enhancing the opportunities for trade of power supplies with the other EAC members.
- Upgrade the existing 110 kV line from Bujumbura to Gitega to 220 kV. The cost of the upgrade of the approximate 70 km would be in the range of $8 million.
- With the construction of Rusizi III, the transmission link to Bujumbura would be upgraded to 220 kV. This will be a distance of about 125 km and at $120,000 per km the total cost would be about $15 million. The bulk of this line would be located in Burundi.
- The transmission line from Bujumbura to Mpanda and Rwegura would be extended through Butare and Nyanza in Rwanda to link to the main grid of that country. Burundi's share of the cost of this extension is not known at this time. Assuming this line was also upgraded to 220 kV, the 20 km extension to the border would cost about $2.5 million, while the cost of the upgrade of the approximate 60 km from Bujumbura to Rwegura may cost about $5 million.
- A new 220kV line would also be built as part of the Rusizi IV project to link this plant to the above-mentioned 220 kV line from Rusizi III.
- A 220 kV transmission line from Gitega to Bururi and Makavda, continuing across the border to Kigoma in Tanzania. The length of this line that would be located in Burundi would be about 135 km. Burundi's share of the cost of this line would be about $16 million.

[41] See African Development Bank Group, Interconnection of Electric Grids of Nile Equatorial Lakes Countries, Appraisal Report, November 11, 2008.

Power Stations and Transmission Grid for Burundi



The total cost of Burundi's share of this expanded 220 kV transmission grid would be in the range of $77 million, after allowing for an outlay of $6 million for a SCADA system for management of the grid.

Distribution Network in Burundi

The current distribution network within Burundi is in poor condition, with much of the essential switch gear beyond repair due to limited availability of spare parts and lack of resources for maintenance. Key load centers such as Bujumbura are already heavily saturated, resulting in increased technical losses for the utility and poor quality of supply. Control, protection and communication equipment is also severely dilapidated and does not permit REGIDESO to operate even the simplest maneuvers without manual intervention. The limited functionality of key relays result in more frequent and longer lasting outages and damage to transformers and other equipment. Lack of adequate system earthing and protection functions cause occasional high voltage surges (up to 1.73 times nominal voltage), the result of which is that consumer equipment and appliances are destroyed.

The African Development Bank and World Bank have substantial ongoing programs aimed at rehabilitating the transmission and distribution systems. The projects will also finance replacement of the most important protection relays and reinstate adequate communication functions for both transmission and medium voltage distribution substations. The 80 MV/LV supply transformer plants and the low voltage supply networks are overhead and are of the 380/220 three-phase volts type. Low voltage is supplied at the following levels: 6.6 kV, 10 kV, 15 kV, 30 kV and 35 kV. The network is partially earthed in Bujumbura, but is overhead in other areas. The distribution network is over-loaded in several areas of the country. Under the ongoing rehabilitation programs, 30kV lines are being used to connect urban centers, provide access to rural areas and connections to local production centers. Supply within urban areas is provided by 10 kV or 6.6 kV lines, with a preference for the 10 kV. The new equipment being installed has a double voltage system to enable future transfer to 10 kV, especially for Bujumbura's underground network. These programs, which involve financial support of $30 million, address most of the identified major deficiencies in the urban distribution network.[42] When completed, the rehabilitation will improve security, reduce outage times and increase quality of supply in the national grid. The investments will re-establish the back-bone grid supply function.

The above will pave the way for future access expansion to achieve the Government's targeted level of access to electricity for 25 percent of the population by 2020; but to meet these targets Burundi will require a major expansion of its distribution network. A cornerstone of the proposed distribution program is to provide 110 kV lines with necessary substations to all 13 of the provincial capitals by 2015. Completion of this distribution grid at that time would lay the foundations for the electrification of 85 percent of urban centers by 2020 and would ensure that a very large part of the business community throughout the country had access to reliable supplies of electricity. The number of household and business connections is projected to rise to about 550,000 by 2020 and 1.2 million by 2030. Implementation of the proposed distribution program for the next two decades would begin in 2011. Phase I of the program would extend from 2011 to 2015, and at a cost of $60.3 million it would allow connections to 115,000 households and businesses. Phase II would be implemented during 2016-2020 at a cost of $210 million and would support an additional 400,000 connections. Phases III and IV would be implemented during 2021-2030 at a cost of $380 million and would allow a further 670,000 connections.

[42] The AfDB program provides $13.1 million of support. The $16.8 million program of the World Bank is financing priority investments in the following 110 kV and 70 kV Substations: RN1, Rwegura, Bubanza, Cibitoke, Mururu and Gitega. On the distribution side, the project is financing rehabilitation of the following 30 kV Substations: Ozone, RN1, Rwegura, Bubanza, Gitega, Muramviya, Ijenda, Kayanza, Ngozi, Itaba, Nyemanga, Rumonge and Musasa.

Expenditures on the Power Sector in Burundi

Key Cost Assumptions

The capital cost assumptions for the major new generation projects are included in Table 5.5 above. The sources for these cost assumptions include various reports of the African Development Bank and the World Bank, supplemented by independent estimates for the cost of the Kaganuzi, Mpanda, and Kabu 16 projects. The average capital cost (at 2007 constant prices) for this new generation capacity ranges from $1.5 million per MW for Rusizi III and IV to $2.5 million per MW for Kabu 16.

Table 5.8: Cost Assumptions for Transmission & Distribution Lines (US$ at 2007 constant prices)

Category	Cost per km	Cost per connection
Transmission lines		
New 220kV lines	120 000	
Upgrade of 110 kV lines	60 000	
Distribution lines		550
Connections to clients		
Urban		200
Rural		300
Internal wiring & meters		
Urban		180
Rural		180

Source: Estimates by authors.

Assumptions about the costs of transmission and distribution are set out in Table 5.8. The cost of 220 kV transmission lines is assumed to be $120,000 per km (at 2007 constant prices). This estimate is consistent with actual experience in the EAC and is comparable to what is assumed for the transmission lines for the Resumo Falls project. The cost of upgrading 110 kV lines to 220 kV is assumed to be $60,000 per km. In the absence of detailed plans for the expansion of the distribution network, it was assumed that the pro-rata cost of the distribution network is equivalent to $550 per connection.[43] The cost of a connection from the distribution line to a client (business or household) is assumed to be $200 in urban areas and $300 in rural areas. The higher estimate for rural areas reflects the more disbursed nature of rural residences. The installation of internal wiring and meters is assumed to be $180 per connection. These cost estimates are based on discussions with various field personnel in Burundi that suggest that the average cost of a connection (including internal wiring and meter) is $400.

Development Program Expenditures

The proposed long-term development program for the power sector outlined in the preceding Section will involve total outlays in the range of $2.1 billion over the next two decades. As Table 5.9 indicates, there is an ongoing need for programs that build institutional capacities in the power sector and fund the remainder of the technical studies that underpin the proposed development program. The total requirements are estimated at about $43 million. Some $20 million would be used to support ongoing and proposed new personnel and institutional capacity building programs. These would include continued support for REGIDESO, a substantial program of support for the Ministry of Water, Energy and Mines, as well as support for the proposed new regulatory authority and for further work on the design of public-private partnership arrangements for development of new power stations. The bulk of the new outlays on generation (amounting to about $700 million) arise in the decade ahead.

As noted earlier, to meet longer term requirements in the 2021-2030 period, decisions will be required on the appropriate degree of dependence on imported power relative to the cost of further development of domestic hydro power resources. The bulk of the new capital outlays will be for new generation capacity, the development of the main transmission grid for the country and the distribution network needed for an accelerated program of

[43] This cost estimate is based on detailed costs for the distribution component of the national electrification program for East Timor that was prepared for the Millennium Challenge Corporation in 2006.

Table 5.9: Summary of Development Expenditures for the Power Sector
(Five year totals in US$ millions at 2007 constant prices)

Category	2007-10	2011-15	2016-20	2021-25	2026-30	Total
Capacity building & technical support	6,3	11,5	2,5	-	-	20,3
Technical studies	8,0	14,8	-	-	-	22,7
Capital expenditures						
Generation	51,2	508,9	165,0	-	-	725,1
Transmission & distribution	31,0	137,0	243,8	162,3	206,6	780,7
Household & business connections	8,0	46,8	175,8	134,3	170,9	535,8
Sub-total	90,2	692,6	584,6	296,7	377,5	2 041,6
Total	104,4	718,9	587,1	296,7	377,5	2 084,6

Source: Annex Table VII.9.

electrification over the next two decades. Transmission and distribution expenditures are estimated at about $780 million (at 2007 constant prices) over the next two decades. This estimate includes the ongoing program of some $55 million for rehabilitation of the existing transmission and distribution grid. The proposed transmission network will require an additional $70 million and a SCADA management system about $6 million. About $650 million would be required for further expansion of the distribution network, including substations and 6 kV, 10 kV and 20 kV

Table 5.10: Ongoing Donor Funding and Immediate New Requirements
(In US$ millions at 2007 constant prices)

Expenditure category	2007	2008	2009	2010	2011	2012	Total
Capacity building & technical support							
On-going	0,3	1,1	1,0	0,9	0,5	-	3,8
Proposed new	-	-	-	3,0	4,0	3,0	10,0
Sub-total	0,3	1,1	1,0	3,9	4,5	3,0	13,8
Technical studies							
On-going	-	3,6	1,6	0,5	-	-	5,7
Proposed new	-	-	-	2,3	4,3	5,0	11,5
Sub-total	-	3,6	1,6	2,8	4,3	5,0	17,2
Capital expenditure programs							
Generation							
On-going	0,2	3,9	7,0	6,5	6,5	3,0	27,1
Proposed new	-	-	-	33,6	46,4	85,4	165,4
Sub-total	0,2	3,9	7,0	40,1	52,9	88,4	192,5
Transmission and distribution							
On-going	0,3	7,7	10,3	12,7	19,1	4,6	54,7
Proposed new	-	-	-	-	9,2	11,3	20,5
Sub-total	0,3	7,7	10,3	12,7	28,3	15,9	75,2
Household & business connections							
On-going	0,2	2,2	3,0	2,7	0,3	-	8,2
Proposed new	-	-	-	-	0,8	2,5	3,3
Sub-total	0,2	2,2	3,0	2,7	1,1	2,5	11,5
Total development program							
On-going	1,0	18,5	22,9	23,3	26,4	7,6	99,5
Proposed new	-	-	-	38,9	64,7	107,2	210,7
Total	1,0	18,5	22,9	62,1	91,0	114,8	310,2

Source: Annex Table VII.8.

distribution lines. Making the actual connections to the 1.2 million households and businesses that would gain access to the grid in the next two decades is estimated to cost about $535 million (at 2007 constant prices). But even with these large outlays, only 40 percent of the population would have access to electricity by 2030. There will be an ongoing need beyond 2030 for expenditures in the range of $65 million a year (at 2007 constant prices) on the distribution network and for customer connections.

Burundi's share of ongoing donor-funded programs is about $100 million (Table 5.10). The bulk of this support is for rehabilitation of existing capacity, small amounts of new capacity (a total of $27 million), and improvements to the existing transmission and distribution network ($55 million). Only relatively small amounts are currently allocated to customer related programs. These are mainly for installation of pre-paid meters and for other demand management initiatives, such as the CFL program. Implementation of the proposed program will therefore require mobilization of about $1.97 billion in new funding over the next two decades, $720 million of which is required for the five-year period 2011-2015. The donor community has a major role to play in assisting Burundi to mobilize this new funding.

Financing Arrangements for the Program

Funding Requirements and Sources for the Decade Ahead

Funding requirements. At this stage, an important objective is to mobilize the funding required for the power sector for the decade ahead. To implement the proposed ten-year program, Burundi will need to mobilize $1.31 billion in new funding for 2010-2019. Details for these new funding requirements are set out in Table 5.11 below, which indicates the amount of new funding commitments needed in each year of the 10-year period.

The ongoing $9.5 million of technical support currently being provided by AfDB, GTZ and IDA will come to an end in 2010-2011. The proposed power sector development program calls for new commitments in the amount of $33.5 million of support for capacity building and technical services for feasibility, detailed design and other studies. Table 5.11 indicates the years in which these new financial commitments would be required. These various programs need to be launched in 2010-2012 to build on what is already underway. Early action by the Government and donor community on arrangements to fund these programs is therefore required.

Burundi needs to mobilize about $700 of new funding for the proposed power generation program. This funding requirement includes $223 million for the three proposed regional power projects and $475 million for the proposed new domestic hydro stations. As Table 5.11 indicates, $475 million of this funding must be firmed up in the immediate future to ensure that the various power generation projects are commissioned on schedule. A key objective for the immediate future will be to firm up these funding arrangements. Funding of $10 million for Kaganuzi is expected to come from the donor community. The total cost of the generation components for the Resumo Falls generation project is estimated at $114 million (Burundi's share of which would be $38 million). The likely sources of funding for this project are the African Development Bank and the International Development Association, but some private sector participation may also be possible. The total funding requirements for the Rusizi III project are estimated at $175 million, while funding for Rusizi IV is estimated at $300 million. Burundi's share of these two projects would be $75 million and $110 million respectively. The European Union has indicated a willingness to fund Burundi's share of these two projects. The other projects are all under consideration by the Government as candidates for private funding under some form of BOO, BOT or BOOT arrangement.

Total funding requirements for the transmission program for the decade ahead are estimated at

Table 5.11: New Funding Commitments Required for Proposed Ten-Year Investment Program for the Power Sector, 2010-2019 (In US$ millions at 2007 constant prices)

Activity	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Capacity building & studies											
Master plan for power sector	1,0										1,0
Technical services for PPPs	5,0										5,0
Capacity building for MWEM	5,0										5,0
Technical studies for Rusizi III	2,5										2,5
Capacity building for REGIDESO		5,0									5,0
Capacity building for regulatory body		1,5									1,5
Technical studies for Rusizi IV		4,5									4,5
Technical studies for Mulembwe		3,0									3,0
Technical studies for other sites			6,0								6,0
Sub-total	13,5	14,0	6,0	-	-	-	-	-	-	-	33,5
New Generation capacity											
Kaganuzi	10,0										10,0
Mpanda	20,0										20,0
Kabu 16	50,0										50,0
Resumo Falls	38,0										38,0
Rusizi III		75,0									75,0
Rusizi IV			110,0								110,0
Mulembwe			220,0								220,0
Kabulantwe					130,0						130,0
Rushihi								30,0			30,0
Ruzibazi									15,0		15,0
Sub-total	118,0	75,0	330,0	-	130,0	-	-	30,0	15,0	-	698,0
Transmission grid											
220 kV line: Resumo Falls to Gitega		24,0									24,0
220 kV line: Rezuzi III to Bujumbura				15,0							15,0
220 kV line: Gitega to Bujumbura					8,0						8,0
220 kV line: Bujumbura-Rwegura-Rwanda							7,5				7,5
220 kV line: Gitega-Bururi-Tanzania							16,0				16,0
SCADA installation and training				6,0							6,0
Sub-total	-	24,0	-	21,0	8,0	-	23,5	-	-	-	76,5
Distribution network and connections											
Distribution network Phase I		60,3									60,3
New connections Phase I		46,5									46,5
Distribution network Phase II							220,3				220,3
New connections Phase II							175,8				175,8
Sub-total	-	106,8	-	-	-	-	396,1	-	-	-	502,9
Total	131,5	219,8	336,0	21,0	138,0	-	419,6	30,0	15,0	-	1 310,9

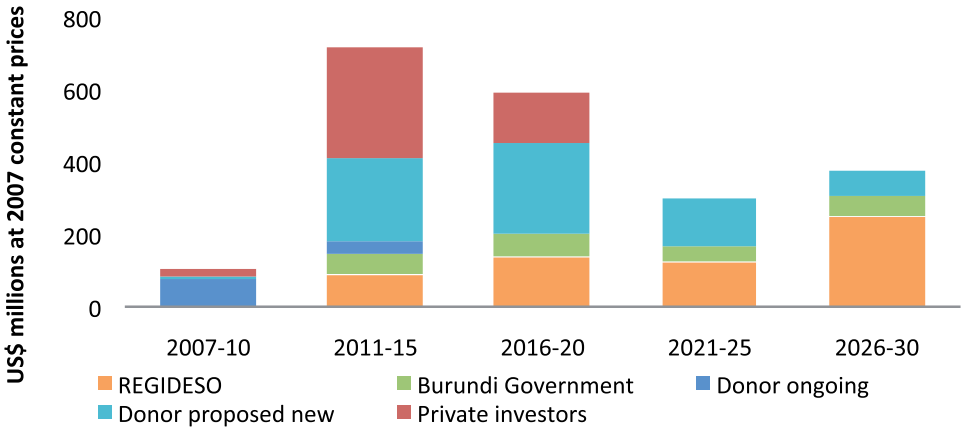
Source: Annex Table VII.9.

Table 5.12: Sources of Funding for the Proposed Power Sector Program (In US$ millions at 2007 constant prices)

Funding source	2007-10	2011-15	2016-20	2021-25	2026-30	Total
REGIDESO	3,1	86,5	137,3	122,8	246,7	596,5
Burundi Government	5,2	59,3	63,6	44,5	56,6	229,2
Donors						
Ongoing	65,5	34,0	-	-	-	99,5
Proposed new	9,5	230,2	251,2	129,3	74,2	694,4
Private investors	21,0	309,0	135,0	-	-	465,0
Total	104,4	718,9	587,1	296,7	377,5	2 084,6
Memo items:						
Share of REGIDESO (%)	3,0	12,0	23,4	41,4	65,4	28,6
Share of Government (%)	5,0	8,3	10,8	15,0	15,0	11,0

Source: Annex Table VII.10.

Graph 5.12: Sources of Funding for the Proposed Power Sector Program



Source: Annex Table VII.10.

about $77 million. In this period, a fully integrated 220 kV transmission grid would be put in place. This grid would be linked with those of Rwanda, DRC, Kenya and Tanzania. A SCADA system for management of power flows in the grid would also be installed. The estimated cost of this system and associated training is estimated at $6 million. The first two phases of the expanded distribution program would be implemented in the decade ahead. The cost of these programs is estimated at about $280 million. The companion connection programs for business and households would require an estimated $220 million.

Funding sources. The main sources of funding will be the Government of Burundi and REGIDESO, the donor community and private investors. The power utility, REGIDESO, will be able to assume responsibility for an increasingly large share of the proposed capital outlays of $1.97 billion over the next two decades as its financial position improves. Opportunities for public-private partnerships in funding new generation requirements may further reduce claims on government and the donor community. But for the medium-term at least, it is likely that the donor community would have to provide the bulk of the financial support required. Table 5.12 sets out a financing strategy for the proposed program. In this scenario, the Government of Burundi and REGIDESO steadily increase their share of funding from about eight percent at present to 45 percent by 2020 and 90 percent by 2030. Private investors fund some $465 million of investment in generation under PPP arrangements, with donors funding the balance of the program. The donor community has a critical role to play in the first decade when the Government's funding capacity is limited by equally pressing requirements for recurrent and capital outlay in health, education and other basic services.

Mobilizing the required $465 million from private investors will be a challenge for the Government. As noted earlier, the proposed program includes $5 million of legal and technical support for the Government to develop the required PPP framework. There is some urgency to the mobilization of this assistance. In the case of Kabu 16, discussions with a potential investor are well advanced.

The primary sources of funding for the transmission program would be the donor community. The Government of Burundi and REGIDESO would be primarily responsible for funding the distribution network and the connections program. However, given current limited funding capacities, the needs for the first five-year phase of these programs will require a substantial amount of cofinancing by donors. As a rough guideline, the Government and REGIDESO would fund the $47 million for the connections program, with the donor community

funding the $60 million required for the distribution network. The second round of five-year programs for distribution and connections would require some $400 million of new funding commitments by 2016. At that stage, the Government and REGIDESO would have the financial capacity to meet these funding requirements.

As Table 5.12 indicates, the proposed program calls for approximately $800 million of donor funding over the next two decades, 65 percent of which is needed in the 2011-2020 period for new investments in generation and transmission. By the latter part of the 2020s, donor funding requirements would be minimal as the Government and REGIDESO would have the capacity to meet most of the new requirements at that time.

Role of Government and the Power Utility

A key objective for the immediate future and for the longer term is to build the financial capacities of REGIDESO so that the utility can assume a major role in the further development of the power sector in Burundi. From 2007 onwards, the growth in sales made possible by the ongoing investments in the sector, results in steady growth in the operating income of the utility. The projections suggest that over the next few years the process of financial recovery, which started in 2005, can come to a successful conclusion, thereby laying the foundations for a much increased ability of REGIDESO to mobilize additional funding from market sources to help meet the costs of the future investment program. The financial projections suggest that the electricity operations of REGIDESO will become a major business activity in the decade ahead. Given the need to build the capacity of the utility to mobilize funds in the domestic market and from international sources, there is merit in spinning off the electricity part of REGIDESO operations into a separate company. This company could begin as a state-owned enterprise, but after a period, consideration could then be given to converting it into a publicly traded company with the sale of stock to local and international investors.

Past financial performance of REGIDESO. The company keeps a separate account of sales and revenue for water and for electricity, (about 70 percent of revenues come from electricity and 30 percent comes from sales of water); but its cost accounting system does not enable allocation of expenses to each of these activities. The company's accounts and financial statements are submitted for auditing and certified by an external auditor. In addition, it has an internal audit department which accounts directly to the Managing Director and which is well staffed. REGIDESO's financial and accounting statements are prepared in conformity with Burundi's national accounting law and in line with the international accounting standards of SYSCOA.[44]

As noted earlier, the overall performance of REGIDESO in the past decade has been inadequate because of the deterioration of existing facilities, high technical and non-technical losses and lack of capacity to satisfy demand. With the support of IDA, a financial restructuring plan of REGIDESO was adopted by the Government in April 2008. The program includes a performance contract between REGIDESO and the State that is designed to improve technical and commercial performance. This agreement aims to develop a culture of performance within the utility, and formalize an operating environment that departs from the past pattern of dependency and lack of accountability. This would pave the way for possible deeper changes in management and/or asset ownership in the medium to long-term. The contract also provides for a revision of the tariff structure so that it is efficient, covers at least operation and maintenance costs, and is fair and equitable. REGIDESO, with the Government's support, has already taken a number of steps in these directions. Tariffs were recently increased and the Government has authorized REGIDESO to apply a four percent surcharge to electricity tariffs when the thermal

[44] Financial statements up until 2002 give a true and satisfactory picture of REGIDESO's assets and situation. Accounts for 2003, 2004 and 2005 were audited in January 2007 and the related reports are currently being examined by REGIDESO and the Ministry of Energy.

Table 5.13: Provisional Projection of Revenues and Expenses for REGIDESO
(US$ millions at 2007 constant prices)

	2007	2010	2015	2020	2025	2030
Revenues						
Electricity sales	11,8	16,8	62,3	226,8	235,6	284,1
Client connection fees	-	0,5	10,4	10,2	6,1	7,9
Total revenues	11,8	17,3	72,7	237,0	241,7	291,9
Expenses						
Electricity purchases	1,2	1,7	25,2	87,3	100,1	139,3
Fuel purchase	0,5	0,7	1,0	1,4	1,9	2,4
Personnel costs	1,9	2,1	4,9	12,8	14,2	14,7
Maintenance & spare parts						
Spare parts	0,3	1,0	4,8	9,3	12,3	16,0
Maintenance	0,5	1,9	9,6	18,6	24,5	32,1
Other operating expenses	3,8	4,4	5,6	7,2	9,1	11,7
Bad debts	1,4	1,3	1,5	2,9	4,6	6,6
Sub-total	9,6	13,2	34,7	88,5	127,7	183,8
EBITDA	2,2	4,3	20,1	97,5	75,0	69,1
Depreciation	1,8	6,4	31,9	61,9	75,3	74,9
Total operating expenses	11,4	19,4	84,5	201,4	242,0	297,8
Net operating income	0,4	(2,1)	(11,8)	35,6	(0,3)	(5,8)
Memo items:						
Annual increase in tariff (%)	10,0	10,0	2,5	(5,0)	(5,0)	(2,5)
Average tariff per kWH (US cents)	8,3	11,0	15,7	13,1	10,1	8,7
Electricity purchase (GWh)	77,4	84,6	637,6	2 092,9	2 409,1	3 454,9
Unit cost of purchases (US cents/kWh						
Domestic purchases	-	-	4,50	4,50	4,50	4,50
Purchase of imports	1,55	2,00	3,75	3,75	3,75	3,75
No of clients ('000)	35	38	151	552	847	1 222,4
No of clients per employee	41,2	54,8	88,2	142,1	228,9	368,6
No. of employees	850	850	1 711	3 881	3 700	3 317
Average cost per employee (US$ p.a.)	2 250	2 459	2 850	3 304	3 830	4 441
Capital stock (US$ millions)	27,1	95,6	479,2	928,8	1 225,5	1 603,0

Source: Annex Table VII.11.

generation plant is in use. In April 2007, the Ministry of Finance and REGIDESO also signed an agreement for the settlement of approximately 50 percent of the State's debt toward the utility by means of bonds.

Financial projections. The provisional financial accounts prepared for this report indicate that REGIDESO's financial position will improve in the coming years (Table 5.13). The rapid growth in the power sector means that REGIDESO will evolve into one of the country's major corporations, with long-term assets of $1.6 billion by 2030 and direct employment of some 3,300 people, and much larger numbers employed indirectly through contracting of maintenance and other activities to the private sector.

The key elements of the financial projections are as follows:

- *Revenues* from the sale of electricity are projected to grow from aout $12 million in 2007 to about $230 million by 2020 and about $280 million by 2030. Electricity tariffs are assumed to increase by an average of 10 percent a year during 2009-2013, as called for under the existing IDA-funded program of the World

Bank. At that point, average electricity tariffs would be about US 15 cents per kWh. To improve competitiveness of industry and reduce the cost of electricity for households, the business plan outlined in this Report assumes that power tariffs are reduced each year from about 2016 to less than US 9 cents a kWh by 2030 (at 2007 constant prices). As Annex Table VII.6 indicates, REGIDESO has modest power surpluses from 2013 through 2022. It may be possible to export these surpluses, as an alternative to cutting back on the purchase of domestic and or imported power.

- *Connection fees and subsidy policy.* The working assumption used in the projections is that businesses and urban households would pay the full cost of installation of wiring and meters for each connection ($180 per connection at 2007 prices). This generates additional revenues of $10 million a year by 2015, but as the electrification of urban areas slows, these revenues decline to about $8 million by 2030. A key policy issue is the extent to which rural households should be expected to pay for their household wiring and meters. Experience from Asia suggests that such connection fees can have a significant impact on the rate of uptake of electrical connections in low income rural communities. If all rural connections were to be made free of charge, the total cost of these subsidized connections would be about $6 million a year by 2015. The size of the subsidy would rise to about $10 million a year by 2030.
- *Electricity purchases.* REGIDESO purchases electricity from the domestic, privately owned power generation facilities to be constructed in the coming decade. It also imports power from the EAPP grid. Domestically supplied power is assumed to cost US 4.50 cents a kWh, while the cost of imports is put at US 3.75 cents a kWh. As Table 5.13 indicates, the power purchases grow very rapidly over the next two decades. In the latter half of the 2020s, purchases are equal to 95 percent of total demand. Total annual payments for the purchase of power grows from $1.2 million in 2007 to about $90 million by 2020 and $140 million by 2030.
- *Personnel costs.* According to the African Development Bank, REGIDESO had a staff of 1,149 in 2006. With electricity revenues at 70 percent of total revenues of the utility, a reasonable allocation of staff might be the equivalent of 800 people assigned to the power sector program in 2006. The required number of staff is assumed to remain at about 850 during 2009-2012, at which time the ratio of clients to staff would have increased from the estimated current level of 50 to almost 70. Thereafter, the number of clients per staff is assumed to increase by 10 percent a year. By 2030, the number of clients per staff is projected to be about 370. Given that personnel costs are assumed to grow by three percent a year, the productivity gain of seven percent a year comes from increased use of meters and computerized accounting systems to handle billing and related services. Under this set of assumptions, personnel costs increase from the current level of $2 million a year to about $15 million by 2030.
- *Maintenance.* After allowing for the expectation that Kabu 16 and other proposed domestic generation projects are privately owned, the long-term capital stock of REGIDESO increases from $27 million in 2007 to an estimated $1.6 billion by 2030 (at 2007 constant prices). The need for increased outlays for maintenance of these assets therefore grows rapidly under the proposed program. For the purposes of this Report, a distinction is made between outlays for spare parts and for routine maintenance of the network. Outlays for these items are assumed to be equal to three percent of the value of REGIDESO's long-term assets each year, with respective expenditures on spare parts and maintenance equal to one percent and two percent of the capital stock each year. Maintenance expenditures are projected to increase from an estimated $1 million in 2007 to about $30 million in 2020 and almost $50 million by 2030.
- *Depreciation.* Depreciation charges are based on the assumption that the average life of the long-term assets of REGIDESO is 15 years. Under this assumption depreciation charges increase from an estimated $2 million at present to $75 million by 2030.

Table 5.14: Impact of Increases in the Cost of Power Purchases
(At 2007 constant prices)

Scenario	Prevailing power price (US cents per kWh)		EBITDA 2030 (US$ mill)
	Domestic	Import	
Base case	4,50	3,75	69,1
Raise domestic price by 10%	4,95	3,75	63,2
Raise import price by 10%	4,50	4,13	60,9
Raise both prices by 10%	4,95	4,13	55,1

Source: Annex Table VII.11.

Financial implications of increased imports of power. On the basis of this provisional set of accounts, REGIDESO earnings before interest, taxes, depreciation and amortization (EBITDA) rises steadily each year to about $16 million by 2015 and almost $70 million by 2030. As discussed earlier, REGIDESO would have a sufficiently strong cash flow to assume responsibility for an increasing large share of the capital development costs of the proposed program, thereby allowing the donor community to make a gradual exit from funding for the program. Given the assumed reduction in power tariffs, the tax obligations of the utility would be minimal over the next two decades. [45]

The cost of power purchases account for a large share of total operating costs of the utility from 2015 onwards. The profitability of the utility is therefore quite sensitive to variations in the cost of these power purchases. Table 5.14 sets out the impact of price increases on the EBITDA of the utility in 2030. A ten percent increase in the domestic price lowers the EBITDA by about $6 million in 2030, whereas a ten percent increase in the import price lowers the EBITDA by about $8 million. The combination of the two therefore lowers EBITDA by $14 million in 2030.

The profitability of REGIDESO operations will also be affected by decisions about the degree to which Burundi should depend on imported supplies of electricity. Since the cost of imported power is lower than that supplied from domestic sources increased dependence on imports improves the financial position of the power utility. The trade-off between import dependence and REGIDESO profitability is illustrated in Table 15. The Government has emphasized the importance of keeping dependence on imported supplies at prudent levels. The strategy for the power sector, therefore, is to accelerate the development of additional domestic hydro sites by attracting foreign investment in new generation facilities that then sell the power to the government grid under some form of take-or-pay contract. In the core program for the power sector outlined in this Chapter, all the new privately owned facilities come on stream in the decade ahead. The supply deficit that emerges in the mid 2020s is then met by increased imports. Under this approach, imports account for about 30 percent of total supply in 2020, with dependence then rising to 60 percent by 2030.

At this stage it is not clear whether the required $465 million of private funding can be mobilized. In the event that it is not available, the Government may look to the donor community for the additional funding, but this may mean reductions in donor support in other key sectors. The alternative is to import the additional power that is required. If all the additional power is imported, the EBITDA of the utility increases by about $9 million to $76 million

[45] There is need for further clarification of the status of tax obligations of companies that have operating losses. According to the World Bank (2008), REGIDESO had to pay taxes each year during 2002-2006 when there were operating losses. The reason was that non-cash expenses such as provisions are not tax deductible expenses – a tax policy that is not in line with international practice. The current status of this aspect of the tax law needs to be reviewed as it has equally important implications for private investment in general

in 2030 (at 2007 constant prices) because of the lower unit cost of the imports (Table 5.15).

This improvement may then allow the utility to pass on these benefits to consumers by lowing power tariffs further or by accelerating the rate of electrification in the country. However, dependence on imports increases dramatically; by 2020, imports account for more than 80 percent of total supply and by 2030, dependence on imports rises to 90 percent. The Government may therefore confront some difficult trade-offs in the decade ahead. Clearly, an important objective for Burundi and other members of the EAC is to ensure that there is a reliable supply of power for all users of the EAPP grid and that there is adequate investment in standby facilities that can be brought on stream in the event of problems elsewhere in the system.

Table 5.15: Comparison of Alternative Power Supply Scenarios

	2007	2010	2015	2020	2025	2030
EBITDA of REDIGESO (US$ mill)						
With additional domestic generation	2,2	4,3	15,7	37,1	40,5	67,4
With no additional domestic generation	2,2	4,3	15,7	55,6	49,0	76,0
Cost of electricity purchases (US$ mill)						
With additional domestic generation	1,2	1,7	25,2	87,3	100,1	139,3
With no additional domestic generation	1,2	1,7	25,2	68,9	91,6	130,8
Share of imports in total supply (%)						
With additional domestic generation	41,0	43,1	26,6	31,4	42,7	59,2
With no additional domestic generation	41,0	43,1	26,6	82,5	86,6	90,5

Source: Annex Tables VII.6 and VII.11.

Chapter 6 – Upgranding Transport Services and Infrastructure

Overview of Transport Service

Services and institutional responsibilities

Transport corridors. Burundi is a small landlocked country, some 2,000 km from the Indian Ocean. As the discussion in Chapter1 indicates, about 80 percent of Burundi's trade is international and only 20 percent is sub-regional. This characteristic stems from the similarity in production among neighboring countries and barriers to trade, in particular, infrastructure. Burundi depends on a combination of road, air, rail, pipeline and shipping on Lake Tanganyika for its links to regional and international markets. This combination handles passenger traffic, general freight, industrial commodities and containers.

Burundi is served by three land-based corridors and an oil pipeline. These services carry almost all of Burundi's sub-regional and international trade in goods. The civil aviation service caters mainly to passenger traffic and plays only a minor role in freight movements. The four main transport routes are as follows:

- The 'Northern Corridor' which links Mombasa to Kampala where freight can travel either by road or rail over a distance of some 1,200 km. Freight destined for Burundi on this route continues on to Kigali and typically enters Burundi on RN1 through Kayanza. The total distance from Mombasa to Bujumbura, via Kigali, is about 2,040 km. The roads on this route are in reasonably good condition, having benefited from donor-funded rehabilitation and upgrading. The road freight industry that serves this Corridor has expanded rapidly in the past decade due to growth within EAC, post-conflict reconstruction, and a shift from a large share of the market previously served by rail transport.
- The 'Central Corridor' road that runs from Dar-es-Salaam to Kigali. This Corridor is a combination of paved and gravel roads, some of which can be impassable during the rainy season. An ambitious, donor-supported program to upgrade the entire road to bitumen standard is underway. Road freight from Dar es Salaam typically travels to Rusahunga in Tanzania (a distance of 1,254 km), after which it enters Burundi via Kobero on RN 16 near Muyinga. Freight can then travel via Kayanza to Bujumbura or on RN 12 to Gitega. The total distance from Dar es Salaam to Bujumbura on this route is about 1,650 km.
- The third freight corridor, until recently of particular importance to Burundi, is the rail service from Dar es Salaam to Kigoma via Tabora. At the port of Kigoma, cargo is transferred to vessels and shipped via Lake Tanganyika to the Port of Bujumbura. The total distance from Dar es Salaam to Bujumbura on this route is 1,670 km.
- Burundi, Rwanda, Uganda and the DRC rely on Kenya and Tanzania for the importation and delivery of white oil products. Currently, these inland markets are served by a combination of pipeline, from Mombasa to Kisumu and/or Eldoret through Nairobi in Kenya and then by road and rail transport to Kampala and beyond, or by rail from Dar es Salaam in Tanzania via Lake Victoria and Port Bell.

The road transport industry is the most important form of transport for Burundi, given the high cost of air traffic and the current unreliability of the Tanzanian rail link to Kigoma. Internal transport within Burundi is totally dependent on the road network. There is no domestic railway system, and very little scope for internal air traffic.

Institutional arrangements for the sector. The road transport industry is the responsibility of the Ministry of Transport, Post and Communications (MTPT). Responsibility for road infrastructure is divided between the Ministry of Public Works and Equipment (MTPE) and the Ministry of Rural Development (MDR). The former is responsible for the classified road infrastructure development and management. Rural road infrastructure, comprising unclassified communal and feeder roads, is the responsibility of MDR which is supported by local government agencies and municipalities. In major cities like Bujumbura and Gitega, roads are managed by the city council. Responsibility for civil

aviation rests with the Civil Aviation Authority, which has primary responsibility for safe and effective operation of flights and air communications, and navigation and transport services for domestic and international services within Burundi. It is an autonomous public agency under the authority of the Ministry of Transport, Post and Communications.

As the subsequent discussion indicates, given the scope of the proposed transport program, substantial amounts of funding are included for technical support for human and institutional capacity building, not only in the traditional areas of roads and the port, but also for the oversight and regulation of the rail industry and the increased responsibilities that will come in the aviation sector in maintaining compliance with ICAO and EAC rules and procedures for air safety and operation. In that connection, one of the challenges that will emerge in the decade ahead will be the need to build a policy framework and related capacities within the government for the effective oversight and regulation of competition among road, aviation, and perhaps port and rail services.

Expenditure Programs for Transport

Projected development outlays. The program of development expenditures for the transport sector during 2010-2030 is estimated at $3.19 billion (at 2007 constant prices), including $0.77 billion for railways, should one of the extensions into Burundi go ahead (Table 6.1). The development expenditure program for civil aviation is not known with any degree of certainly at this time, but a notional allowance of about $260 million has been made for the International Airport in Bujumbura. As noted in the discussion on the port program, only nominal amounts of capital spending will be required on port facilities, if one of the proposed options for the railway expansion goes ahead.

The financing arrangements for the road and port programs would be met by the Government and donors. Under the public-private partnership (PPP) agreements proposed for the rail and aviation programs, the private contractors would be responsible for mobilizing the bulk of the funding for these programs. The total capital to be raised by the private sector would be $1 billion, primarily for the rail extension. The Government and donor community would be responsible for the $2.16 billion needed for the road and port programs. As the subsequent discussion indicates, the Government currently contributes about five percent of the cost of these programs, but its share of the funding is projected to rise to 30 percent by 2030. If the nickel mining operation goes ahead, the Government's capacity to fund a larger share of these capital outlays would be strengthened by royalties and income tax revenues from the mining operation. The stronger financial position could lead to larger allocations for capital works, or enhanced capacity to borrow internationally for major infrastructure programs.

Maintenance of transport infrastructure assets. As Table 6.1 indicates, maintenance outlays for the substantially larger pool of transport infrastructure assets would rise sharply over the next two decades. These outlays are estimated at about $5 million in 2008. They are projected to rise to about $30 million a year by 2020 and $40 million by 2030. A substantial part of the increased maintenance outlays would be met by private contractors under the PPP agreements in civil aviation and rail operations. The public portion of the maintenance program is projected to rise to about $17 million a year by 2030.

At the present time, maintenance outlays are estimated to be about $5 million a year for roads, aviation and the port. In the period 2020-2030, development spending requirements begin to decline, but outlays on routine maintenance continue to rise to about $17 million a year by 2030 (at 2007 constant prices). This is a common pattern in well-designed public infrastructure programs. Initially, spending is dominated by development outlays in rehabilitation of assets or creation of new assets, but as the development outlays shift over time mainly to periodic maintenance of existing assets, outlays on routine maintenance rise. Well maintained public assets then require smaller capital outlays on periodic maintenance programs for road networks and other assets.

Table 6.1: Proposed Development and Maintenance Expenditures for Transport Sector
(US$ millions at 2007 constant prices)

	2007	2008	2010	2015	2020	2025	2030	Total
Development expenditures								
Road sector	21,0	33,6	106,4	125,6	81,7	74,2	114,0	2 128,6
Port program			-	0,5	0,5	0,5	0,5	27,5
Civil aviation			2,0	62,5	5,5	5,5	5,5	261,0
Railways			1,5	201,0	15,0	15,0	15,0	773,0
Total	21,0	33,6	109,9	389,6	102,7	95,2	135,0	3 190,1
Maintenance expenditures by public sector								
Road sector	4,0	4,2	5,7	12,0	13,2	14,5	16,1	264,9
Port program	0,2	0,2	0,3	0,5	0,5	0,5	0,5	9,9
Civil aviation	0,6	0,9	0,9					2,7
Total	4,9	5,4	6,9	12,5	13,7	15,0	16,6	277,5
Total outlays	25,9	38,9	116,8	402,1	116,3	110,2	151,6	3 467,6
Funding sources								
Development program								
Government and donors	21,0	33,6	109,9	127,6	82,7	75,2	115,0	2 180,1
Private contractors				262,0	20,0	20,0	20,0	1 010,0
Maintenance program								
Government and donors	4,9	5,4	6,9	12,5	13,7	15,0	16,6	277,5
Memo items:								
Development outlays as % GDP	2,1	3,3	9,7	24,6	3,5	2,6	3,0	
Public maintenance as % GDP	0,5	0,5	0,6	0,8	0,5	0,4	0,4	

Source: Annex Table VI.7, Annex Table VIII.3, Annex Table VIII.4, Table VIII.22 and Table VIII.27

Road Transportation and Infrastructure

Road Transport Services

Growth of the vehicle fleet. Road traffic in Burundi is dominated by motor cycles and private cars which account for almost 80 percent of all registered vehicles. The number of registered motor bikes and vehicles was 8,460 at end 2008. The registered fleet of vehicles grew rapidly during 2002-2008, averaging about 17 percent a year. As Table 6.2 indicates, the motor cycle fleet grew by about 22 percent a year, private vehicles by about 13 percent a year, and trucks and buses by about 8.5 percent a year. The movement of people around the country is primarily by private vehicles. As Table 6.2 indicates, there are only about 500 buses in the entire country, many of which are located in Bujumbura.

Rapid growth notwithstanding, the number of vehicles (excluding motor bikes) per thousand people was stable at about 0.6 - one of the lowest ratios among the countries of Sub-Saharan Africa. In Kenya, the ratio is 18 vehicles per thousand people, and in Uganda it is five per thousand. Furthermore, the number of vehicles per km of road in Burundi stands at about 0.5, compared with eight for all low income developing countries, 10 for Kenya and four for Uganda. These very low vehicle densities suggest that the sustained strong economic growth projected for the next two decades in the range of 6-7 percent a year will result in sharp increases in the vehicle fleet of Burundi. The vehicle fleet is assumed to grow at an average of 11 per cent a year, reflecting the rapid growth projected for the transport services sector of the economy set out in Annex VI. The implication is that by 2030 there would be about 40,000 motor cycles and slightly more motor vehicles in Burundi. The tenfold increase in the number of motor cycles and vehicles within two decades implies substantially larger traffic volumes, especially in urban areas and on key thoroughfares such as Bujumbura to Gitega.

Much higher numbers of vehicle registrations are entirely possible within the next two decades. As the discussion in Chapter 1 indicates, Burundi is likely to have an urban population of at least 2.6 million by 2030. Even if almost all the 32,000 private vehicles projected in Table 6.3 for 2030

Table 6.2: Annual Vehicle Registrations by Type of Vehicle

Vehicle type	Annual registrations							Growth
	2002	2003	2004	2005	2006	2007	2008	(% p.a.)
Motor cycles	1 006	1 151	1 177	2 473	1 706	1 909	3 378	22,4
Vehicles								
Private cars	1 033	1 419	2 150	1 929	2 250	1 815	2 336	14,6
Four-wheel drive vehicles	211	855	480	571	866	632	866	8,4
Sub-total	1 244	2 274	2 630	2 500	3 116	2 447	3 202	12,7
Buses	304	744	390	365	529	415	506	8,9
Trucks and tractors								
Mid-sized	314	744	427	415	401	375	475	7,1
Large	173	454	252	335	379	330	252	6,5
Heavy	21	16	13	12	45	61	84	25,9
Tractors	6	6	9	4	-	2	5	-
Sub-total	514	1 220	701	766	825	768	816	8,0
IT and CD plates					320	274	558	-
Total	3 068	5 389	4 898	6 104	6 496	5 813	8 460	16,7
Memo items:								
Population (mill)	6,82	7,00	7,19	7,38	7,58	7,80	8,04	
Motor vehicles per 1,000 people[1]	0,3	0,6	0,5	0,5	0,6	0,5	0,6	
Motor vehicles per km of road[1]	0,2	0,3	0,3	0,3	0,4	0,3	0,4	

Source: Ministry of Finance, Fees Registration Service. Note 1: excludes motor cycles.

were in urban areas, the vehicle density would only be about 12 per thousand - still substantially lower than the current national average for Kenya. A vehicle density of five per thousand, which is equal to the current average for all low income countries, would imply about 70,000 private vehicles in Burundi by 2030.

Road transport industry.[46] In the absence of a domestic airline industry and railroad, the bulk of the internal movement of freight is by road. The road freight industry, made up of cargo fleets that serve the Northern and Central Corridors, has expanded rapidly in recent decades. The growth in the industry stems from a period of strong economic growth within the EAC, the post-conflict reconstruction in neighboring countries of the EAC, and as noted earlier, a decline in the share of the market previously served by rail transport. One of the advantages of these routes for road freight is that no trans-shipment is necessary at the various borders, although freight passes through several countries. Most of the road freight traffic is operated by private companies that transport foodstuff, agricultural produce, livestock, consumer manufactures, and other industrial products along the two main corridors. The Northern Corridor is the route used for most of the fuel imports (over 80 percent) and tea and coffee exports for

Table 6.3: Projected Vehicle Registrations

Vehicle type	Annual registrations				Growth
	2008	2010	2020	2030	(% p.a.)
Motor cycles	3 378	4 240	13 150	40 800	12,0
Private vehicles	3 202	3 950	11 500	31 925	11,0
Buses and trucks	1 322	1 570	3 700	8 800	9,0
Official vehicles	558	640	1 250	2 475	7,0
Total fleet	8 460	10 400	29 600	84 000	11,0
Memo items:					
Population (mill)	8,04	8,49	11,03	14,05	
Motor vehicles per 1,000 people[1]	0,6	0,7	1,5	3,1	
Motor vehicles per km of road[1]	0,4	0,5	1,3	3,5	

Source: Estimates by authors. Note 1: Excludes motor cycles.

[46] This discussion draws heavily on the findings of the recent World Bank study of transport prices and costs in Africa. See World Bank (2009).

Table 6.4: Ten Road Sections with the Largest Traffic Flows

RN	Road section	Number of Vehicles in 24 hours			
		Cars	Buses	Trucks	Total
2	Bujumbura-Gatumba	1 972	723	389	3 084
5	Bujumbura-Airport	1 806	320	301	2 427
1	Bujumbura-Bugarama	837	306	693	1 836
8	Gitega-RN16	751	115	179	1 045
9	Bujumbura-Muzinda	638	120	59	817
3	Bujumbura-Ramongi	267	257	170	694
2	Bugarama-Muranwie	450	140	89	679
1	Bugarama-Kayanza	372	141	123	636
6	Ngozi-RN14	404	52	112	568
7	Kamesa-Muranwia	260	171	93	524

Source: Ministry of Public Works and Equipment.

EAC. The largest professional trucking companies in the EAC account for approximately 20 percent of total market shares, which is comparable to any mature trucking market in Europe or North America. There are about 20 large companies that operate more than 100 trucks each. The largest Kenyan company, for example, owns a fleet of 600 trucks - roughly equal to the entire registered truck fleet in Burundi. These large companies obtain loads from long-term direct contracting (from one to three years). The yearly mileage to Kampala can reach more than 100,000 km for an individual truck.

The business registration database of Ministry of Justice indicates that a total of 63 transport companies were registered during 2000-2008, although it is not know how many of these are still in business. A number of these companies provide freight trucking services. In the absence of a detailed survey of the Burundi trucking industry, there is no reliable information about the extent to which the domestic trucking industry is engaged in cross-border trade, or whether the bulk of the freight that moves to and from Burundi from the ports of Mombasa and Dar es Salaam is carried by large trucking companies that operate out of Kenya and Tanzania. The working assumption in this Report is that the bulk of the Burundi truck fleet is used to provide freight services within the country. There is an increasingly important need for periodic surveys of the Burundi trucking industry. Data from such surveys could improve the quality of policy analysis about the impact of improved road conditions within Burundi on trucking costs and the design of road maintenance strategies and standards.

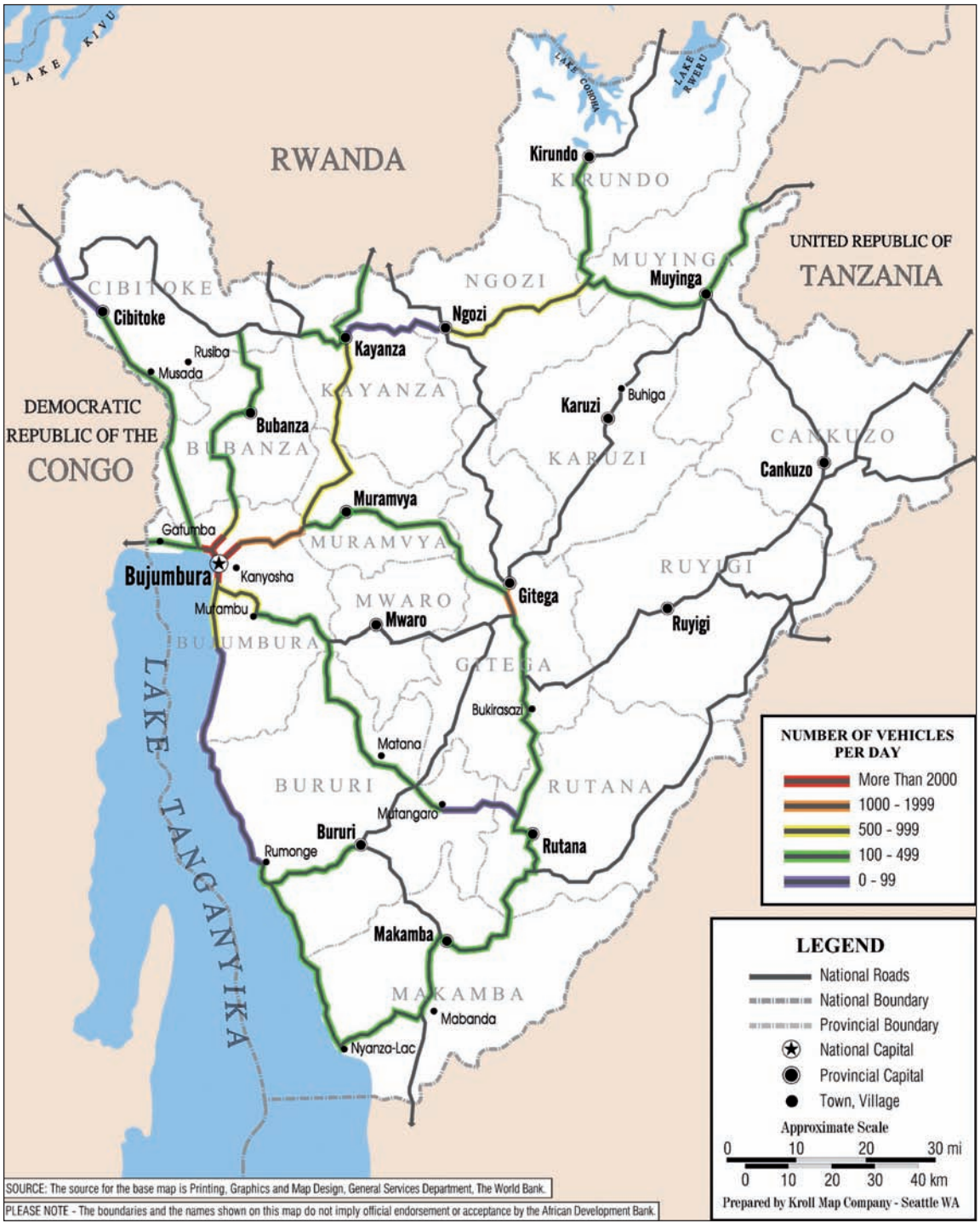
Road traffic densities. Traffic densities vary widely in Burundi. In and around Bujumbura, traffic flows are in the range of 2,000 to 3,000 vehicles a day on RN 1, RN 2 and RN 5 (Table 6.4). The heaviest passenger vehicle and bus traffic is on the road from Bujumbura to Gatumba and the crossing in the DRC. The heaviest truck traffic is on RN 1, which is the extension of the Northern Transport Corridor for the EAC, but it also leads to access to the Central Corridor. Some of the trucks that use RN1 cross into or from Rwanda. However, the traffic counts suggest that a larger share of the truck traffic travels from Kayanza to Ngozi and then via Kirundo into Rwanda or on to Muyinga and cross into Tanzania on RN 6. The traffic count reports 83 trucks crossing into or from Tanzania on RN 6, compared with 57 crossing into or from Rwanda on RN 1. The Map below illustrates the results of the November 2008 traffic count.

Table 6.5: Comparative Transport Costs in 2007

Indicator	Central Africa	East Africa	France
Transport cost per vehicle km (US$)	1,87	1,33	1,59
Variable costs (US$ per km)	1,31	0,98	0,72
Fixed costs (US$ per km)	0,57	0,35	0,87
Total transport costs (US$ per km)	1,88	1,02	1,59
Average fleet age (years)	11	7	7
Fuel consumption (litres per 100 km)	65	60	34
Yearly mileage (km)	65 000	100 000	121 000
Average daily speed (km per hour)	30	43	69
Payload utilization (%)	75	76	87
Wait time before loading at port (hours)	13	6	1,6
Cost of articulated truck (US$)	n.a.	169 200	138 000

Source: World Bank (2009), Tables 2.1 and 2.2, pages 15-16.
n.a.=Not applicable.

Traffic Counts on Main National Roads of Burundi - November 2008



The earlier discussion about the likely build-up in vehicle registrations in Burundi over the next two decades suggests sharp increases in the volume of traffic at these and other border crossings. Truck crossings into Rwanda and Tanzania on RN 1 and RN 6 respectively could easily exceed a thousand a day by 2030, compared with the 140 recorded for one day by the recent traffic count. This growth in road traffic has important implications for the build-up of capacities at these and other border crossings in the decade ahead. It also draws attention to the importance of establishing and enforcing axle load standards in harmonization with other EAC members. Overloaded freight vehicles and poor enforcement of axle load regulations add to the deterioration of the road network and reduce road life spans. The EAC has adopted regulations to a limit of 3 axle-35 ton rule trucks. To date however, no country has been enforcing the legal axle weight along the corridor. Unlike the other countries traversed by the North Corridor in which there are limits on axle loads, Burundi has no weight restrictions on road traffic.

Transport costs and prices. High road transport costs and prices are a major obstacle to increased trade and economic growth of the East Africa region. In the particular case of Burundi, the high cost of new transport infrastructure coupled with equally high transport costs are major inhibiting factors in the predominantly rural economy of the country. Although Burundi does not have a domestic rail network, the role and quality of rail services of Tanzania and Kenya is of concern for Burundi. Efficient rail services available in the Northern and Central corridors are essential for effective intermodal competition on these corridors. An absence of competitive rail services creates opportunities for the trucking industry to inflate its prices. The competition from rail benefits transport users primarily through comparable or lower transport costs.

Experience from various parts of Sub-Saharan Africa indicates clearly that transport prices may not necessarily reflect actual transport costs. It is important, therefore, to distinguish among transport prices (tariffs), transport costs, and vehicle operating costs. Vehicle operating costs (VOC) include the various direct costs the transport provider must pay to operate a given vehicle, notably labor, capital, fuel, tires, maintenance and depreciation cost of the vehicle. Vehicle operating costs provide insights on the quality of road infrastructure and type of vehicles. Generally speaking, the variable costs of African trucking companies are high, while fixed costs are usually lower. The main reason for the latter is widespread use of older vehicles in Africa, compared with the regularly renewed vehicle fleets of Europe. In East Africa, the ratio of variable to fixed costs is 60/40, compared with say France, where the ratio of variable to fixed costs is 45/55. Fuel and lubricants are the main variable costs for African trucking companies, typically accounting for at least 40 percent of total vehicle operating costs. A recent World Bank (2009) study concludes that policy recommendations related to VOCs need to distinguish between highly regulated and more mature market environments. In a competitive environment with high traffic volumes, measures to improve road conditions and limit fuel prices are likely to yield significant results. Furthermore, in such environments, measures aimed at reducing delays at the border or at weighbridges can be useful as they help increase truck utilization.

Table 6.6: Impact of Measures that Reduce Transport Costs

Measures	Decrease in transport costs (%)	Increase in sales (%)	Decrease in transport price (%)
A. Rehabilitate corridor from fair to good	-15%	ns	reduced 7-10%
B. 20% reduction in border-crossing time	reduced 1-2%	increased 2-3%	reduced 2-3%
C. 20% reduction in fuel price	-12%	ns	reduced 6-8%
D. 20% reduction in informal payments	-0,3%	ns	ns

Source: World Bank (2009), Table 1.2, page 9. Note: ns = Not significant.

Transport costs are the costs the transport operator incurs when transporting a cargo. They cover VOC and other indirect costs, such as license fees and road block payments. In the past decade, there have been a number

of studies of transport costs in Africa. Key factors that raise costs include low productivity of the trucking industry, notably caused by infrastructure constraints (Pedersen 2001); low levels of competition between service providers (Rizet and Hine 1993); and weak infrastructure (Limao and Venables 2001). The latter also suggested that poor infrastructure accounted for most of Africa's weak trade performance and that trade was highly sensitive to transport costs; for example, a 10 percent drop in transport costs increases trade by 25 percent. MacKellar et al. (2002) concluded that transport prices for most African landlocked countries range from 15 to 20 percent of import costs - a figure three to four times more than in most developed countries.[47]

Table 6.7: Transit Times and Transport Price

Gateway	Destination	Distance (km)	Transit time (days)	Transport price	
				($ per ton)	US cents per ton/km
Mombasa	Kampala	1 145	5 to 6	90	7,9
Mombasa	Kigali	1 700	8 to 10	100-110	6,2

Source: World Bank (2009), Tables 4.1, page 38.

Table 6.5 shows that transport costs on the Northern corridor for East Africa are not unduly high. Variable costs are higher because of fuel costs, and road conditions that increase fuel consumption. Offsetting high variable costs, fixed costs are much lower than in Europe because of lower capital costs associated with aged trucks. The trucking industry is labor intensive, and as such, the lower wages in Africa help to keep total transport costs down.

The above-mentioned World Bank (2009) study finds that in East Africa the trucking environment is more competitive than in Central and West Africa. The study found that in East Africa, measures that would reduce transport costs, such as improving road conditions or increasing road capacity, would lower transport prices. As Table 6.6 indicates, the largest impacts come from improving the condition of the corridor road and lowering fuel prices, both of which are relevant for Burundi. Reduced border crossing times also help to a somewhat less extent. The study concludes that the Northern corridor in East Africa would benefit from improvements in the physical condition of the road. These findings support the position taken in this Report that a major ongoing road rehabilitation program in Burundi can yield substantial benefits.

Transport prices or tariffs are the rates charged by a transport company or a freight forwarder to the shipper of importer. Transport prices usually are the result of negotiated rates between the shipper and the transport service provider. Transport prices normally cover the transport costs and the operator's overheads and profit margin. According to the World Bank study, East Africa is a competitive and mature market with transport rates determined by market forces, especially for corridors originating from the port. Table 6.7 gives average road transport prices charged by trucking lines. Surveys indicate that trucking companies are aware of the competition from rail and set prices accordingly. A separate survey in 2007 indicated the variation in prices that exist for the northern corridor; for instance, from Mombasa average prices are set at 4 cents per ton km for Kenya, for Uganda 8.5 cents, for Rwanda 9 cents, for Burundi 11 cents, and for DRC 12 cents (all in US cents per ton km).[48] Comparable data for Tanzania are not available, but the freight rate of about 5 cents a ton km that is charged by the Tanzanian railway is indicative of the competitive pressures that can be exerted by a well-run railway.

Road Infrastructure

Existing road network. Burundi has some 12,300 km of roads divided into two categories: (i) a "classified network"; and (ii) an unclassified network. The classified network is the responsibility of the Ministry of Public Works and Equipment and

[47] MacKellar, L.A., A. Wörgötter, and J. Wörz (2002), "Economic Growth of Landlocked Countries," Ökonomie in Theorie und Praxis, ed. G. Chaloupek, A. Guger, E. Nowotny, and G. Schwödiauer, 213-26. Berlin: Springer.

[48] Oyer, S. (2007), Freight Rates Determinants along the Northern Corridor Road. MSc. Thesis, Nairobi UNES.

is managed by the National Roads Authority (OdR). As Table 6.8 indicates, the classified network of some 4,800 km includes 1,950 of national or primary links, 2,523 km of provincial roads linking the provinces, 282 km of communal roads, and 49 km of the 462 km of roads in Bujumbura. About 64 percent of the national road network is paved, while only 11 percent of the entire road network of the country is paved. By way of comparison, Kenya has 14 percent of its entire road network paved, Rwanda has 19 percent paved, Tanzania has 9 percent, and Uganda has 23 percent. Table 6.9 lists the national road network. The Map below sets out the national and provincial networks.

The "unclassified" network of some 7,520 km is managed by local governments and councils, and is distributed according to geographical boundaries. Physical and budgetary programming for the upkeep of these roads is done by each local government or council. Resources for the upkeep of these roads are minimal. There is only limited oversight of national funds that are distributed to these administrative cost centers for road works. Almost all the "unclassified" network is unpaved (except for 88 km of the network located in Bujumbura). It has not been possible to collect information on the number of bridges in the national road network, nor the number of km of bridgework involved. The proposed national master plan for the transport sector to be prepared in 2010 should include a survey of these bridges and a determination as to which ones need rehabilitation or reconstruction to meet future axle load requirements.

Strategy for development of road infrastructure. The civil war and accompanying social unrest placed a heavy toll on Burundi's road infrastructure, which deteriorated as a result of a prolonged lack of maintenance and destruction by warring factions. In the past decade, the emphasis has therefore been on rehabilitating the existing road infrastructure network. In the past five years, the donor community has stepped up levels of support for rehabilitation of the national network. While much has been accomplished, a large part of the network has not yet been rehabilitated. A key objective of the program proposed in this Report is to accelerate and complete the rehabilitation of the entire national network within the next decade, including the upgrade and paving of the remaining 700 km of national roads that are gravel.

Table 6.8: Classified and Unclassified Road Network

Type of road	Length of road (km)		
	Paved	Unpaved	Total
Classified network			
National	1 242	708	1 950
Provincial	22	2 501	2 523
Communal		282	282
Urban Bujumbura	49		49
Sub-total	1 313	3 491	4 804
Unclassified network			
Local governments		7 105	7 105
Urban Bujumbura	88	325	413
Sub-total	88	7 430	7 518
Total network	1 401	10 921	12 322

Source: National Roads Authority

National Road Network for Burundi

The rationale for selection of roads to be rehabilitated under the road rehabilitation program is threefold:

- Economic. For all sections of roads that provide an economic internal rate of return superior to 12 percent.
- Social. For all sections of roads that benefit the poorest areas in the country.
- Connectivity. For all the sections for which the proposed investment would ensure all parts of the country are physically integrated.

In the case of the national road network, the projected levels of freight and traffic suggest that traffic flows on this network will increase substantially over the next two decades. Ongoing donor programs for rehabilitation of the national network point to attractive economic rates of return. The Action Plan therefore proposes that over the next 10 years the entire national network is rehabilitated and paved (Table 6.10). It also makes provision for a substantial increase in the urban road network, given the projected increase in the urban population over the next two decades.

Table 6.9: Inventory of the National Highways in Burundi

RN	National road	Length (km)		
		Paved	Unpaved	Total
1	Bujumbura-Kayanza-Rwanda (Butare)	116,3		116,3
2	Bugarama-Gitega	65,4		65,4
3	Bujumbura-Nyanza lac- Tanzania (Kigoma)	146,9	20,5	167,4
4	Bujumbura-Gatumba- DRC (Uvira)	18,9		18,9
5	Bujumbura-Rugombo-Rwanda (Bukavu)	80,8		80,8
6	Kayanza-Muyinga-Tanzania (Nyakanazi)	133,4		133,4
7	Bujumbura-Matana-RN8	130,7		130,7
8	Gitega-Rutana-RN11	78,7		78,7
9	Bujumbura-Bubanza-RN10	41,5	41,6	83,1
10	Rugombo-Rwegura-RN1	121,5		121,5
11	Mabanda-Makamba-RN13	70,2	113,7	184,0
12	Gitega-Buhiga-Muyinga	93,3		93,3
13	Makebuko-Cankuzo-Tanzania (Nyakanura)	42,0	98,3	140,3
14	Gashoho-Kirundo-(Rwanda (Kigali)	68,4		68,4
15	Gitega-Ngozi-Rwanda (Butare)		107,0	107,0
16	Mutambara-Bururi-RN8	34,0	79,2	113,2
17	Bururi-Gitaba-Makamba		36,9	36,9
18	Nyakararo-Kayokwe-RN16		50,1	50,1
19	Cankuzo-Kigamba-Muyinga		61,7	61,7
20	RN13-Tanzania (Kibondo)		36,8	36,8
21	Nyakatsi-Gisagara-(Tanzania)		34,5	34,5
22	Rwegura-Rwanda		27,4	27,4
	Total	1 242,1	707,7	1 949,8

Source: National Roads Authority.

Based on these considerations, the Action Plan includes specific programs for each of the main categories of roads set out in Table 6.8 above, the details of which are in Annex Table VIII.2. The prioritization of individual roads in this program is based on detailed discussions with the Government.

To further improve connectivity, the Action Plan makes provision for rehabilitation of portions of the existing provincial and communal network and portions of the unclassified network to facilitate access of rural communities to markets and to lower the costs of agricultural and other supplies that are

required by these communities. The Action Plan proposes a program under which budget resources would be transferred to the provincial and local governments and communities responsible for road rehabilitation and maintenance, along with capacity building programs that strengthen accountability for the use of the funds. As the discussion in Chapter 2 about improving market access for farming communities indicates more work is needed to identify areas that can respond to market opportunities if road transport costs are reduced by rehabilitation and regular maintenance.

Table 6.10: Benchmarks for Upgrade and Expansion of National and Urban Road Networks
(In kilometers)

Road category	2007	2008	2010	2015	2020	2025	2030
National highways							
Paved	1 242	1 267	1 345	1 540	1 735	1 950	1 950
Unpaved	708	682	604	409	214	-	-
Urban road network	650	650	650	790	1 008	1 287	1 643
Memo items:							
Vehicles per km of national road	2	3	3	5	8	14	22
Urban population per km urban roads	1 216	1 296	1 470	1 596	1 611	1 611	1 611

Source: Annex VIII.3.

In the course of designing and implementing the proposed Action Plan for the road network, there will be need for close attention to regional agreements on corridor operations and streamlining and harmonizing regulations affecting transport. A key justification and source of benefit in such programs is a reduction in transport prices. Since the 1970s donors have actively supported improvements to the transport corridors throughout Africa under the presumption that large investments in improving road infrastructure would indeed reduce transport prices. Although these improvements facilitated road transport and reduced costs for the trucks carrying cargo on the corridors, in many cases no clear impact on the transport prices was evident. Moreover, the end users of road transport services did not seem to benefit fully from the lower transport costs and better service quality resulting from the improved infrastructure. The Action Plan makes provision for regular surveys of the transport industry in order to monitor the extent to which rehabilitation and improved maintenance are, indeed, resulting in reduced transport costs as well as reduced transport prices to end users of these services.

Capacity Bulding in the Road Transport Sector

The proposed program for 2010-2030 includes about $40 million for human and institutional

Table 6.11: Summary of Development Spending on Road Infrastructure and Related Services
(In US$ millions at 2007 constant prices)

Type of expenditure	Annual disbursements							Total	
	2007	2008	2010	2015	2020	2025	2030	2010-19	2020-30
Management and capacity building	1,4	1,1	1,2	3,0	2,0	1,0	1,0	26,3	13,0
Technical studies	1,1	0,4	1,0	4,0	3,0	3,0	3,0	31,0	33,0
Capital development programs									
National highways	16,9	30,6	98,9	95,9	43,3	26,3	58,0	863,2	477,4
Provincial gov't & community networks	1,6	1,5	1,3	3,0	6,0	6,0	-	29,8	41,4
Urban road network	-	-	4,1	19,7	27,4	37,8	52,0	189,2	424,4
Sub-total	18,4	32,1	104,2	118,6	76,7	70,2	110,0	1 082,1	943,2
Total	21,0	33,6	106,4	125,6	81,7	74,2	114,0	1 139,4	989,2

Source: Annex Table VIII.3.

capacity building activities and $64 million for the conduct of technical studies of various kinds. There is an ongoing need for transport industry surveys, passenger and freight traffic information, and assessments of road conditions and traffic counts that are required for sound policy making for the sector. There is also a continuing need for technical assessments, feasibility studies and detailed design work associated with the ongoing program to rebuild the road infrastructure of the country. As noted elsewhere, an immediate priority is a comprehensive master plan for the transport sector as a whole, an important component of which will be a detailed master

Table 6.12: Completed, Ongoing and Proposed New Rehabilitation Programs for National Road Network. (In US$ millions at 2007 constant prices)

RN	National road Section concerned	Source of funding	Start date	Capital cost Total $ mill	Length repaired (km)	Total length (km)
3	Bujumbura-Gitaza	IDA	Completed	6	29	167
4	Bujumbura-Gatumba	EU	Completed	3	8	19
4	Bujumbura-Gatumba	IDA	Completed	3	11	19
5	Ruzizi river bank	IDA	Completed	3		81
10	Rugombo-RN1	IDA	Completed	6	27	122
12	Gitega-Muyinga	EU	Ongoing	71	104	93
14	Kirundo-Rwanda border	AfDB	Ongoing	11	37	68
5	Nyamutanga- Ruhwa	AfDB	2009	62	57	81
13	Ruyigi-Cankuzo	EU	2009	34	49	140
19	Muyinga-Cankuzo	EU	2010	44	62	62
1	Bugarama-Bujumbura	Proposed	2010	35	46	116
3	Southern section	Proposed	2010	97	138	167
5	Bujumbura-Rwanda border	Proposed	2010	17	24	81
13	Makebuko-Tanzania border	Proposed	2010	64	92	140
16	Muambara-Bururi-RN8	Proposed	2012	79	113	113
6	Muyinga-Tanzania	Proposed	2013	10	40	133
6	Muyinga-Kayanza	Proposed	2013	63	115	133
9	Bubanza-RN10	Proposed	2013	29	42	83
11	Mabanda-RN13	Proposed	2014	129	184	184
17	Bururi-Gitaba-Makamba	Proposed	2014	26	37	37
15	Gitega-Ngozi-Rwanda border	Proposed	2016	75	107	107
7	Bujumbura-RN8	Proposed	2017	91	131	131
18	Nyakararo-Mwaro-RN16	Proposed	2019	35	50	50
20	RN13-Tanzania border	Proposed	2020	26	37	37
21	Nyakatsi-Gisagara-Tanzania border	Proposed	2020	24	35	35
22	Rwegura-Rwanda border	Proposed	2021	19	27	27
2	Bugarama-Gitega					65
8	Gitega-Rutana-RN11					79
	Ongoing			83	141	
	Completed			21	75	
	Proposed			958	1384	
	Total			1061	1600	

Source: Ministry of Public Works and Equipment and estimates by the authors.

plan for the further development of road transport infrastructure.

Development programs for the regulation and management of road transport. The primary objective of this component of the program is to build human and institutional capacities in the government agencies that have primary responsibility for the regulation and management of road transport activities. The proposed Master Plan for the transport sector that is to be completed in 2010 with support from the AfDB and the World Bank will need to conduct a full assessment of the requirements for the road transport industry. A number of these requirements are already evident. The capacity building programs will, for example, need to support the collection, reporting and management of data for the transport industry, including traffic counts for roads and road conditions, vehicle fleet information, surveys of passenger and freight services, and information about the cost of these services. These types of data will allow comparisons with competing services in neighboring countries and alternative transport modes such as air and rail, and appropriate design of policies and programs for the development of the industry in Burundi. Of the above-mentioned approximate $100 million for capacity building and studies, some $35 million would be allocated for activities related services undertaken by those agencies responsible for the road transport industry.

Building human and institutional capacities and technical services related to road infrastructure. Continued support for capacity building in the key agencies responsible for the road infrastructure network is a high priority. A total of $70 million is included in the proposed program for capacity building activities in these agencies and technical studies of various kinds related to the development and maintenance of the road network. Key areas of focus for capacity-building and training would include the following:

- Managing technical assessments and feasibility studies in collaboration with the donor community, such as a bridge inventory and technical survey, transport studies and master plans, including evaluation of design work required for roads and bridges.
- Management and oversight of prime contractors and quality control inspectors in coordination with donors who participate in project funding activities. This will require a build-up in capacities for road rehabilitation contracts, bridge design and construction contracts, management of transport master plans, and so on.
- Oversight of the various environmental and social assessments that will be required as part of the ongoing program to rehabilitate road transport infrastructure and services.

Capital Expenditure Programs for the Roads Sector

Capital expenditure programs. In the past five years there has been a sharp increase in donor support for the rehabilitation of road infrastructure in Burundi. As Annex Table VIII.1 indicates, during 2004-2008 about $250 million of new commitments were made, for the rehabilitation of the national road network, $150 million of which came from the European Union, and about $75 million from the African Development Bank Group. At the same time, there was an equally important build-up in donor disbursements under these programs. Donor spending on the highways network was estimated to be only about $4 million in 2004. It is estimated to be currently in excess of $30 million a year. Spending from these ongoing donor programs is expected to peak at about $70 million a year in 2010-2011, after which disbursements will decline rapidly as these ongoing programs come to a close. As Chapter 4 emphasizes, this spending is having an important impact in the country with increased demand for labor and construction materials and increased economic growth.

The proposed rehabilitation program for road infrastructure over the next two decades is summarized in Table 6.11. The detailed program by road is presented in Table 6.12. In the decade ahead, the priority is the rehabilitation and upgrade of the entire national road network. During 2010-2019, capital outlays on the rehabilitation of the national road system amount to about $860 million. In the following decade (2020-2029), the

rehabilitation program is completed with outlays of another $480 million. During this period, all the remaining 700 km of unpaved national roads would be upgraded and sealed, and a start would be made on sealing high priority parts of the 2,800 km of provincial and community roads. In addition, in the latter ten-year period, some $260 million would be spent on major capital improvements to the network. As traffic volumes grow on the main thoroughfares, Burundi will have to upgrade its road system further. In some locations, two lane roads may no longer suffice. Moreover, there will likely be a need to implement a common set of standards for the main road grid for the EAC; for example, Burundi's two-lane paved roads are only six meters wide while those of neighboring Kenya are seven meters. The substantially larger volumes of traffic projected for Burundi will benefit from such upgrades.

Second, in response to the large increase in urban population, the Action Plan proposes a substantial increase in the urban road network of the country. A commonly used objective for urban road networks is that the entire urban population should be within 500 meters of a road supporting motorized access. As noted in Chapter 1, more work is needed on planning for the infrastructure requirements of Burundi's future urban population. For the purposes of this Report, the current ratio of urban populations per km of urban roads was used as a benchmark to anticipate future requirements. The Action Plan estimates that the urban network will need to be increased by about 1,000 km over the next two decades (Table 6.10) to accommodate the needs of the 2.6 million people who will be living in urban areas at that time.

Road construction costs. The projected cost of these improvement programs is indicative at this stage because there is a degree of uncertainty about the costs of construction. As Table 6.13 indicates, since 2004 there has been a substantial increase in the cost per km for reconstruction of a 6m two-lane paved road in Burundi. In several IDA-funded projects that began in 2004, the estimated costs of rehabilitation that were made at the time of project appraisal were in the range of $210,000 to $240,000 per km.[49] The capital cost of an AfDB project that started in 2006 was $307,000 per km. The realized contract price for an EU funded project that started in 2007 was about $685,000 per km. More recently, in a project that will begin in 2009 the AfDB estimated the cost at $1.08 million per km, while the EU estimated the cost of road work for a forthcoming Bujumbura road rehabilitation project at $950,000 per km. These sharp increases in unit costs cannot be explained entirely by the appreciation of the Euro against the U.S. dollar since 2004. The increase can be attributed in part, at least, to the impact of higher petroleum prices on the cost of asphalt during 2006-2008; asphalt typically accounts for more than one-third of the cost of rehabilitating paved roads in Burundi.

Table 6.13: Trends in Capital Costs of Roads

Donor	Project route	Start date	Length (km)	Cost ($ mill)	Cost/km ($ '000)
IDA	RN3	2004	29,3	6,3	215
IDA	RN4	2004	10,5	2,5	241
IDA	RN10	2004	27,0	6,1	225
EU	RN4	2004	8,3	3,0	361
AfDB	RN14	2006	37,0	11,4	307
EU	RN12	2007	104,0	71,3	686
EU	RN13	2009	48,5	33,6	693
AfDB	RN5	2009	57,0	61,7	1082
EU	RN19	2010	61,7	44,0	713
EU	Urban	2011	43,0	40,9	950

Source: Annex Table VIII.1

The capital costs of rehabilitation used in this Report are assumed to be $700,000 per km at 2007 constant prices for a two-lane paved road. If the cost of rehabilitation of the national road network is increased to $1 million per km, the total cost of this component of the roads program for 2010-2030 rises from $1.34 billion to $1.65 billion (at 2007 constant prices) - an increase of some 23 percent.

[49] The actual cost of these IDA reports is reportedly about 50 percent more than the estimates made at the time of appraisal. If that is the case, it would put them in the range of $340,000-$360,000 per km, similar to the EU project that began in 2006.

Maintenance Programs for Road Infrastructure

At the above unit cost of $700,000 per km for rehabilitation, the 1,950 km of national roads, when completely paved in 2025, would have an asset value of about $1.365 billion (at 2007 constant prices). As the foregoing capital development program evolves, the Government faces the important task of ensuring that these rehabilitated assets are adequately maintained. Increased budget allocations for routine maintenance that keeps roads in good condition will result is lower outlays on periodic maintenance.

Building capacities for improved maintenance. The proposed strategy for maintenance should be built around three key principles:

- *A clear program of maintenance works.* This would require that OdR has a detailed three-year and indicative five-year maintenance plan for all national and urban roads. This would be accompanied by a set of maintenance policies for each type of road. Bitumen roads (either asphalt concrete or surface treatment) and gravel roads would each require different specifications for maintenance.
- *A clear strategy for funding the required maintenance programs* on an ongoing basis, if need be with some cost-sharing in the early years with the donor community.
- *A clear strategy for private sector and community involvement in the maintenance program.* The respective roles of the government and private sector need to be clear; for example, all routine maintenance would be undertaken by private contractors and or communities, but the government might retain responsibility for emergency repairs/maintenance.

Larger, more manageable contracts are needed to implement routine maintenance on the main parts of the national network. Consideration should therefore be given to the award of multi-year "period" contracts for routine maintenance of individual sections of the core national network and urban roads. The full program could be phased in over a period of say, five years. Each contract could, for example, cover an average of not less than 100 km. When the program is fully operational, this would result in about 25 contracts with an average value of $175,000 per contract per year (at 2007 constant prices). This would introduce a degree of competition in the industry and provide valuable information about the capacities of individual firms. As the capacity of domestic contractors grows, the size of some of the period contracts could be increased. Longer-term contracts, the size of which are increased over time, will reduce unit costs for road maintenance, permit contractors to purchase necessary equipment, and locate staff close to the road sections rather than operate only from larger towns. Contractors could be required to use local communities for appropriate activities such as clearing drains and vegetation. The immediate issue is building the capacity of the OdR and the domestic contracting industry

Table 6.14: Annual Cost of Routine Road Maintenance

Road catergory	Cost per km (US$)		Length	Total cost (US$'000)	
	SME	ACD	(km)	SME	ACD
National network					
Paved	1 200	1 800	1 242	1 491	2 236
Unpaved	2 200	2 100	708	1 557	1 486
Provincial roads					
Paved	1 200	1 800	22	26	40
Unpaved	1 200	2 100	2 501	3 001	5 252
Communal roads	2 200	2 100	282	620	592
Bujumbura urban roads					
Paved	11 500		137	1 576	
Unpaved	7 500		325	2 438	
Total			5 217	10 708	9 606

Source: World Bank (2004).

to implement this type of program. OdR, for example, would need a sufficient number of works supervisors to manage these maintenance contracts. Donor assistance may be required to help build these capacities within OdR. The business registration system of the Government indicates that there are about 530 entities registered in Burundi as construction companies (see Table 1.3). The average value of the reported capital of these companies is about $6,300, which suggests many of them are small and likely have limited capacities. Business development programs will need to be formulated and implemented, with assistance from the donor community as necessary, to build the capacities of these business entities. As discussed in Chapter 2, these types of programs in other countries typically use business development centers to provide SMEs with training and support for bookkeeping and accounting, preparation of bid documents for maintenance contracts, applications to the banking system for working capital loans, and so on.

Road maintenance costs and programs. As noted earlier, maintenance of the national road network deteriorated during the period of conflict in the 1990s. According to the World Bank (2004), expenditures on road maintenance, for example, declined from $11 million in 1993 to $1.2 million in 2003. In 2004, the World Bank estimated the annual costs of routine maintenance for various categories of roads.[50] Table 6.14 summarizes the results of this World Bank assessment. The estimated annual cost for routine maintenance of the national road network was estimated at $3-$4 million depending on whether the work was done by Associations of Community Development (ACDs) using labor-intensive methods, or by small and medium business (SMEs) used mechanized equipment. Subsequently, the OdR has prepared a detailed program of maintenance for national and urban roads.

The annual maintenance cost for the provincial and communal road network was estimated at $3.6 million to $6 million in 2004, depending on the extent to which ACDs would be used for maintenance work. Routine maintenance of the Bujumbura urban road network was estimated at about $4 million. Thus, the annual cost of routine maintenance of the entire classified road network and all urban roads in Bujumbura was put at about $12-$14 million, depending on the extent to which ACDs were used for the work.

According to the World Bank (2008), the Government spent the equivalent of 0.03 percent of GDP on routine maintenance of the national road network during 2004-2006 - the equivalent of about $245,000 a year. Allocations for routine maintenance have increased each year since then. The World Bank estimated that routine maintenance of the national network would cost about $5 million a year by 2008. To help bridge the gap in maintenance spending, the 2004 World Bank Road Sector Development Project included $5.8 million for a three-year program of routine maintenance of the classified road network. This included maintenance of 1,500 km of roads by the ACDs, and 1,300 km of the network by SMEs.

Table 6.15: Proposed Annual Maintenance Expenditures on Road Network

Road category	Length (km)	Annual disbursements							Total	
		2007	2008	2010	2015	2020	2025	2030	2010-19	2020-30
National highways	1 950	3,5	3,5	3,5	3,4	3,2	3,1	3,1	33,8	34,7
Provincial & communal	2 805	0,2	0,3	1,0	5,6	5,6	5,6	5,6	43,1	61,7
Urban road network[1]	1 643	0,3	0,4	0,7	1,6	2,0	2,6	3,3	14,5	28,7
Unclassified network	7 105	-	-	0,5	1,4	2,3	3,2	4,1	13,3	35,2
Total	13 502	4,0	4,2	5,7	12,0	13,2	14,5	16,1	104,6	160,3

Source: Annex Table VIII.4. Note 1: the length of the urban network as of 2030.

[50] See World Bank (2004), Government of Burundi:Road Sector Development Project. World Bank Appraisal Report, February 19, 2004.

The proposed levels expenditures on routine maintenance of the classified road network are set out in Table 6.15 above, along with outlays for the urban road network. The proposed annual expenditures for routine maintenance would require a steady increase annual outlays over the next two decades from current levels of about $5 million a year to about $16 million a year by 2030 (at 2007 constant prices). As noted earlier, the objective of the rehabilitation program for the national highways is to have the entire network completely paved by 2025. As a result, there is a small decline in routine maintenance outlays in later years because of the assumed lower cost of maintenance for paved roads.[51]

Table 6.16: Revenue Sources for the National Road Fund

Source of revenue	2005	2006	2007	2008
Fuel tax	1 196,7	2 216,9	3 580,6	3 255,2
Import duties on vehicles	334,2	353,9	354,2	373,5
Road tolls	935,2	1 213,0	1 054,5	1 114,9
Drivers license fees	6,8	33,0	57,1	62,8
Total receipts	2 472,9	3 816,8	5 046,5	4 806,4
Memo item:				
Total receipts (US$ mill)	2,286	3,710	4,665	4,054

Source: Ministry of Finance.

The proposed program also includes an increasingly large program of expenditures on the 7,100 km of unclassified rural and feeder road network. These budget funds could cover, say half the cost of maintenance and upkeep of these roads, with the other half contributed by the local communities who are the main beneficiaries of the roads. The budget funds could be allocated on the basis of equal amounts per capita for each jurisdiction. However, there will be need for a careful assessment of the requirements for various parts of the unclassified network prior to the launch of this program in 2010. Those roads that are essential for farmer access to processing facilities and markets need to be identified and budget allocations made according to these priority needs. The proposed transport master plan to be undertaken in 2010 will need to investigate these requirements.

Funding for road maintenance. Earlier in the decade, there was a persistent shortage of budget resources for maintenance of the road network. To address the problem, the Government created the Fonds National Routier (FNR) - an autonomous national road fund. The Fund is financed by revenues from fuel taxes,

Table 6.17: Vehicle Registration Revenues

Vehicle type	2002	2003	2004	2005	2006	2007	2008
Motor cycles	18,1	20,7	21,2	44,5	30,7	34,4	64,2
Vehicles							
Private cars	37,2	51,1	77,4	69,4	83,3	67,2	88,8
Four-wheel drive vehicles	9,5	38,5	21,6	25,7	39,0	28,4	39,8
Buses	13,7	33,5	17,6	16,4	23,8	18,7	23,3
Trucks and tractors							
Mid-sized	15,1	35,7	20,5	19,9	20,1	18,8	21,9
Large	8,3	21,8	12,1	16,1	19,0	16,5	12,6
Heavy	1,1	0,8	0,7	0,6	2,3	3,1	4,3
Tractors	0,3	0,3	0,5	0,2	-	0,1	0,3
Total	103,2	202,4	171,4	192,9	218,0	187,1	255,1
Memo item:							
Registration fees (US$ mill)	0,111	0,187	0,156	0,178	0,212	0,173	0,215

Source: Ministry of Finance, Fees Registration Service.

[51] It is assumed that the routine maintenance costs for paved roads are $1,600 per km and $2,200 per km for unpaved roads at 2007 constant prices. Maintenance costs for the provincial, communal and urban networks are assumed to be $2,000 per km (also at 2007 constant prices).

drivers' licenses, road tolls and import duties on vehicles. A portion of the resources in the Fund are allocated to the national budget each year for routine road maintenance. The OdR believes that the funds mobilized through the FNR are now sufficient to meet two-thirds of the annual cost of routine maintenance of the national road network. As Table 6.16 indicates, receipts into the Fund receipts have increased sharply, largely as a result of a series of increases in the fuel tax. In 2001, the fuel tax stood at 20 Bf per litre (equivalent to US 2.4 cents a litre). There has been a series of increases in 2005, 2006, 2007 and most recently, in November 2008. The tax now stands at 80 Bf (equivalent to US 6.7 cents a litre). Fund receipts have increased from $2.3 million in 2005 to $4.1 million last year.

A particular concern about the fuel tax is its potential negative impact on international competitiveness of Burundi business activities, in part because fuel prices and taxes are lower in some other member states of the EAC. Rather than relying on further increases in the fuel tax, other sources of funding might be considered to help meet the costs of routine maintenance. One source would be vehicle registration fees, which currently generates only $215,000 in revenues (Table 6.17). At the present time, the annual cost of registering a vehicle is quite low; for example, the annual fee for a private car is $32. The highest annual fee is $44 for a heavy truck. Consideration might be given to raising the fees for four-wheel vehicles to $150-250 a year, depending on the type of vehicle. This would add another million dollars to revenues from the transport industry. In the event that the four-wheel vehicle fleet of the country increases to somewhere between 40,000 and 70,000 vehicles by 2030, the annual proceeds from vehicle registration could rise to as much as $10 million. This would cover a substantial part of the costs of routine maintenance and may also allow for some reduction in the fuel tax to improve international competitiveness.

Petroleum Pipelines

As the trade statistics for Burundi, Rwanda and Uganda indicate, the inland markets for petroleum products are growing at rapid rates. As a result, the long-term security of supply of petroleum products is of considerable importance for these governments. The Governments of Kenya and Uganda have expressed an interest in extending the existing Western Kenya Pipeline (WKPL) system westward into Uganda to secure the delivery of product, notably into Kampala. A feasibility study of the proposed extension was completed in May 1999. It concluded that the project was feasible and viable. A follow-up study in 2001 confirmed that the pipeline was the least-cost mode of transporting petroleum products to Uganda. A decision was made in 2003 to implement the project and pre-qualification of potential investors was concluded. In July 2006, Tamoil East Africa Ltd. was awarded the contract which was signed in January 2007. It is expected that construction work on the pipeline will begin in mid-2009, and the Eldoret Kampala portion of the pipeline will be commissioned in late 2010. The total length of the pipeline is 352 km. The project is being undertaken on a BOOT basis. The BOOT period would end in 2028. Once completed, the petroleum products will be distributed by oil marketing companies in Uganda and the neighboring states.[52]

There is no readily available information on the capital cost of the pipeline. The recently completed 1,768 km pipeline from Baku to Tbilisi and to Ceyhan in Turkey, which was financed by the IFC, the European Bank for Reconstruction and Development, export credit agencies of seven countries and a syndicate of 15 commercial banks, cost $3.9 billion. Applying the average cost of $2 million per km of this project to the above extension to Kampala suggests investment expenditure in the range of $700 million.[53]

[52] For a more detailed discussion of the technical aspects of the pipeline, see Tamoil East Africa Ltd., Process Description for Kenya-Uganda Pipeline Extension Project, undated memorandum.

[53] See report on the Baku-Tbilisi-Ceyhan pipeline at http://en.wikipedia.org.

The import of petroleum products into Burundi is growing rapidly. According to Central Bank data, imports for fuels for the transport industry increased from about 36,000 tons in 2005 to more than 60,000 tons in 2008. Given the projected growth rates for the vehicle fleet and civil aviation, including growth in domestic registrations of four wheel vehicles of 11 percent a year (Table 6.3), imports of fuel products for the transport sector would increase to about 600,000 tons by 2030. These quantities may justify an extension of the pipeline to Burundi. The AfDB is taking the lead in arranging a feasibility study of a possible extension of the pipeline from Kampala to Kigali and Bujumbura. The NEPAD IPPF Special Fund would be used to fund the study. An extension from Kampala to Bujumbura would probably involve a pipeline of about 660 km if it followed the road route. At the above-mentioned cost of $2 million per km, the total cost might be in the range of $1.3 billion.

Port Facilities and Services

Regional port services

Burundi depends heavily on the international ports of Mombasa and Dar es Salaam for transshipment of a large share of its imports and as a point of exit for many of its export products. Mombasa, the largest port in East Africa, is operated by the Kenya Ports Authority. It is well endowed with equipment and facilities, has a natural port whose berths do not require constant dredging, and has an adequate dock infrastructure. Mombasa has a total annual capacity of 20 million tons. It has two separate terminals, one devoted solely to containers and the other for miscellaneous goods. The latter is functioning below capacity as there has been a shift away from bulk cargo to containers. The capacity of the container terminal is limited, resulting in backlogs at the offloading stages. Goods in transit to Burundi are stored in separate areas at the port.

Table 6.18: Total Tonnage and Transit Tonnage Through Ports of Mombasa and Dar es Salaam (Thousands of MT)

	2000	2001	2002	2003	2004	2005	2006
Mombasa							
Total tonnage							
Imports		8 299	7 844	9 332	10 018	10 700	11 846
Exports		1 998	2 380	1 994	2 494	2 278	2 255
Total	9 125	10 297	10 224	11 326	12 512	12 978	14 101
Transit tonnage							
Imports	1 153	1 844	1 875	2 186	2 590	3 202	3 583
Exports	301	273	340	266	300	334	335
Total	1 454	2 117	2 215	2 452	2 890	3 536	3 918
Transit as % of total	15,9	20,6	21,7	21,6	23,1	27,2	27,8
Dar es Salaam							
Total tonnage							
Imports	3 058	3 512	3 631	4 072	4 763	4 829	5 225
Exports	745	666	724	881	920	1 051	1 036
Total	3 803	4 178	4 355	4 953	5 683	5 880	6 261
Transit tonnage							
Imports							
Exports							
Total	31	93	169	246	371	405	428
Transit as % of total	0,8	2,2	3,9	5,0	6,5	6,9	6,8
Burundi transit tonnage							
Through Mombasa	2	7	29	4	19	29	66
% of total transit at Mombasa	0,2	0,3	1,3	0,2	0,7	0,8	1,7
Through Dar es Salaam			73	75	99	134	170
% of total transit at DAS			43,3	30,4	26,6	33,0	39,6

Source:CPCS (2007). Estimates by authors for 2007 and 2008

The transshipment procedures for goods in transit to the landlocked countries have been simplified pursuant to the arrangements negotiated under the Northern Corridor Transit Agreement signed by the Governments of Burundi, Kenya, Rwanda and Uganda. Transit trade accounted for 28 percent of the total tonnage through the port in 2006, compared with only 16 percent in 2000. Some 70 percent of the increase in this transit trade was accounted for by Uganda. Burundi's exports and imports that pass through Mombasa accounted for less than two percent of the total transit trade in 2006.The Port of Dar es Salaam, on the other hand, handled less than half the tonnage that passed through Mombasa in 2006. It primarily serves the needs of Tanzania. It has eight deep-water berths (1,478 m in length), and four terminals with a total capacity of 10 million metric tonnes per year. There are numerous complaints by importers and transshipment agents about the congestion and abnormally long delays at the port. The terminal area is constricted, and the rapid growth in containers through the port has congested the terminal area, which is reducing efficiency in clearing cargo from the port. The general cargo terminal is also experiencing continued performance problems. The transit trade that passed through Dar es Salaam in 2006 accounted for only seven percent of the total tonnage handled by the port. An important reason for the relatively small volume of transit trade has been the poor performance of the Tanzania railways. Trucking costs are similar from both ports and this reality has led to substantial shifts from rail to road transport, especially on the Northern Corridor to Uganda and Central Corridor to Burundi and Rwanda. The amount of transit cargo carried by the Tanzania Railways Corporation (TRC) declined from 350,000 tons in 2003 to 174 thousand tons in 2006. Its domestic freight experienced a similar very shape decline as well. Overall, the amount of freight carried by TRC declined to half the 2003 level in three years.

Although Dar es Salaam accounts for only ten percent of the total transit trade through the two ports, the port is of importance to Burundi. In 2006, about 40 percent of imports and exports that transited through Dar es Salaam were to and from Burundi. Burundi has relied primarily on Dar es Salaam as its gateway to international markets. As recently as five years ago, approximately 85 percent of its transit trade imports and exports passed through Dar es Salaam, but with the loss of the rail freight to road transport, the share of Burundi's trade through Dar es Salaam had declined to about 60 percent in 2006 (Table 6.18).

The Port of Bujumbura

Until recently, the bulk of the cargo movements between Burundi and the Port of Dar es Salaam were carried by rail to and from Kigoma or Mpulungu, and by vessel from these ports to and from the Port of Bujumbura. The Port at Kigoma is affected by lack of suitable rolling stock and the age of the cargo handling equipment at the port. As a result, there are long delays in loading and unloading goods. The shipment of goods on Lake Tanganyika is provided primarily by four Burundian companies.

Table 6.19: Volume of Imports and Exports Shipped Through Bujumbura Port

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Imports									
Kigoma and Kasanga	107	110	84	83	63	67	57	25	19
Mpulungu	47	28	48	62	42	59	57	27	19
Total	155	138	133	145	105	126	114	52	38
Exports									
via Kigoma	28	21	19	24	12	10	6	5	2
via Mpulungu	1	0	0	3	2	6	5	8	7
Total	29	21	20	27	15	16	11	13	9
Total tonnage	184	159	152	172	120	143	125	65	47

Source: Port of Bujumbura.

The fleet of these companies has limited capacities. The vessels are old, with some in service for over one hundred years. Moreover, there is no shipyard on the Lake that can do maintenance and repair work on these vessels.

The Port of Bujumbura has an annual capacity of 500,000 metric tonnes. There are five berths, four of which are devoted to miscellaneous goods. The fifth is devoted to loading/offloading of petroleum products. Port equipment is old and needs to be modernized to speed up loading and offloading operations. The deterioration in the performance of the TRC has had a profound effect on the operations of the Bujumbura Port. There has been a major reallocation of freight away from the TRC to road freight, As Table 6.19 indicates, the volume of trade entering and leaving Burundi through the Port of Bujumbura has declined sharply and is now a quarter of what it was in 2000. The total volume of imports into Burundi is estimated at about 250,000 MT at the present time (see Annex V). The Port of Bujumbura handles only 15 percent of this import trade. Reliable estimates for the total volume of imports in 2000 are not available, but it is very likely that at that time, 80-90 percent of this trade came through Bujumbura Port.

Future Role of the Port

The recent diversion of traffic from rail to road raises fundamental questions about the future role of the Port of Bujumbura - the more so, if a rail extension is, in fact, built in Burundi in the decade ahead. There are several possible scenarios for the medium-and longer-term:

- Tanzania upgrades the existing rail line to Kigoma and rail transport costs and services are again competitive with road, in which case there is a movement of bulk cargo from road back to rail. In this scenario, Bujumbura Port would need a substantial upgrade in its capacity at some point in the future. According to the projections of trade volumes used for this report (see Chapter 2), it will take ten years of sustained strong economic growth for Burundi's total imports to rise to 500,000 MT a year. Since not all imports would come through Das es Salaam, the prospect of 500,000 MT of freight passing through the port is more than a decade away in this scenario. There is no immediate need for major new investment in port facilities to expand capacity. In the event that there was an early improvement in TRC performance and a move back to rail by some importers, there may be need for modest investments in the range of $10-15 million to upgrade equipment and so on. The Action Plan makes provision for such an investment in 2011-2013 and again in 2021-2023.
- The proposed rail extension into Burundi is constructed, in which case it would carry freight and passenger traffic direct to Bujumbura. The need for transshipment from rail to vessels at Kigoma would virtually disappear. The future of the Port would then depend on its ability to generate new sources of business on and around Lake Tanganyika.
- There is a long delay in the upgrade in the Tanzania railway services, in which case there are serious delays in the mining venture in Musongati and no rail extension is constructed in Burundi. In this case, the competitiveness of the road network would remain and the Bujumbura Port would continue to handle only modest volumes of freight and passenger traffic.

As indicated in Chapter 4, the Base Case Scenario used in this Report includes the development of nickel mining in the decade ahead, but because of serious questions about economic viability it does not include the rail extension into Burundi. The mining project would require the rehabilitation of the TRC within the next seven years. (It is assumed that the mine would come on stream in 2017.) In this Case, the future of the Port remains as an open question. A rehabilitated TRC would open the possibility of a shift in freight from road to rail in the latter part of the decade ahead.

Civil Aviation in Burundi

Status of Civil Aviation

Institutional arrangements for civil aviation. Burundi is a member of the International Civil Aviation Organization (ICAO). It has ratified the Chicago Convention and by doing so Burundi is committed to ensure safe civil aviation by following the rules and regulations as laid down in the Standards and Recommended Practices (SARPs) of the ICAO. Moreover, as a member of the EAC, it is also committed to improve safety and other standards to the levels required of EAC member countries.

The Civil Aviation Authority, or Régie des Services Aéronautiques (RSA), has primary responsibility for the promotion of safe, regular, standard and effective operation of flights, and air communication, navigation and transport services for domestic and international services within Burundi. It is an autonomous public enterprise under the authority of the Ministry of Transport, Post and Telecommunications. The RSA is both a regulator and an operator as it is the airport authority and the civil aviation authority. Its main functions are as follows:

- Licensing of air transport and the provision of accommodation in aircraft.
- Provision of air navigation services and aeronautical assistance and information.
- Management and operation of airports.
- Registration of aircraft and ensuring safety of air navigation and aircraft, including airworthiness.
- Regulation of air transport services.
- Advising the Government on matters concerning civil aviation.

The RSA also licenses professional and private pilots, air traffic controllers, flight and ground engineers and cabin crew, and approves aircraft maintenance organizations.

Organization of RSA. The RSA is required to operate on a sound commercial basis and is directed by a Board of Directors that report to the Minister of Transport, Post and Telecommunication. The RSA employs about 270 staff and has five departments:

- Infrastructure Department with 56 staff whose responsibilities include planning, construction and maintenance of airport infrastructures.
- Finance Department with 65 staff in central support functions such as finance, corporate planning, airport management and human resources.
- Air Navigation Services (ANS) Department with 94 staff responsible for provision of air navigation services and control of all flights within Burundi airspace.
- Engineering Department with 60 staff in areas such as providing and maintaining air navigation equipment and airport lighting.
- Air Transport Department with four staff whose responsibilities include monitoring of flight operations and aircraft maintenance.

Table 6.20: Civilian Airports in Burundi

Location	Usage	Customs	Runway	Length (m)
Bujumbura	civil	yes	paved	3 600
Gitega	civil	no	unpaved	945
Kirundo	civil	no	unpaved	975
Gihofi	civil	no	unpaved	

Source: Civil Aviation Authority.

Civil aviation facilities and services. The Burundi aviation sector depends on several international airlines for services, including Kenya Airways, SN Brussels Airlines, Ethiopian Airlines and Rwandair Express. It has one national airline, Air Burundi, which operated scheduled air services to Rwanda and Tanzania, but it ceased operations in the Spring of 2007. Given the current lack of compliance with ICAO requirements and lack of an ICAO "Certification of Aerodromes," it is difficult for Burundi to attract major international airlines.

Table 6.21: Annual Arrival and Departure of Passengers and Freight at Bujumbura International Airport

Category	Annual arrivals and departures									Growth
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2000-08 (% p.a.)
Passengers										
International										
Scheduled	52 323	51 815	58 438	61 022	75 249	88 469	101 402	129 531	141 814	13,3
Charter										
Transit	13 149	9 472	10 604	7 881	9 763	8 352	14 364	29 912	25 526	8,6
Sub-total	65 472	61 287	69 042	68 903	85 012	96 821	115 766	159 443	167 340	12,4
Domestic		121	828	83	72					
Total	65 472	61 408	69 870	68 986	85 084	96 821	115 766	159 443	167 340	12,4
Freight (MT)										
Imports	3 392	3 116	2 251	2 054	3 066	3 120	2 632	2 271	2 549	(3,5)
Exports	225	270	297	236	228	210	227	360	329	4,9
Total	3 616	3 385	2 547	2 290	3 295	3 330	2 860	2 631	2 878	(2,8)
Freight/passenger (kg)	69	65	44	38	44	38	28	20	20	

Source: Régie des Services Aéronautiques and SOBUGEA.

Burundi has one international airport, Bujumbura International Airport, which is controlled and operated by RSA (Table 6.20). In addition, there are three other small airports at Gitega, Kirundo and Gihofi, all of which are unpaved. These four airports are recognized by the ICAO and therefore are required to comply with the SARPs of the ICAO. There are another four small airports that are not in use by the public.

Passenger traffic and cargo. Passenger traffic at the Bujumbura International Airport grew by 13 percent a year during 2000-2008 (Table 6.21). International arrivals and departures now stand at about 142,000 a year. Domestic traffic at the Bujumbura Airport has been negligible due to the almost complete absence of domestic airline services. Freight movements through Bujumbura Airport are small and consist mainly of baggage and a small volume of mail services. The volumes vary from year to year, but are relatively stable at around three thousand MT a year. The amount of freight per passenger was equivalent to about 70 kg in 2000, but the ratio has declined steadily to about 20 kg per passenger in the past two years.[54]

Major Challenges Facing the Sector

The structure and operation of Bujumbura International Airport needs to be improved as it currently does not have the capacity for sustainable long-term development. In certain areas, it is currently under-staffed for the volume of traffic it handles and is not able to offer adequate service to international or domestic users. Safety and security issues are in need of improvement. And airport operations, airport inspection, and airport fire and rescue all need to be developed and modernized.

With rising demand for air services, safety issues are a particular source of concern throughout Sub-Saharan Africa. Accounting for a mere three percent of global air traffic, Africa has a disproportionately large number of air traffic accidents. Many African countries have low safety standards, with aviation authorities that have little or no control of safety oversight. In 2006, for example, the European Union banned 92 airlines, the vast majority of them from Africa. Many airlines are declared unsafe according

[54] Assuming the average load per passenger is 200lbs (90kg), including the weight of baggage, this number of passengers could be carried by two flights a day using planes such as the Airbus A320 or the Boeing 737-800, each of which can take loads of up to 20 tons.

to international standards and are not permitted to land at European airports.

Lack of compliance with ICAO standards. The civil aviation sector of Burundi is not in compliance with a numbera number of the international standards set by the ICAO. The RSA has indicated that the following are areas of particular concern:

- *Measures to strengthen the legal framework.* One of the weakest areas of RSA operations relates to institutional issues such as legislation and organization, safety/security regulations and supervision which are not sufficiently well managed and applied. There is an urgent need to establish a viable and effective regulatory system that can work to the benefit of the traveling public and airline operators.
- *Air traffic management.* The Bujumbura Aerodrome Control Unit/Approach Control Unit/Flight Information Centre provides air navigation services (ANS) within Burundi airspace/territory. However, rules, regulations, manuals and working methods and management arrangements, as well as airspace organization and its design and classification, are not up to date and need to be reviewed and revised.
- *Airport development program.* Aviation infrastructure (i.e., airports) is essential for the growth and functioning of air transport services. Infrastructure inefficiencies in Burundi, coupled with limited competition and difficult operating conditions are making market access both difficult and expensive. There is an urgent need to improve the amount and quality of airport infrastructure so that Burundi can be in compliance with the requirements of the EAC and the ICAO. To develop the airports in Burundi, the operations have to be organized and performed in a way that fulfils international standards and brings the efficiency of the airports to a competitive level.

The objective is to get an ICAO "Certification of Aerodromes" so that Burundi can attract major international airlines and tourism and other traffic.

Environmental protection measures. The RSA is also responsible for protection of the environment against pollution from civil aviation activities. As of now, there is no environmental policy in place, nor any environmental regulations. The RSA is yet to develop these policies, rules, guidelines and plans to implement the requirements.

Improving regional cooperation and coordination with other EAC members. An objective of the EAC is …"to ensure safe, secure and efficient civil aviation for travel within the Partner States as well as to and from other parts of the globe." To accomplish this objective, the founding EAC Partner States, Kenya, Tanzania and Uganda, established the Civil Aviation Safety and Security Oversight Agency (CASSOA) in April 2007. The Protocol has been ratified by Kenya, Tanzania and Uganda. It is yet to be acceded to by Burundi and Rwanda.

The purpose of CASSOA is to help Partner States meet the requirements of the ICAO. This involves developing consensus among the Partner States, coordinating activities, sharing technical expertise and facilities, and achieving effective oversight of civil aviation and security. The CASSOA legislative bill, which gives legal status to the organization, has been drafted and is currently awaiting approval by the East African Legislative Assembly (EALA). In the meantime, CASSOA has signed a contract with the Civil Aviation Consulting Services of the International Air Transport Organization (IATA) for the development of a five-year strategic plan. Early discussions with stakeholders from member countries indicate agreement on the transfer of a number of regulatory oversight functions from State CAAs to CASSOA. These include safety programs, airworthiness, personnel licensing, air operation and inspection, and certification of international aerodromes. There was also agreement that aircraft registration should remain a State CAA function.

Development of human resources. Capacity building is the key issue for the achievement of a sustainable and competent organization that, in turn, can contribute to the development of the aviation sector. The RSA needs support to improve its in-house human and institutional capacities and thereby gain the trust of users and stakeholders such as passengers, airlines and cargo distributors.

The main problem faced by RSA is lack of technical competence, experience and knowledge in various disciplines of civil aviation. Shortages of funds make it difficult to train and thereby improve the level of competence and knowhow of the staff of the RSA. Training abroad is expensive, and given the very limited resources of the RSA and lack of domestic training facilities, efforts to build competence and expertise within the RSA have fallen short of what is needed. There is an urgent need for a master plan for training of RSA staff that includes a review of existing modalities and work practices and proposed changes as necessary. Moreover, the existing facilities do not meet the basic training needs of the sector. A comprehensive program to upgrade the Training Center is needed. For example, comprehensive training is needed for all staff assigned to the Air Traffic Management System (ATS). All ATS training should be carried out in Burundi, but this requires installation of a simulator at the training center. Other areas in need of advisory services and special training programs include Aeronautical Information Services (AIS), training of air traffic control officers and Aeronautical Information Service and Briefing Officers (basic/advanced), and hiring and training Search and Rescue (SAR) personnel.

A related issue concerns the evolving personnel needs of CASSOA. If responsibilities for these aspects of civil aviation are transferred to CASSOA within the next five years, for example, RSA will face important adjustments in its staffing. CASSOA has indicated that to build its own capacities it would look to transfers of staff who currently have responsibilities at the national level for the activities that would be part of the proposed CASSOA mandate. In the event that RSA staff currently engaged in these activities decline to transfer from Burundi to Arusha, there may be a need to retrain these staff for different assignments within RSA.

Growth in Demand for Aviation Services

Given the uncertainties about the amount of time and technical and financial support that will be needed for the International Airport to be in compliance with ICAO and EAC requirements, any forecast of the growth in demand for passenger and freight services is at best, somewhat notional. As noted earlier passenger traffic at Bujumbura International Airport has been growing at about 13 percent a year. The current global economic downturn is resulting in declines in international air travel in 2009. IATA is forecasting a drop of about three percent in air travel this year, for example.

Table 6.22: Two Scenarios for Future Passenger and Freight Growth at Bujumbura Airport

Category	Actual	Projected arrivals and departures					Growth
	2008	2010	2015	2020	2025	2030	2008-30 (% p.a.)
Passengers							
International							
Low growth	141 814	140 000	180 000	230 000	290 000	370 000	4,5
High growth	141 814	140 000	270 000	445 000	715 000	1 150 000	10,0
Domestic							
Low growth	-	-	500	2 500	5 000	20 000	
High growth	-	-	1 000	5 000	15 000	50 000	
Total							
Low growth	141 814	140 000	180 500	232 500	295 000	390 000	4,7
High growth	141 814	140 000	271 000	450 000	730 000	1 200 000	9,2
Freight (MT)							
Low growth	2 878	2 730	4 000	5 000	6 000	7 500	4,5
High growth	2 878	2 730	7 500	15 400	31 000	62 000	15,0

Source: Estimates by authors.

For the purposes of this Report it is assumed that there will be a corresponding drop in passenger traffic at Bujumbura in 2009 and 2010. Table 6.22 sets out two possible scenarios for the growth in passenger traffic from 2011 onwards:

- *A low growth scenario* in which passenger and freight traffic grows by 4.5 percent a year. In this scenario, the amount of freight remains at recent levels equivalent to 20 kg per passenger. In other words, there is no development of a commercial freight business in this scenario. This outcome is included in the low growth Scenario E described in Table 3.1. In this scenario, business activities and tourism expand only slowly.
- *A high growth scenario* in which passenger traffic grows by 10 percent a year and freight grows by 15 percent a year. In this scenario, there is a growth of five percent a year in the commercial freight business. It is this scenario that is used in the Base Case outlined in Chapters 3 and 4. In the Base Case, GDP grows at about seven percent a year in real terms and this generates substantially larger amounts of business traffic. In this scenario, it is also assumed that Burundi will be successful in building a tourism industry that attracts increasingly large numbers of international travelers.

The implications for the airport are clear in each of these cases. In the low case, passenger arrivals and departures and freight double in about 15 years. By 2030, this volume of passengers and their baggage could be handled by 6-8 flights a day (with an Airbus A320 or Boeing 737-800 or equivalent). In the high case they double in about 10 years; passengers and their baggage could be handled by an average of about 18 flights a day and the commercial freight by about six flights per day. In both cases, there will be a need to build human and institutional capacities as quickly as possible and to ensure that Burundi is in compliance with ICAO and EAC standards for civil aviation. In the high case, it is assumed that there is rapid progress towards ICAO compliance and issue of the necessary certifications by ICAO that, in turn, allows Burundi to attract international airlines and tourism traffic. In this scenario, there would be need for substantial additional expenditures on the capacity of the airport in the next five years.

An Action Plan for Civil Aviation

To lay the foundations for a vigorous expansion of the civil aviation industry, the RSA will need an action plan for the near- and medium-term. The key elements of this action plan are outlined below.

Airport ownership and management. The future development of airport infrastructure and services in Burundi will require large, but as yet, undetermined amounts of capital funding to upgrade the capacity and functionality of the airport. Cash flow from the current operation of the airport is not sufficient to meet these funding needs. Given the very large competing claims on the National Government, it is unlikely that the required amounts of funding will be available from the national budget. Moreover, to date at least, there has been only minimal support from the donor community for improvements to the civil aviation infrastructure. In these circumstances, there is merit in considering some form of private operation of the International Airport. The impending transfer of some key national regulatory and oversight responsibilities to CASSOA for safety programs, airworthiness, personnel licensing, air operation and inspection, and certification of international aerodromes, offers an important opportunity to review arrangements for the commercial aspects of aviation services within Burundi.

Over the past three decades since the deregulation of the U.S. airline industry began in 1978, there has been a worldwide reappraisal of the civil aviation industry that engendered a broad thrust toward bringing the “market” and overt competition into the operation of civil air transport. In a number of countries, the airports - rather than the airlines - have been in the forefront of this move toward market competition and deregulation. International experience with privatization in civil aviation over the past three decades has led increasingly to the view that:

- Airport service levels to passengers and airlines can be increased by the introduction of the commercial ethic.

- Airports should, in most cases, be financially self-sufficient in the long term, and their capital expenditure requirements can be generated from income.
- Government regulation of the commercial aspects of the aviation industry is largely unnecessary and that the mechanism of the private market can best supply the air travel needs of the public. A variety of options for privatization have emerged over the past three decades. Those most likely to be applicable in Burundi are management contracts, or third-party facility development arrangements.[55]

    - *Management contract.* The use of management contracts permits competition within the airport operation without a change in ownership. This technique is widely used in the industry and is often seen as a first step towards privatization. Under this arrangement, private contractors would bid and are awarded contracts to perform services that were previously carried out entirely by airport staff. Contracts that typically fall into this category are engineering and architectural design services, cleaning, maintenance of buildings and grounds, security services, and the operation of heating and air conditioning plants. A more radical form of management contract involves the management of the entire airport facility.

    - *Third-party facility development.* Under this arrangement, a developer who is neither the airport authority nor airline, provides turnkey arrangements of finance, design, construction, operation and ownership of an aviation facility at an airport.

Preparation of a business plan. The most urgent requirement is the preparation of a business plan for civil aviation in Burundi over the next five years. The business plan would be an integral part of an overall corporate plan for the aviation industry in Burundi. The business plan would need to address the following three issues: (i) as the agency responsible for civil aviation in Burundi, outline the evolving role of the RSA with particular attention to measures needed for compliance with ICAO and evolving CASSOA standards and requirements; (ii) set out the training and other capacity building programs required to meet these standards; and (iii) outline a commercial plan for the development of Bujumbura Airport, which will continue to be the only international airport in Burundi for the foreseeable future. The business plan for the airport would need to address the following issues:

- Statement of the airport's business aims and objectives. In the case of publically operated airports it is not uncommon to find that the objectives of an airport as a corporate entity frequently are unstated. Commercial profit is often not considered to be an important corporate objective.
- Market analysis of the demand for air transport, identifying underlying trends. This aspect would need to include one or more scenarios for expected growth in passenger and freight traffic.
- Assessment of the degree of competition within the market for airport business and an evaluation of the airport's strengths and weaknesses with respect to competing airports in neighboring countries, especially for tourism and for possible export of high value agricultural products.
- Determination of the range of services to be offered. This might, for example, include an assessment of the need for improved storage facilities at the airport, including cold storage that can support the export of fresh fruits and vegetables, flowers, and other high value agricultural products, to industrial country markets.
- Statement of the measures to be taken by the airport to market and sell its services.
- Determination of the impact of proposed

[55] Other privatization mechanisms used in the aviation business include public incorporation with share ownership retained in the public sector, public incorporation with shares available to the public, management buyout, or outright sale. These are less likely to be applicable in Burundi, at least at this stage.

Table 6.23: Indicative Development Expenditure Program for Civil Aviation, 2010-2030
(US$ millions at 2007 constant prices)

Expenditure category	Annual disbursements										Total	
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2010-19	2020-30
Capacity building & management												
Preparation of business plan	0,5										0,5	-
Preparation of master plans	0,5										0,5	-
Preparation of PPP arrangements		0,5	0,5								1,0	-
Upgrade of training facilities	0,5	0,5	0,5								1,5	-
Conduct training programs	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	5,0	5,5
Sub-total	2,0	1,5	1,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	8,5	5,5
Airport development												
Detailed design for facilities		1,0	1,0								2,0	-
Civil works, incl. runways				10,0	20,0	25,0	25,0				80,0	-
Terminal, control tower etc				5,0	10,0	15,0	15,0				45,0	-
Electrical						10,0	10,0				20,0	-
Telecomm, navigation aids						10,0	15,0				25,0	-
Fire & rescue etc						2,0	3,0				5,0	-
Sub-total				15,0	30,0	62,0	68,0	5,0	5,0	5,0	190,0	55,0
Total	2,0	1,5	1,5	15,5	30,5	62,5	68,5	5,5	5,5	5,5	198,5	60,5
Funding												
Donors	1,9	2,4	2,4	0,4							6,9	-
RSA	0,2	0,2	0,2	0,2	0,5	0,5	0,5	0,5	0,5	0,5	3,6	5,5
Private turnkey				15,0	30,0	62,0	68,0	5,0	5,0	5,0	190,0	55,0
Total	2,0	2,5	2,5	15,5	30,5	62,5	68,5	5,5	5,5	5,5	200,5	60,5

Source: Estimates by authors.

measures on the management and operation of the airport.

- Preparation of financial forecasts, estimation of required resources, and an indication of how resources are to be used.

Once completed, the proposed business plan would need to be complemented with an airport master plan. This master plan would set out the long-term strategy for airport development in Burundi, including possible upgrade of the small airports in Burundi to better meet future domestic demand for air travel.

Capital Expenditure Program for Civil Aviation

High priority programs and funding. The most immediate funding requirements are for the preparation of a business plan for the five-year period, 2010-2014, for the master plans for staff training and development, and for preparation of a longer-term master plan for development of the airport network in Burundi. Of equally high priority is the need to upgrade the training facilities of RSA and to launch a training program for RSA staff. As Table 6.23 indicates, the cost of the business and master plans might be in the range of $1 million, the upgrade of training facilities, $1.5 million, and the conduct of the five-year staff training program, $2.5 million.

It is assumed that RSA would contribute $150,000 a year to this five-year program from airport revenues. This would be equivalent to 15 percent of the cost of the program. The other $4.25 million would need to be mobilized from the donor community. The involvement of the donor community in civil aviation in Burundi has been minimal, in recent years at least. The only ongoing program of donor funded assistance for the aviation sector is a project that is fencing the boundaries of the international airport. It is supported by the European Union and the Belgian Government. The ICAO could be approached for assistance in preparing the business plan and master plans and for the training program.[56] The Technical Cooperation Bureau of the ICAO has been active for many years in assisting governments in a wide range of activities related to civil aviation. The UNDP or other donors could

[56] The ICAO website includes a list of more than 30 programs of assistance that have been provided to countries as diverse as Botswana, Chile, Portugal, Russia, Singapore and Ethiopia. The ICAO has helped establish or develop more than 70 national training schools for aviation. These have included planning, equipment, course development, instructor training.

be approached to fund the proposed program via a trust fund that would be managed by the ICAO.

Illustrative costs of airport development. At this early stage it is not possible to give definitive estimates of the likely capital cost of the improvements that will be required at the Bujumbura International Airport. Detailed studies will be required once the main outlines of the proposed business plan are clear. However, some rough orders of magnitude can be derived from experience with other major airport investments in Africa. Table 6.24 sets out the capital costs of international airports built in the early 1980s in Botswana and Malawi, both of which had runways lengths similar to that at Bujumbura. The dollar cost of such construction has undoubtedly risen since then, but the relative importance of themain components of the projects may not have changed.

Table 6.24: Capital Costs for Airport Construction, Malawi and Botswana
(US$ millions)

Expenditure category	Malawi (1981-82)	Botswana (1983-84)
Civil works, including aircraft pavements	66,4	55,1
Terminal, control tower, operations building	31,2	27,2
Electrical works	12,7	12,6
Telecommunications, navigation aids, meteorological services	14,9	13,9
Fire and rescue equipment	3,1	2,9
Total	128,3	111,7

Norman Ashford and Clifton Moore, Airport Finance, Van Nostrand, New York, 1992.

Table 6.25: Profit and Loss Statement for RSA
(In US$ thousands)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Operating income									
Traffic charges	658	548	617	817	1 107	1 242	1 317	1 457	1 560
Passenger charges	645	618	734	764	859	952	1 213	1 531	1 768
Commercial income	53	63	62	58	70	161	99	109	87
Total revenues	1 355	1 229	1 413	1 639	2 036	2 355	2 629	3 098	3 415
Operating expenses									
Personnel costs	307	330	306	284	289	424	737	926	1 034
Maintenance	288	383	248	328	362	511	793	645	946
Other operating expenses	88	130	121	132	138	183	180	181	201
Depreciation	195	208	244	234	345	577	879	1 049	912
Total operating expenses	878	1 050	919	978	1 134	1 694	2 589	2 801	3 093
Net operating income	476	180	494	661	902	661	40	296	321
Interest									
Income	-	-	53	106	94	22	-	12	45
Payments									
Profit before taxes	476	180	547	767	996	682	40	308	367
Tax payments									
Extrordinary expenses									
Net income	476	180	547	767	996	682	40	308	367

Source: Régie des Services Aéronautiques.

The Kamuzu International Airport was constructed at Lilongwe, Malawi, in the late 1970s, with a runway length of 3,540 meters. The airport was designed for wide-bodied Boeing 747 aircraft. The design included a partial parallel taxiway, a passenger terminal-apron complex, a control tower, and operations blocks. Financing and design took approximately two years, with invitations to tenders in 1977. Construction began in late 1977, with operations at the new airport beginning in 1982. The Sir Seretse Khama International Airport in Botswana was built in the early 1980s to serve the new capital. The 3,000 meter runway was also designed to accommodate Boeing 747 wide-bodied aircraft. It had a terminal building and apron with connecting taxiways, a control tower, and an operational block. Project design and assembly of the financial package took two years, with an invitation for tenders of the contracts in 1981; construction began in 1981 and the new airport became operational in 1984.

Table 6.23 includes an indicative program of capital works to upgrade the existing in international airport at Bujumbura. The notional cost is put at $245 million at 2007 constant prices. Construction begins in 2013 and is completed in four years, with the new airport becoming operational in 2017. As noted earlier, the $5 million of high priority technical support needed for the business plan, master plans and training would be funded by donors and RSA. For the longer-term a key issue is the likely financial capacity of RSA to meet the recurrent and capital costs of the civil aviation services, oversight and regulation. Some of the latter are expected to transfer to CASSOA in the next few years, but the exact financial implications for RSA are not clear at this stage.

Financial accounts for RSA. Table 6.25 provides a summary of the operating income and expenses of RSA for the period 2000-2008. Revenues have increased steadily each year to about $3.4 million in 2008. The bulk of the income is from traffic and passenger charges. Operating expenses have increased in line with traffic growth and now stand at $3.1 million. EBITDA has improved since the early part of the decade and has averaged about $1.2 million a year over the past five years. The cash flow of RSA is such that it is able to make a significant contribution to the proposed program of business plan and master studies that are now urgent.

In the above scenario of 10 percent growth in passenger and freight through the airport, revenues would rise to about $5.5 million by 2013, the time at which the redevelopment of the airport would begin under a PPP arrangement. After allowing for expenses and depreciation, net operating income of the RSA may be in the range of $0.5 million with EBITDA about $1.5 million. This continued steady improvement in the financial position of the airport will help lay the foundations for attracting a suitable international investor for the proposed PPP arrangement and for an early launch of the proposed upgrade of the international airport.

More work is needed on the specifics of the PPP arrangement for aviation services at the Bujumbura International Airport. The transport master plan to be undertaken in 2010 will need to examine this option in greater detail. For the purposes of this report, it is assumed that the investment cost of the upgrade of airport infrastructure and facilities will be funded by the private partner on a turnkey basis.

Expansion of the Regional Rail Network

Integration of Regional Rail Networks

In East Africa, as elsewhere in Sub-Saharan Africa, the railways have been operated by public sector companies that have long been experiencing deterioration of their operations and investments. The result has been heavy losses of income. The past decade has seen increased attention to the problems of the railway networks in the East African Community (EAC). In the course of promoting the recovery of public enterprises Kenya, Tanzania and Uganda have taken steps to involve the private sector in the management of railway activities through concessions. Another significant measure

that has been taken to mitigate problems facing the railways sector has been the promotion of regional cooperation within the Community.

Cooperation in the railway sector was agreed by member states of the EAC from the beginning. The ultimate objective of the member states is to have a common transport policy covering all modes of transport, including the railways. The Treaty for the establishment of the EAC provides a legal basis for cooperation in the railway sector. In implementing the treaty provisions, the second EAC Development Strategy 2006-2010 was adopted. With regard to railways, the main objectives of the strategy are: (i) to assess the state of restructuring of railways in the three partner states in areas of ownership, management, infrastructure, financing and investment, national legislation and human resources; and (ii) to recommend a harmonized approach towards restructuring the railways in the region and possible areas of cooperation during the restructuring process.

These initiatives have led to the preparation of a plan for the rehabilitation of the existing EAC rail network. A Master Plan for the East African Railways was completed for the East African Community Secretariat in June 2008.[57] The study indicated that after many years of decline, the railway sector and associated rail marine services can potentially play an important role in the future development of the East African Community, particularly for long distance freight and bulk transport, but also for urban transport in major cities and for medium-distance intercity passenger transport.

The Master Plan recommends the creation of detailed guidelines and steps needed to implement the treaty provisions. The Master Plan observes that there is a serious overlapping of membership and functions among different legal frameworks and, unfortunately, no common approach by EAC Member States to these different legal frameworks. The view of the Master Plan is that the Northern Corridor Transit Agreement provides a good basis for structuring legal cooperation in the railway sector in the EAC. Since its establishment, the Northern Corridor Transit Transport Coordination Committee (NCTTCA) has focused on the reduction of transport costs on the corridor and facilitation of trade and traffic. As such, it has coordinated a number of initiatives that have reportedly resulted in improvements in corridor efficiency. Although NCTTCA operates under very limited budget, it has managed to set a baseline for the preparation of corridor action plans. NCTTCA-type institutions can be strengthened for central and southern corridors.[58]

The thrust of the strategy in the short-term is to use public-private partnerships to pull the railways back from collapse by restoring a minimal level of acceptable, reliable service on the trunk lines (Mombasa-Kampala, Dar-es-Salaam-Mwanza and Dar-es-Salaam-Zambia. The medium-term strategy is to improve the level of service on the trunk lines, to extend the network to Rwanda/Burundi and to carry out feasibility studies for the other line extensions identified by the Task Force in 2004-2007. The long-run strategy is to achieve best-in-class performance on the trunk lines, successful commercial operations on the Rwanda-Burundi and other medium-term lines and further extend the network.

The rehabilitation and upgrade of the existing TRC line from Mombasa to Isaka and to Uvinza is of particular interest to Burundi because the rail service from Kigoma to Dar es Salaam provides an important, low cost alternative to the road freight industry. As the earlier discussion indicates, the

[57] See CPCS Transcom International Ltd, East African Railways Master Plan Study: Final Report Prepared for East African Community. Bridgetown, Barbados, June 2008. CPCS Ref: 06089. Also, CPCS Transcom International Ltd, East African Railways Master Plan Study: Traffic Working Paper Prepared for East African Community. Bridgetown, Barbados, November, 2007. CPCS Ref: 06089.

[58] The CPCS Transcom International Ltd., Master Plan (2008) gives a detailed list of actions legal and regulatory actions needed to address these coordination problems (see p.ii).

recent deterioration in this rail service has resulted in a major shift by importers to road freight.

The Tanzanian Rail Service

Current status of the rail service. In recent years, the rail service in Tanzania has been very inadequate. The railway has lacked the necessary funds for investment and maintenance, particularly in recent years, and this is reflected in the overall condition of the fixed infrastructure. The capacity of the existing railway network has been limited by a number of factors that have led to the deterioration in service and the consequent shift of freight to the trucking industry.

- There has also been poor availability of rolling stock due to over-aged fleet and the lack of spare parts.
- In the case of wagon provision, not only have customers not been provided empty wagons in a timely manner, but once loaded, there has been a delay in having wagons pulled and brought to yards for marshalling. Furthermore, because of the way trains have been operated, the wagons may end up waiting in yards along the way to their ultimate destination.
- Transit times, on average, have been two to three times that of trucks with very large variations in transit times from one movement to another. The lack of consistency in service led shippers to conclude that they could not rely on the railways to get their goods to destinations.
- Over-aged and insufficiently dimensioned rails in some line sections have led to numerous rail breakages and speed restrictions. The trains therefore operate at low speeds and with limits to the permissible axle loads. This has caused shortages in motive power and level of service.
- Theft of open wires and poles in virtually all the open wire line territory has led to operation in the "Total Failure of Communication" mode, which is time consuming and dangerous.

Other weak points of the Tanzania Railways Corporation (TRC) network are line closures due to train accidents and washaways, which deteriorated considerably during the past years. For the central line east of Tabora and the Mwanza line, between 2003 and 2006 on average every fifth day a section of the line was closed for traffic due to train accidents or washaways.

Regular and reliable operation is nearly impossible under these conditions. The TRC has lost significant market share of cargo to road transport since 2000 as a result of these problems. The deterioration in service led to a situation where many shippers had no choice but to use trucks to get their goods to market. The new concessionaire of the TRC aims to reverse the decline. If the concessionaire improves service, some of the freight that shifted to trucking services may move back to the rail services. Surveys of shippers confirm that if the new rail concessionaires are successful at improving the transit times and maintain consistency, they are willing to move a good portion of their shipments back to the railway mode. Improved services could be achieved with the introduction of a block working system of signaling.

Table 6.26: Required Investment in Fixed Infrastructure for Each Railway Organization (US$ millions at 2007 constant prices)

Railway Network	Period			Total
	Years 1 to 5	Years 6 to 10	Years 11 to 20	
Rift Valley Railway Kenya	69,0	68,0	129,0	266,0
Rift Valley Railway Uganda	13,5	13,5	25,0	52,0
Tanzania Railways Ltd	144,0	141,0	268,0	553,0
Tanzania Zambia Railway Author	83,0	78,5	120,0	281,5
Total	309,5	301,0	542,0	1 152,5

Source: CPCS Transcom International Ltd (2008).

Table 6.27: Rail and Road Freight Charges in Africa
(In U.S. cents)

Corridor	Operator	Average tariff per ton km	
		Road	Rail
Senegal-Mali	Transrail	7,9	5,3
Ivory Coast-Burkina/Mali	Sitarail	7,9	5,5
Cameroon-Chad	Camrail	11,2	6,3
Mozambique	CCFB/CFM	10,0	5,5
Tanzania-Great Lakes	TRC	13,5	4,3

Source: World Bank review of selected railway concessions in Africa.

Rehabilitation of the Tanzanian rail network. The Master Plan includes provisional estimates of the investment cost required over a 20-year period to rehabilitate the existing networks and meet base-level traffic forecasts. In formulating the proposal, the Master Plan looked at four key considerations in assessing the rail/road competition: (i) distance comparisons; (ii) service comparisons; (iii) truck axle load limits and comparison with railway wagon loads; and (iv) freight rates. As Table 6.26 indicates, the capital cost associated with the rehabilitation of the entire existing network is estimated at $1.153 billion (at 2007 constant prices), of which the TRC portion is put at $553 million. These estimates do not include the capital costs of the proposed network extensions to Burundi and Rwanda. Nor do they include the capital costs associated with expansion in the capacity of the existing networks to meet new traffic requirements generated by extensions into Burundi and Rwanda. This latter point is of particular importance for Burundi. As the discussion below indicates, the rail extension would provide the transport needed to develop a large mining industry in the Musongati area of Burundi.

The prospect of a major program to rehabilitate the existing Tanzanian rail service is of considerable importance to Burundi, given the competitiveness of rail freight prices. As Table 6.27 indicates, there are substantial differences in road and rail freight charges in various parts of Africa. According to a recent World Bank study, the Tanzania-Great Lakes rail route had the lowest rail freight rate and the highest road freight rate. There are obvious advantages if the rail services are efficient and reliable.

Extension of Railway from Keza to Gitega

In addition to the rehabilitation of the existing network in Tanzania, two of the options for extension of the network are of particular interest to Burundi:

- A line from Isaka in Tanzania to Kigali in Rwanda, with a link from Keza to Gitega, and perhaps Musongati in Burundi to bring rail access to the mining opportunities discussed in Chapter 2.
- A line from Uvinza in Tanzania to Bujumbura, perhaps with a link to the Musongati-Keza line.

Isaka-Kigali line with a link from Keza to Burundi. The area that would be serviced by this new line would be Rwanda, Burundi and north-west Tanzania. Since the Master Plan was completed in 2008, a detailed feasibility study of the Isaka-Kigali/Keza-Gitega-Musongati Rail project has also been carried out.[59] According to the feasibility study, the results of the topographical, alignment, hydrologic and structures studies linked with the transport demand analysis and traffic forecasts have led to the recommendation of final routes in Rwanda (Isaka-Resumo-Bugesera-Kigai) and Burundi (Keza-Ruvubu-Gitega-Musongati). The length of the Burundi section is 197 km, 138 km of which are in

[59] See Mobility Networks Logistics, Feasibility Study for the Isaka-Kigali/Keza-Gitega-Musongati Railway Project: Study Summary Draft Report. February 17, 2009.

Burundi and 59 km are in Tanzania. Four mines would be connected to the line via branch lines to Nyabikere, Mukanda, Waga and Muremura. This route would bring rail services to Gitega, thereby providing an important agricultural area with access to low cost rail freight for fertilizer and other supplies. The feasibility study assumed that the Burundi mining operation would export very large quantities of ore for refining elsewhere in the world. One of the implications of this scenario is that the traffic volumes generated by the mining operation would result in train numbers exceeding the capacity potential of the existing single track TRC line in Tanzania. The implication is that a simple rehabilitation of the existing single line from Isaka to Dar es Salaam would not be sufficient; a large mining operation in Burundi that shipped ore for refining elsewhere would require a major upgrade of the TRC line to Dar es Salaam.

However, as the discussion in Chapter 2 indicates, a number of potential investors that have investigated the mining opportunity at Musongati have indicated a strong preference for refining the nickel and associated minerals at the mine site. As a result, the quantities shipped from the mine would be substantially smaller, in the range of 50,000 tons a year of metal, or a somewhat larger volume of ores with a high metal content. As the discussion below indicates, this scenario also has important implications for the rail extension to Burundi.

Capital cost of the extension. The feasibility study for the extension of the TRL line from Isaka to Rwanda with the spur line from Keza to Burundi estimates the capital cost of this project at about $3.7 billion (at 2007 constant prices).[60] The details of these capital expenditures are given in Table 6.27 above. The infrastructure cost of the 494 km line from Isaka to Kigali is estimated at $1.65 billion (compared with $1.24 billion in the earlier Master Plan). The proposed 197 km extension from Keza to Musongati in Burundi is estimated at $1.23 billion, including $666 million for the extension lines to the mine sites.

The feasibility study proposes a public private partnership (PPP) arrangement for the development, financing and operation of the project. Several options are considered, including a Build Operate Transfer (BOT) concession for a term of 30 years. The preferred approach in the feasibility study is a split concession under which the project is segregated by function and country. The study is of the view that this arrangement would reduce the risk profile of the respective components of the project and consequently enhance the appetite of private investors and enable more competitive pricing. The key components under this arrangement would be as follows:

- *Train operating concession* (TOC). Contracts would be tendered for TOCs for passenger and or freight forwarding services, under which private companies would be granted the right to offer train services on the rail infrastructure. Their investment would be limited to rolling stock.
- *Infrastructure manager concessions*. Contracts would be tendered per country for infrastructure management concessions. Under these contracts private companies would be selected to finance, build and maintain the rail infrastructure for a certain period of time. The concessionaire would receive income from TOCs through train access charges.

The latter proposal suggests that the estimated $16 million of rolling stock allocated to Burundi would be covered by the proposed TOC (Table 6.28). The capital cost of the Burundi portion of the infrastructure is estimated at $556 million, not including the $666 million for the rail extensions to the mines. The feasibility study proposal is to fund

[60] The Master Plan put the construction cost for the 450 km Isaka-Kigali line at $1.238 billion. The comparable number from the feasibility study is $1.65 billion.

Table 6.28: Capital Expenditures for Proposed TRC Extension to Rwanda and Burundi
(US $ millions in 2007 constant prices)

Expenditure category	Infrastructure				Transport	Total
	Tanzania	Rwanda	Burundi	Sub-total	company	
Rolling stock	28	11	16	55	788	843
Architecture	16	11	10	37	27	64
Earthworks	354	255	263	872		872
Structures	31	495	101	627		627
Permanent way	220	135	137	492		492
Signalling	36	19	22	77		77
Telecommunications & energy	24	15	17	56		56
Mining connections			666	666		666
Total	709	941	1 232	2 882	815	3 697

Source: Mobility Networks Logistics (2009).

the $556 million under the infrastructure management concession outlined above. The remaining issue would then be whether the mining companies finance and build the rail lines that connect the mines to the main rail network, or whether these extensions would be part of the network funded under the infrastructure concession

Extension of Railway from Uvinza to Bujumbura

This line would connect Bujumbura to the Kigoma-Tabora railway line in Tanzania. It would extend from Uvinza along the Malagarazi river valley to Gihofi, which is the home of the sugar industry in Burundi. which lies in eastern Burundi, descend to Lake Nyanza then to Bujumbura passing alongside the paved road which links Bujumbura to Mugina (on the border with Tanzania). This line could also join the above-mentioned Keza-Musongati Line, if it were to go ahead as well, because Musongati is located approximately 20 km from the center of Gihofi. The Master Plan estimates the capital cost of the 300 km line from Uvinza to Bujumbura at $1.065 billion and suggests that the new line be operated on a BOT basis, while noting that partial capital subsidies may be required for the operation. It also notes that the line should not be built unless it can be operated and maintained by the private sector without a recurrent public subsidy. A detailed feasibility study is required for this line, including the option of an extension to the Musongati area as an alternative route for the transport ore that is mined.

Economic Feasibility of the Rail Extensions

In any evaluation of the economic attractiveness of the rail extensions, a crucial factor is, and will remain, the cost of fuel, which penalizes road transport more than rail. As a result of the prolonged period of low fuel costs, the role of rail systems around the world has been in decline relative to road and air transport. The few rail expansion programs that have been undertaken have often been associated with mineral developments (for example, iron ore in Brazil and Australia, coal in Mozambique), given the edge that rail has when it comes to transporting large volumes of bulky matter over long distances. For a rail extension of the kind proposed by the Master Plan, the main economic benefits would be a reduction in freight costs relative to the alternative of road freight, and a reduction in road construction and maintenance costs, given that freight would be diverted to rail and road traffic densities would be lower. Another benefit that is sometimes considered is a reduction in accidents.

The Master Plan for the railway extension project assessed the economic costs and benefits of

investments on the proposed rail links to Rwanda and Burundi. The listed benefits during both the construction and operations phases, included:

- Significant reductions in the costs of transport leading to more affordable imports and expansion of export markets.
- Improved reliability of the transport networks serving the landlocked countries as the proposed rail links would develop other access routes to the ports of the Indian Ocean.
- Development of additional economic activity in construction, maintenance and transport services as a result of new routes and transport options.
- Job creation, particularly during the construction phase when large numbers of workers would be required. According to the report on a study of the Kagera River Basin Railway Line, construction of the new lines would need 30,000 laborers and 7,000 skilled workers.[61]

The feasibility study for the extensions to Rwanda and Burundi quantified various benefits, including those from lower transport costs and lower transport prices to users. Table 6.29 includes the resulting economic internal rates of return (EIRR) that were derived. The EIRR for the Burundi extension of the line is about 40 percent. This high return is made possible by the inclusion of the rail freight for the Musongati nickel mining operation under the assumption that some four million tons of ore would be transported by rail each year for shipment to a refinery elsewhere in the world. But as the discussion in Chapter 2 indicates, potential investors may prefer to refine the ore at the mine site and transport the material by road to the railhead near Kigoma.

Table 6.29: Economic Internal Rate of Return for Two Design Speed Scenarios (In percent)

Scenario	Tanzania	Rwanda	Burundi	Average
A. Design speed 80 km/hour	20,1	15,8	39,4	32,2
B. Design speed 120 km/hour	19,3	14,9	37,6	30,7

Source: Mobility Networks Logistics (2009).

For the purposes of this Report, a baseline assessment of the economic benefits of the rail extensions in the absence of any mining development was seen as a key element for policy discussions about future

transport options. Internal rates of return (IRRs) were calculated for three freight cost scenarios for the above-mentioned two extensions on the assumption that the proposed mining operations do not materialize, or if they do, that the minerals are shipped by road to the railhead near Kigoma (as discussed in Chapter 2). The freight volumes used for the analysis are those reported in Annex Table V.4 and Annex Table V.5 for exports and imports that are projected to pass through the Port of Dar es Salaam. The rail extensions were assumed to become operational in 2016 and the freight volumes were extended to 2040 to give an assessment of benefits over a 25 year period. The baseline road transport cost used was the 13.5 US cents per ton km reported in Table 6.27 above. Three alternative freight price reduction scenarios were examined: (i) a reduction of three US cents; (ii) a reduction of six US cents; and (iii) a reduction of nine US cents. The latter scenario approximates the average rail freight cost of 4.3 US cents per ton km reported in Table 6.27.

The results of the analysis are set out in Table 6.30. In the absence of the mining operation, the rail extensions from Uvinza to Bujumbura and from Keza to Gitega do not appear to be economically viable without the mine traffic. The only scenario for the Gitega extension that appears to be marginally attractive is where the cost of freight is reduced by nine US cents per ton km. As noted earlier, a key issue is the outlook for fuel prices in the medium- and longer-term, given that fuel prices account for 40 percent or more of operating costs for trucking companies. (See the earlier discussion in this Chapter about the components of transport costs.) Prolonged periods of high international prices for fuel would push up road traffic costs relative to rail. If the differential between road

[61] See KBO, The Kagera River Basin Railway Study, Annex I, Regional Analysis, March 1984, p.415.

and rail freight costs is raised to 11 US cents, the resulting IRR is 12 percent - a rate that would justify the rail investment if the outlook was for continued high fuel prices for many years. As noted earlier, these calculations do not take account of savings in road maintenance costs relative to rail. More work is needed on this latter point, but it would likely result in a somewhat smaller freight cost differential needed to yield an IRR of 12 to 14 percent. The dilemma then is that this extension is only feasible if the line from Isaka to Kigali is constructed.

A detailed assessment of the financial implications of these alternative scenarios is beyond the scope of this Report. If it were undertaken, the likely result would be that substantial public subsidies would be required for the operation of the rail network in Burundi if the rail freight price remained in the range of four to five US cents a ton km. More work is needed on this point, but a freight price of seven to eight US cents per ton km would probably be needed to eliminate the need for public subsidies. To then get an IRR in the range of 12-14 percent, the cost of road freight would have to be in the range of 18-20 US cents per ton km. This combination of circumstances would likely only apply under a prolonged period of high international oil prices.

Capital Costs of the Rail Program and Next Steps

In the event that one or other of the rail extensions were to go ahead without the benefit of freight generated by the mining project, or perhaps in combination with mining operations, the development cost of the rail program for Burundi would be in the range of $1.44 billion, including rail access to the mine sites if that option were pursued. Table 6.31 provides a summary of the cost components.

Given the apparent importance of nickel mine import and export freight for the economic viability of the rail extension into Burundi, the next step is to undertake a more detailed assessment of the development costs of the rail program, along with more detailed assessments of likely freight volumes and freight prices. An amount of $3 million is included in the proposed program for such studies to be completed in 2010-2011. In the event that an investment in rail is justified, the Government will need assistance in developing the details of an appropriate PPP arrangement for the program. It would also need technical support to create and

Table 6.30: Comparison of Rates of Return for Rail Extensions with No Mine Traffic

Indicator	Extension from proposed Isaka-Kigali line: Keza to Gitega	Extension to from Uvinza to Bujumbura
Distance (km)	197	300
Capital cost ($ mill)	566	1 065
Capital cost per km ($ mill)	2,87	3,55
IRR (%) for three scenarios		
Reduction in freight prices:		
A. By US 3 cents per ton km	3%	negative
B. By US 6 cents per ton km	7%	3%
C. By US 9 cents per ton km	10%	6%

Source: Estimates by authors.

build capacities within the relevant ministries for oversight and regulation of the rail industry. An amount of $5 million is included in the proposed program for this support and related capacity building.

If the program is to go ahead, Burundi's share of the cost of the rail extension is estimated at about $600 million for the decade ahead, assuming that the mine operator met the cost of the rail extensions to mine sites. Burundi will also need to develop appropriate coordination and consultation mechanisms with the Tanzanian authorities, given the critical role of the TRC in the program. In the event that the extension to Rwanda is to proceed, mechanisms for three-way consultations will needed to ensure a harmonized approach to rail standards, policies and regulations. These will also provide a mechanism for inter-governmental consultation on the design and implementation of the PPP arrangements and on the management of the investment promotion program that will be required to mobilize the $3.7 billion of funding proposed in the Master Plan the extensions into both Rwanda and Burundi.

Table 6.31: Capital Costs of the Burundi Rail Program
(US$ millions at 2007 constant prices)

Expenditure	2010-19	2020-30	Total
Capacity building	5,0	-	5,0
Technical studies	3,0	-	3,0
Capital expenditures			
Rail extension	600,0	165,0	765,0
Lines to mines	670,0	-	670,0
Sub-total	1 270,0	165,0	1 435,0
Total	1 278,0	165,0	1 443,0

Source: Annex Table VIII.6.

Chapter 7 – The Regional Communications Network

Regional Integration of Communications Services

Improving International Access in the EAC

Current international connectivity. The East African countries have long been without access to the extensive network of submarine cables that serve many parts of the world. East and South Africa, which is the only region in the world that is not connected to the global broadband infrastructure, accounts for just 0.07 percent of the world's international bandwidth capacity. There is currently only one submarine fibre optic cable off the coast of West Africa that provides a high quality international service. Moreover, individual countries are not connected to a communication grid for the entire sub-continent. Eastern Africa, including Burundi, relies on satellites and Very Small Aperture Terminal (VSAT) earth stations for most of its connectivity. A combination of low internet penetration rates and high tariffs stems mainly from a lack of high-capacity international networks. The prices of these services are among the highest in the world as operators can set prices far above the marginal cost of the service. Moreover, the applications are often slow compared to other technologies.

Communications Strategy for the East Africa region. In recent years, there has been a major push by African leaders to accelerate development of the communications industry - an initiative that has been strongly supported by the EAC members. At the October 2007 Heads of State Summit meeting in Kigali, it was agreed that the World Summit on the Information Society (WSIS) targets would be framed around five goals:

- Interconnect all African capitals and major cities with ICT broadband infrastructure and strengthen connectivity to the rest of the world by 2012.
- Connect African villages to broadband ICT services by 2015 and implement shared access initiatives such as community tele-centers and village phones.
- Adopt key regulatory measures that promote affordability, widespread access to a full range of broadband ICT services, including technology and service neutral licensing/authorization practices, allocating spectrum for multiple, competitive broadband wireless service providers, creating national internet exchange points and implementing competition in the provision of international internet connectivity.
- Support the development of a critical mass of ICT skills required by the knowledge economy, notably through the establishment of a network of ICT centers of excellence in each sub-region of Africa and ICT capacity-building and training centers in each country, with the aim of achieving a broad network of inter-linked physical and virtual centers, while ensuring coordination between academia and industry by 2015.
- Adopt a national e-strategy, including a cyber-security framework, and deploy at least one flagship e-government service as well as e-education, commerce and e-health services using accessible technologies in each country in Africa by 2012, with the aim of making multiple e-government and other e-services widely available by 2015.

Progress in improving access to international networks. In the past five years, a number of specific project initiatives have been taken to improve access to international networks in Eastern Africa. When fully operational, these will have a significant impact on the availability and cost of communications services in the region:

- The East African Submarine Cable System (EASSy) is under implementation. This involves a 10,000 km long submarine fibre optic cable that will connect countries from South Africa to Sudan, including Burundi. The $263 million project was to have been completed by 2008, but it has suffered delays, largely due to disagreements over management of the consortium responsible for the project. Construction started in March 2008 and is now scheduled for completion in 2010, thereby providing the “missing link” in the cable around the continent. EASSy is funded by 20

telecommunications operators and has received funding from the International Finance Corporation (IFC) of the World Bank Group.Thirteen adjoining countries, including Burundi, Rwanda and Uganda, will be linked to the EASSy system as terrestrial networks are completed. It is expected that an increase in supply and EASSy's open access policy - where every service provider can purchase at the same price, regardless of whether they were investors - will lead to a reduction in wholesale and therefore retail prices of calls and internet access.

- SEACOM is a 17,000 km submarine fibre optic cable costing $650 million that was scheduled for launch in June 2009. It links South Africa with Mumbai in India, Marseille in France, and London via Kenya, Tanzania, Mozambique and Madagascar. In contrast to the consortium arrangement of EASSy, SEACOM is privately owned with 76.25 percent African ownership. It plans to deliver open access to capacity and landing infrastructure, which is also expected to drive international backbone prices down by 90 percent.
- The East Africa Marine System (TEAMS) will provide a point-to-point system connecting Mombasa and Fujairah, UAE. This project is supported by the Government of Kenya, Etisalat and other investors. COMTEL's network will provide a link between central and eastern African countries to the newly built submarine cables such as EASSy and TEAMS.
- FLAG Next Generation Network (NGN), System-2 will connect India and Kenya. It will have a potential to extend the network to South Africa and Reunion, and later Mozambique, Tanzania, Madagascar, Mayotte and Mauritius. The system is to be completed in 2010.

Attention is also being given to ensuring that the three land-locked countries - Burundi, Rwanda and Uganda - have access to the global gateway that is comparable to Kenya and Tanzania. The Map below lays out the proposed regional network that will link countries to the new submarine cable. The fiber optic cable to Kigali will be completed by end 2009. This will allow completion of the link to Burundi in 2010. The status of the connection to Burundi through Tanzania is unclear.

The governments of the EAC countries have stepped up their interventions in the ICT sector in order to improve national backbone networks and speed up broadband access on a country-wide basis. In Kenya, Tanzania and Uganda, national backbone links are in advanced planning stages with Chinese financing.

So far, no initiatives have been taken to establish a seamless and coherent regional communications network within the EAC. The possibility of EAC governments taking the lead to connect their national broadband networks is therefore under investigation.

In March 2007, IDA approved a financing package of $164.5 million for Kenya, Burundi and Madagascar as the first tranche of the $424 million Regional Communications Infrastructure Program (RCIP) for high-speed connectivity in East and Southern Africa. By the end of the program, it is expected that all capitals and major cities in East and Southern Africa would be linked to competitively priced high-bandwidth connectivity. Lower prices for international connectivity will decrease the cost of doing business and significantly improve private sector investment opportunities in the region. Universities, schools and hospitals also benefit, and governments will be able to deliver services to citizens more efficiently and transparently online.

To facilitate work on the further integration of these national networks, the EAC Secretariat received a grant of approximately $830,000 from the NEPAD Infrastructure Project Preparation Facility (NEPAD-IPPF) in early 2008 for detailed pre-investment analysis aimed at implementing an integrated East African Broadband ICT Infrastructure Network (EAC-BIN) that would provide cross border connectivity among EAC member countries and link up with global gateways through the soon-to-be completed submarine fiber cable systems.

Proposed Telecommunications Infrastructure for Eastern Africa

Accelerating Developement of Communications In Burundi

Access to Communication Servicesin Burundi is Low

Current domestic access to services. Teledensity remains poor at three percent and more than 90 percent of subscribers are concentrated in the urban areas. At less than two percent, Africa has the lowest internet penetration rate in the world, and within Africa, Burundi has one of the lowest with less than one percent of the population having access to the internet (Table 7.1). The penetration of fixed line services is similar, with less than one percent of the Burundi population having access to these services. In the case of mobile phone services, Africa has had the fastest growth in the world in new mobile phones in recent years; about 14 percent of the population now has access to these services. In Burundi, however, less than two percent of the population has access to mobile phone services. In a population of eight million, only 30,000 people have access to fixed line services, a high proportion of who live in Bujumbura.

The state-owned Organisation Nationale des Télécommunications (Onatel) has a monopoly on the fixed-line network and offers around 30,000 lines, giving Burundi one of the lowest rates of telephone density in the world. The company was audited in 1999 in preparation for privatization, but the sale has since been stalled by political concerns. There are four mobile-phone service providers in Burundi. U-Com (formerly Telecel) is the largest, with around 160,000 subscribers. In second place is Onamob, which is owned by Onatel, and a distant third and fourth are Africell and Econet. There are estimated to be five Internet users per 1,000 people about 14,000 in all, who are serviced by four Internet providers, U-Com, Onatel, Usan Bu, and Cbinet.

Service costs are high. Despite liberalization in the Burundi telecommunications sector, services remain costly and inefficient. The high cost of communications has a direct impact on the cost

Table 7.1: Selected Indicators for the Communications Sector

Indicator	Burundi	Low income countries	Sub-Saharan Africa
Access			
Telephone mainlines (per 100 people)	0,4	2,5	1,0
Mobile telephone subscribers (per 100 people)	1,9	14,3	13,5
Internet users (per 100 people)	0,7	4,2	3,8
Personal computers (per 100 people)	0,7	1,4	1,8
Households with television set (%)	14,0	16,0	14,0
Quality			
International internet bandwidth (bits per person)	1,0	22,0	5,0
Secure internet servers (per million people, Dec 2007)	0,2	0,6	2,5
Affordability			
Price basket for international fixed line ($ a month)	2,6	6,1	11,6
Price basket for mobile telephone service ($ a month)	12,2	10,0	12,3
Price basket for internet service ($ a month)	40,0	12,0	15,9
Price of call to United States ($ for 3 minutes)	2,45	1,99	2,43
Institutional efficiency and sustainability			
Telecommunications revenue (% of GDP)	..	4,0	3,2
Telephone subscribers per employee	234	141	586

Source: World Bank, ICT at a glance.

of international business as it affects, for example, the costs of marketing, trade facilitation and trade financing. The cost of mobile phone services is comparable to other countries in Sub-Saharan Africa, but the cost of accessing the internet is almost three times that of other Sub-Saharan countries (Table 7.1). As a result of the Government's pricing policies, the cost of an international fixed line is low relative to other Sub-Saharan countries, while the cost of a three minute call to the United States is comparable to other countries in Africa. As noted above, the problem is that access to these services is very limited. The cost of a mobile call is four times higher than fixed-line calls, but with increased competition and expansion of domestic networks, it is likely that this differential will decline with increased traffic and lower costs.

Communications Strategy and Program of Burundi

The communications strategy of Burundi. The international backbone infrastructure to connect Eastern Africa to the rest of the world is being built and will soon be operational. At the same time, the Government is committed to accelerating the roll-out of high capacity, affordable and good quality core communications infrastructure with national coverage. The Government's objective is to leverage as much as possible, private sector investment in the development of infrastructure, developing effective PPPs. The key elements of the strategy include : (i) improving availability and diversification of services across the country; (ii) providing incentives for the development of an internet backbone; (iii) participating in regional infrastructure backbone (such as the EAC Backbone System and the Eastern Africa Submarine System (EASSy) and other terrestrial and submarine infrastructure initiatives); and (iv) developing access points to the regional projects and extend the networks to low-income areasof the country. These objectives are consistent with the agenda set by African leaders at the above-mentioned WSIS meeting in October 2007.

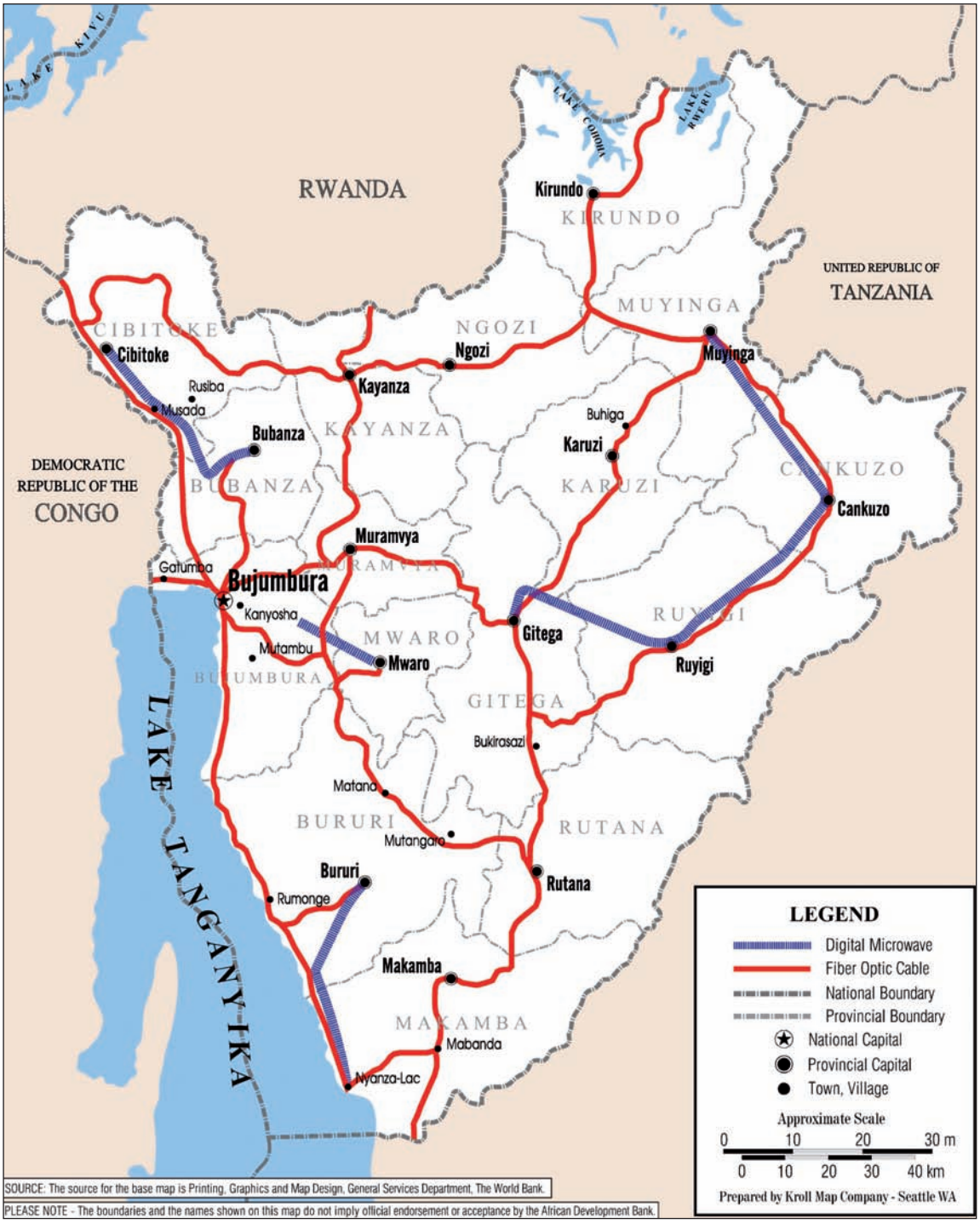
In the absence of any official targets for improved access to communications in Burundi, Table 7.2 sets out some plausible objectives, given the proposed program to increase access to electricity outlined in Chapter 5, and the soon-to-be completed communication backbone for the country. Progress towards these targets would have a major impact in transforming access to media and communications throughout Burundi. The effects are likely to be profound; for example, increased access to a wide range of information in rural communities, including education and health services in schools and community centers via TV and the internet, and improved access to market opportunities for farm products.

Table 7.2: Indicative Growth in Access to Communications

Indicator	2007	2010	2020	2030
Telephone access (per 1,000 people)				
Fixed mainlines	4	5	25	60
Mobile subscribers	19	25	60	150
Households with TV (%)	14	15	20	35
Computers and internet (per 1,000 people)				
Personal computers	7	8	40	100
Internet users	7	8	30	80
Memo items:				
Total population (million)	7,80	8,49	11,03	14,05
% of population with electricity	2,1	2,1	24,5	42,9

Source: Estimates by authors.

Fiber Optic and Digital Microwave Network for Burundi



This approach is clearly supported by the private sector. Five telecommunications companies in Burundi signed a Memorandum of Understanding (MOU) in June 2006 with the objective of coming together to build a shared national fiber optic backbone connecting the main populated centers in Burundi. At the time, the financial positions of these Burundi operators were relatively weak and they lacked any backing from large international investors. The ongoing World Bank project for the communications sector provides support for this partnership.

As liberalization of the domestic market proceeds within Burundi, there is likely to be increased competition in the provision and pricing of communications services.

Development of a national backbone network. The above-mentioned RCIP program with $164.5 million of IDA funding includes a grant of $20.1 million for Burundi for its backbone network. The key objective is to contribute to lower prices for international connectivity and to extend the geographic reach of the broadband networks. The program includes: (i) support for equipment and construction of a virtual landing station and the establishment of an internet exchange point; (ii) a total of $13.5 million to support improved connectivity in Burundi with the rollout of a national backbone, the Burundi Backbone System (BBs); (iii) support for the purchase of capacity for targeted users, including for example, schools, universities and hospitals; and (iv) support for extension of the ICT coverage to rural areas.

The strategy that underpins the design of the project is to focus first on the physical investments needed for the creation of a national communications network, given that the required core infrastructure is currently not in place in Burundi. While the project provides some limited support for setting the basis for the development of eGovernment services and other applications. The experience of other countries has shown that developing applications without having the appropriate infrastructure can be problematic. The availability of infrastructure is a precondition for successful growth in applications. The proposed national network of some 913 km is set out in the Map above. It is designed as a fibre optic ring (to ensure redundancy and backup) with four international exits: there are two exits in fibre optic to Rwanda (one link to Butare and the other next to the border with DRC), and two exits to Tanzania (one via Muyinga and Kobero and the other via Makamba and Mugina). The fibre ring is complemented by microwave links. The current plan calls for the completion of all these links in 2010, including the two-cross border links to Rwanda in June 2010.

As noted earlier, operators in Burundi have signed a MoU to build jointly the Burundi Backbone System. The commercial structure will be in the form of a joint venture or special purpose vehicle, to which all major operators (fixed, mobile and ISPs) and other investors would contribute equity. The entity will be responsible for building and operating the network. It will have a wholesale license, but will be barred from providing retail services.

Given the low traffic volumes, it is unlikely that the infrastructure will be financially viable in the early years of operation. The operation will therefore receive a subsidy of $7 million from the Government to ensure viability after a reasonable number of years. Additional Government support could take the form of equity contributions. By ensuring its financial viability, the structure would then have access to other potential sources of financing.

The project also includes support for development of the Government's communications network and preparation for eGovernment applications. This part of the program will support development of an eGovernment strategy, develop IT architecture standards and interoperability framework for eGovernment networks and development of a pilot eGovernment portal.

The potential benefits of the program will be widespread. Table 7.3 sets out some of the key targets for the proposed program supported by the World Bank. By the end of the program Burundi would have access to competitively priced high-bandwidth connectivity which will benefit all sections of society. Bandwidth costs are projected to decline more than tenfold from between $5,000-8,000 per month for one Mbit/s today to under $1,000 per Mbit/s per month by 2010. This reduction is

Table 7.3: Monitorable Indicators for the RCIP Project of the World Bank

Indicator for Burundi	Units	Baseline	Project Implementation			
		2007	Year 1	Year 2	Year 3	Year 4
OUTCOMES						
Volume of international traffic	Mbit/s simplex	250	250	300	400	500
No. of internet subscribers	Subscribers	2 000	4 000	7 000	10 000	15 000
Total teledensity	Percent	3	4	6	8	10
Wholesale price of international link	US$	8 000	7 500	4 000	2 500	2 000
RESULTS						
Mobile phone charges	US$	320				250
Operators with access to landing station	Number	0	0	4	6	8
Monthly price of 256 kb internet connection	US$	2 500	2 000	1 000	600	300
Communities with broad band access	Number	0	0	20	30	50
Success rate for international calls	Percent	50	60	65	70	80
University PCs connected to broadband	Number	0	50	150	200	250
Gov't entities connected to gov't virtual network	Number	0	1	4	7	10

Source: World Bank (2007), Regional Communications Infrastructure Program.

expected to translate immediately into end-user broadband access at under $150 per month, after which prices are expected to continue to decline. This will lead to lower prices for telephone services and better access to the Internet that, in turn, will improve significantly foreign and domestic investment opportunities, decrease the cost of doing business and increase the prospects for job creation. These targets for the medium-term are broadly consistent with the longer term objectives set out in Table 7.2 above.

Institutional Arrangements In The Sector

Responsibility for the communications sector rests with the Ministry of Transport, Post and Telecommunications (MTPT), and Autorité de Régulation et Contrôle des Télécommunications (ARCT), the telecommunications regulatory authority. A recent report of the African Development Bank indicated, that "Governments should play a more active role in attracting inland backbone investment and in regulating prices in order to reach more users and increase usage in Africa, since improved international connectivity will not be sufficient by itself."[62]

The outlook for service provision in Burundi is comparable to other countries in Africa. Most investment in telecommunications will come from the private sector. The AfDB (2009) recently recommended that governments and regulators could do more to attract private capital to the fixed-line segment of the market. Governments could privatize the remaining state-owned fixed-line incumbents since private investors can bring the technological know-how necessary to upgrade their networks, and as called for at the WSIS meeting in 2007, more regulators could adopt convergent licensing regimes and symmetric regulation of termination charges to create favorable conditions for fixed-line investments.

Strengthening regulation and oversight. Increasingly, the role of government will be to set the basic goals of telecommunications policy with a regulatory agency responsible for implementation and enforcement of these policies. Regulatory systems have been slowly evolving towards international good practice, but there is considerable scope for further improvements. A survey of 14 Sub-Saharan countries in 2006 by Research ICT Africa highlighted inefficiencies of the regulatory environment in these countries[63]. The rewas a high correlation between the

[62] OECD and African Development Bank (2009), African Economic Outlook. Paris, France, 2009.

[63] The survey did not include Burundi, but did include Kenya, Rwanda and Uganda.

Telecommunications Regulatory Environment (TRE) scores and the extent of market reforms and performance. In countries where the TRE scores are higher, regulation encourages private investment. Countries that are seen to be more inefficient, including Rwanda, Namibia, Ethiopia and Kenya, have been slow to launch market reforms. In all four countries, the performance has been disappointing, with penetration rates of less than two percent of the population.

The on-going World Bank funded RCIP program includes some $3.25 million for technical support and capacity building in the MTPT and the ARCT. This program includes a number of components:

- Technical support for regulatory reform that aims to maximize benefits from access to capacity. The program would help develop regulatory tools to guarantee open access to national and international infrastructure, cost-modeling, price control mechanisms, interconnection, essential facility regulation and regulatory competition law. The experience of other African countries in recent years has drawn attention to the lack of appropriate tools available to regulators for arbitration of interconnection disputes among competing operators.[64]
- Capacity building for policy and regulatory issues.
- Drafting of detailed "e-legislation" and its corresponding regulatory framework to address issues such as e-security, fraud, privacy, data protection, and intellectual property rights.

In setting strategies and objectives for the regulatory environment in Burundi, there is merit in considering the use of licensing systems that are 'neutral' with respect to technology and service. Governments in Africa are increasingly moving towards regulatory environments that make use of technologically neutral licenses. Australia, the European Union, Japan, Malaysia, Pakistan and Singapore also use them. In this environment, the operator chooses the technology to provide. Mobile operators, for example, can choose between GSM and CDMA wireless technologies. Under a service neutral licence, operators can also select services that are in greater demand or are most cost effective. This new licensing regime helps traditional fixed-line operators since they can get out of high-cost fixed-line connections and use wireless technologies instead. This neutral technology of regulators is also helping the spread of universal service schemes in rural areas, because fixed-line services are not the best choice for low density, low income areas.

[64] In response to this problem, the World Bank has built a cost model that provides Sub-Saharan Africa regulators and operators with a sound regulatory tool allowing for the determination of accurate interconnection costs, thus facilitating the settlement of lengthy and costly interconnection disputes among fixed and mobile operators. See Gille, L., Noumba Um, P., C. Rudelle and L. Simon (2002), "A Model for Calculating Interconnection Costs in Telecommunications," The World Bank, Eds. Washington DC, 2002.

Table 7.4: Proposed Development Expenditure Program for Communications

	Annual expenditures												Totals	
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2010-19	2020-30
Expenditures														
Capacity building														
Ongoing program	1,4	1,4	1,4	0,6									2,0	
Proposed new activities					1,0	1,0	1,0						3,0	-
Technical studies														
Ongoing program			1,0	0,9									1,9	
Proposed new activities					1,0	1,0	1,0						3,0	-
Communications infrastructure														
Donor program		0,5	10,0	3,0	3,0	2,0	1,0						19,0	-
Government				1,0	1,5	2,0	2,0	2,5	2,5	2,5	2,5	2,5	19,0	27,5
Private investment					3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	24,0	33,0
Total expenditures	1,4	1,9	12,4	5,5	9,5	9,0	8,0	5,5	5,5	5,5	5,5	5,5	71,9	60,5
Funding														
Donors														
Ongoing programs	1,4	1,9	12,4	4,5									16,9	
New programs					5,0	4,0	3,0						12,0	-
Government support				1,0	1,5	2,0	2,0	2,5	2,5	2,5	2,5	2,5	19,0	27,5
Private investment					3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	24,0	33,0
Total funding	1,4	1,9	12,4	5,5	9,5	9,0	8,0	5,5	5,5	5,5	5,5	5,5	71,9	60,5

Source Annex Table IX.1.

Proposed Program for Communications

The proposed development program for communications is set out in Table 7.4 above. It consists of three main components: (i) continued capacity building within government agencies; (ii) further technical studies on the development of eGovernment and other applications; and (iii) investment in the further development of the communications infrastructure within Burundi.

The main focus of the capacity building component of the proposed program is to support the further development of the regulatory and policy environment that the ongoing World Bank project is supporting. This ongoing program of support will come to an end in about 2011. The proposed program includes another $3 million to extend the program. An additional $3 million is included in the program to fund additional support for the development of new applications throughout the country. These would include development and or expansion of e-education, e-health and e-commerce services for communities, schools, hospitals and business entities throughout the country within the next five years. The ongoing donor-funded program to develop the infrastructure of the country will be completed in 2011, at which time the backbone national fibre optic and digital microwave grid would be in place. The proposed program includes a notional allowance of $3 million a year of new private investment in communications services. As Table 7.3 above indicates, one of the key objectives for the ongoing program is to have at least eight operators with access to the land stations of the network within the next four years. The expectation is that the entry of additional service providers, including large international companies, will result in a new round of investment as complementary programs such as provision of grid electricity to all 13 provincial capitals by 2015, and electrification of 25 percent of households by 2020 gives impetus to the demand for communications services within Burundi. The program also includes a notional amount of government spending that would support operations that extend services to schools, medical facilities and communities in more inaccessible parts of the country.

Annexes

In the course of preparing this Report, a large amount of detailed information on the Burundi economy was assembled. These data have been assembled in a total of nine annexes to the main report. The information in these annexes is available on the website of the African Development Bank and can be accessed at the following address: http://www.afdb.org/en/countries/east-africa/burundi/
The website contains the following annexes:

Annex I: **National Income Accounts for Burundi.** This annex includes notes on the various sources of national income accounts data for Burundi and the extent to which there is consistency among these various sources. The annex includes the complete set of accounts for selected years from 1970 to 2008.

Annex II: **Population and Demographic Characteristics of Burundi.** This annex reports on the provisional results of the population census undertaken in Burundi in October, 2008. The annex also contains a discussion of various population projections available on the website of the United Nations and explains why these projections understate the expected future growth of population in Burundi. An independent projection of population to 2030 was prepared for this Report, the details of which are included in this annex.

Annex III: **Labor Force and Employment in Burundi.** This annex includes a detailed set of projections for the Burundi labor force to 2030 that are consistent with the population projections included in Annex II. The main report also includes estimates of the employment impact of the proposed investments in infrastructure and mining. In the absence of detailed data about current employment patterns in Burundi, estimates of employment by economic sector for 2008 were prepared for the Report. The basis for these estimates is described in this annex.

Annex IV: **International Trade Statistics for Burundi.** This annex reviews the various sources of information for Burundi's merchandise exports and imports and about trading partners. It includes the details of the trade data for 2000-2008 that were used in this Report.

Annex V: **Estimation of International Freight Movements in Burundi.** The analysis of the transport sector undertaken in this Report required detailed information about freight and passenger movements for each transport mode in Burundi. This annex provides a summary of the freight and passenger data that was collected and describes the manner in which freight and passenger movements for Burundi are projected to 2030.

Annex VI: **Macroeconomic Projections for Burundi.** To assess the economic impact of the proposed investment programs for infrastructure and mining, a very simple macroeconomic model was constructed. This annex describes the way in which the projections of various components of GDP were made.

Annex VII: **Data for the Electric Power Sector in Burundi.** A large amount of information was collected for the electric power sector in Burundi. This annex reports on the data that was collected. It includes the details of projected demand for electricity by major consumer categories to 2030 and the possible sources of supply to meet this demand. Using these various supply and demand projections, an income statement was then prepared for the national power utility, REGIDESO. This income statement was then projected to 2030. This annex explains the ways in which these projections were prepared.

Annex VIII. **Data for the Transport Sector in Burundi.** The data for the transport sector that were collected for this Report are included in this annex. These data report on the transport industry itself, and the status of road, port and civil aviation infrastructure. The annex tables include projections of proposed rehabilitation expenditures for all 23 of the roads that make up the national network, as well as projections of capital expenditures on the urban, provincial and community road networks. It includes the details of the proposed action plan to upgrade the International Airport in Bujumbura and a summary of the proposals for an extension of the Tanzanian rail network into Burundi.

Annex IX: **Data for the Communications Sector in Burundi.** This annex reports on the data that was collected for the communications sector in Burundi. It includes proposed projections of expenditures on the communications network included in this Report.

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