



Climate Risk Informed Decision Analysis: Iolanda Water Treatment Plant Case Study

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Retrospective Study: Lusaka Water Supply

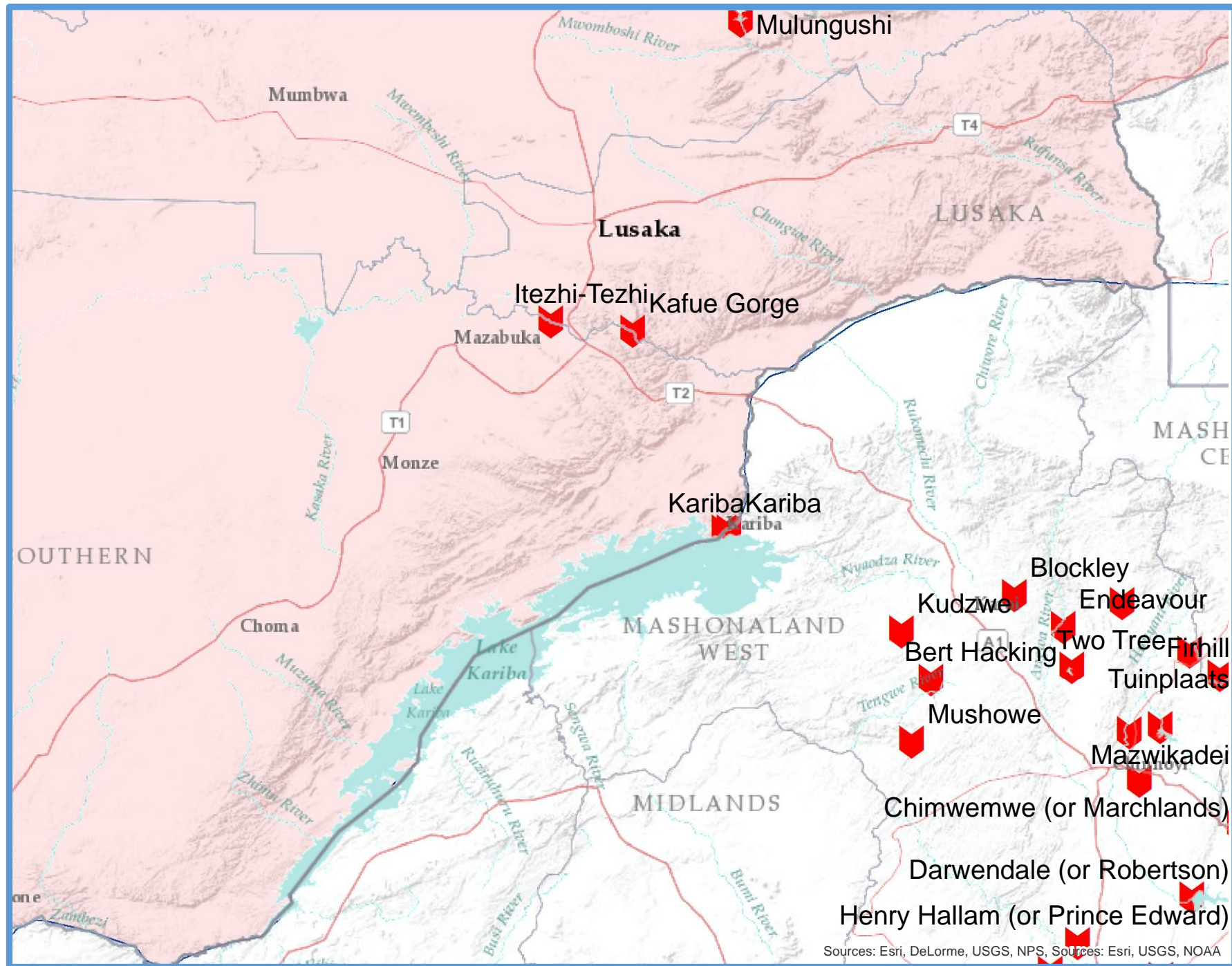
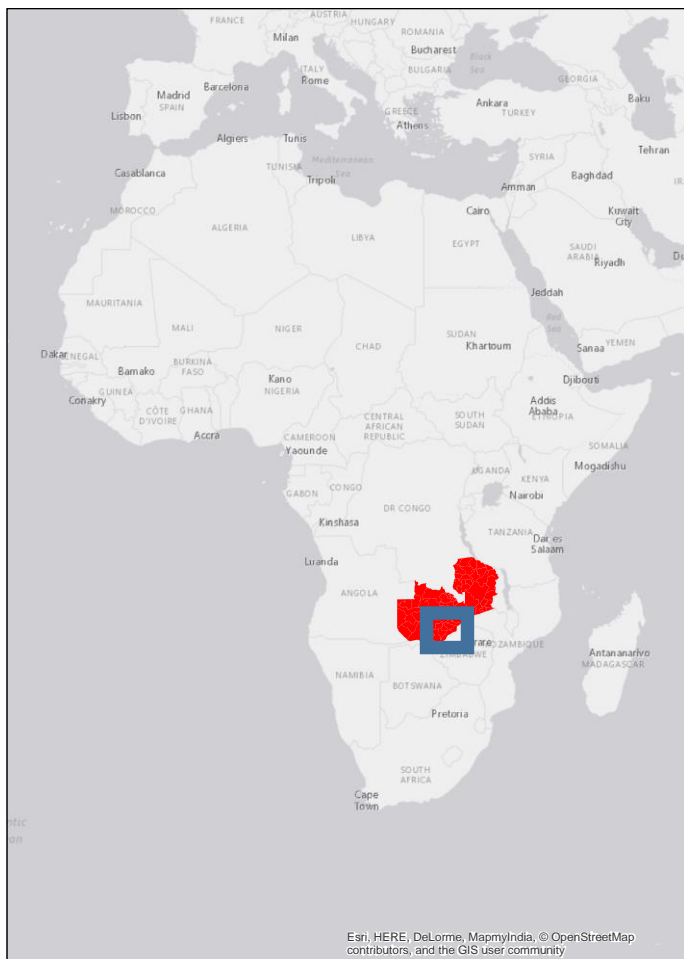
- Iolanda WTP supplies 40% of Lusaka
- 24 MGD
- Hydropower Dependent
- 12-18 hrs of load shedding (2014-16)
- Zambia is drought prone



Decision Scaling Framework

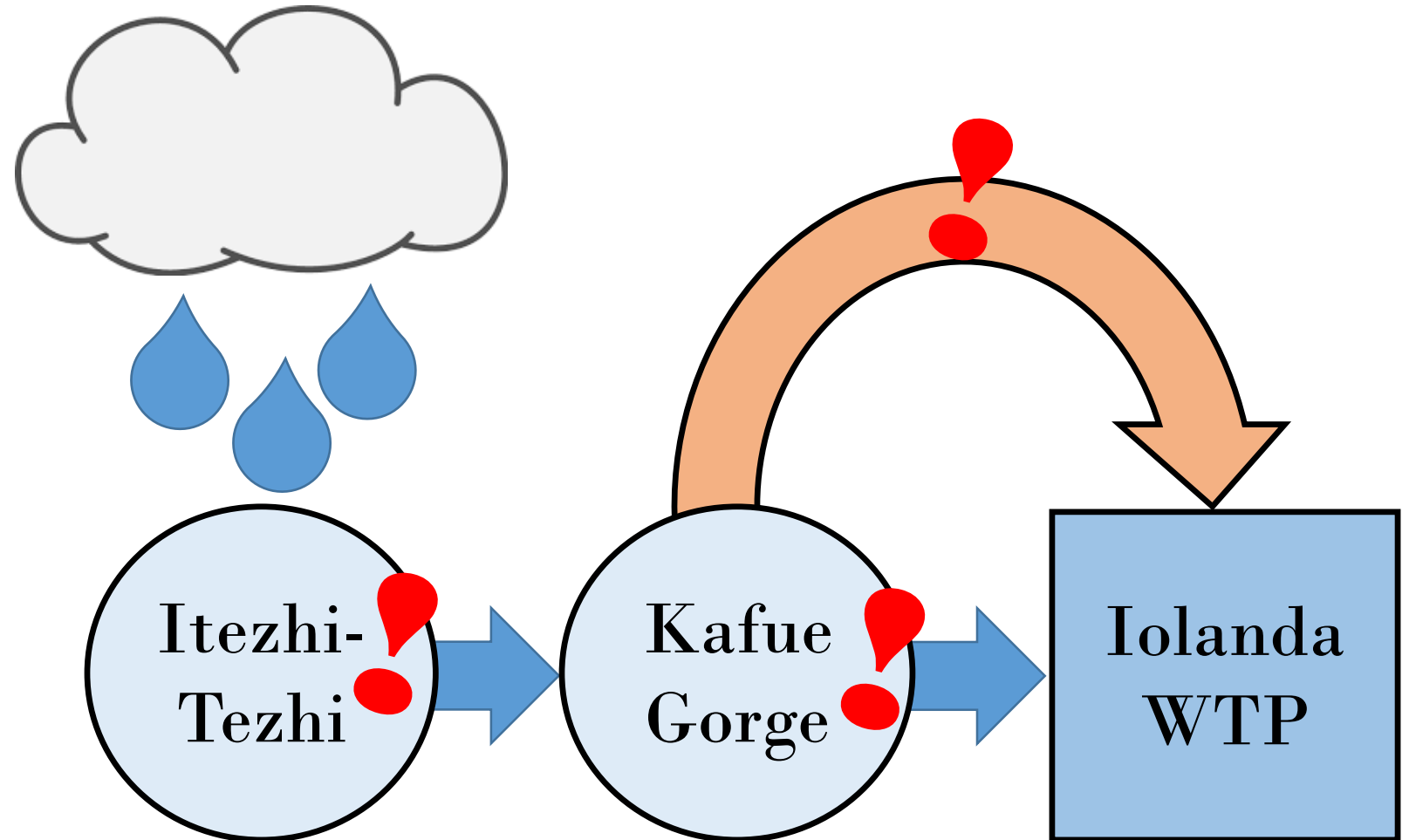
1. Participatory scoping and Performance Metrics
2. Model the System & Identify the Vulnerabilities to Performance through Stress-Testing
3. Model Actions to Reduce Vulnerabilities to Performance
4. Consider Action Effectiveness, Feasibility and Cost
5. Design Adaptive Plan
6. Implement
7. Monitor

Case Study Background



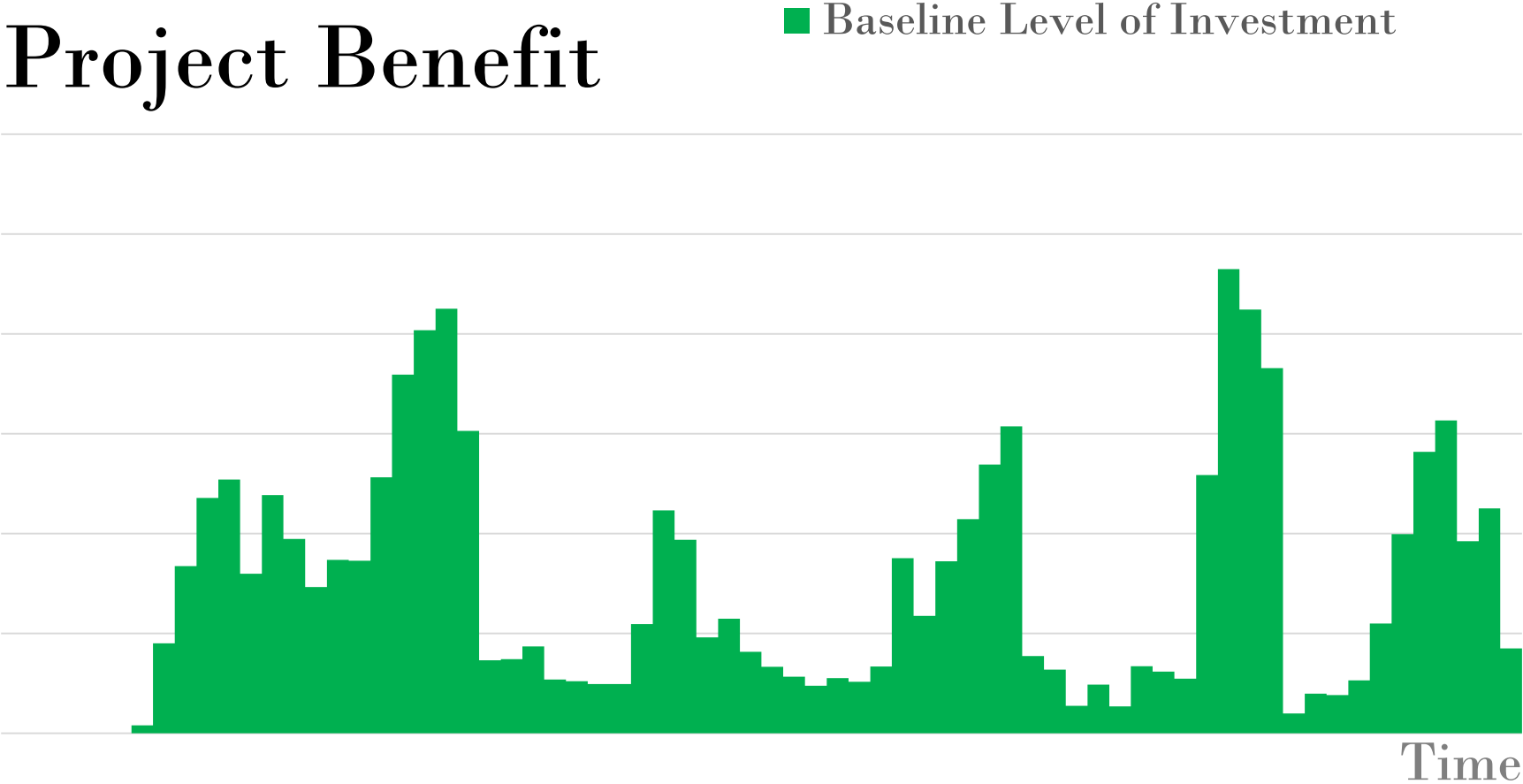
1. Decision Context

Problem statements linked to measures of vulnerability, objectives and sources of deep uncertainty.

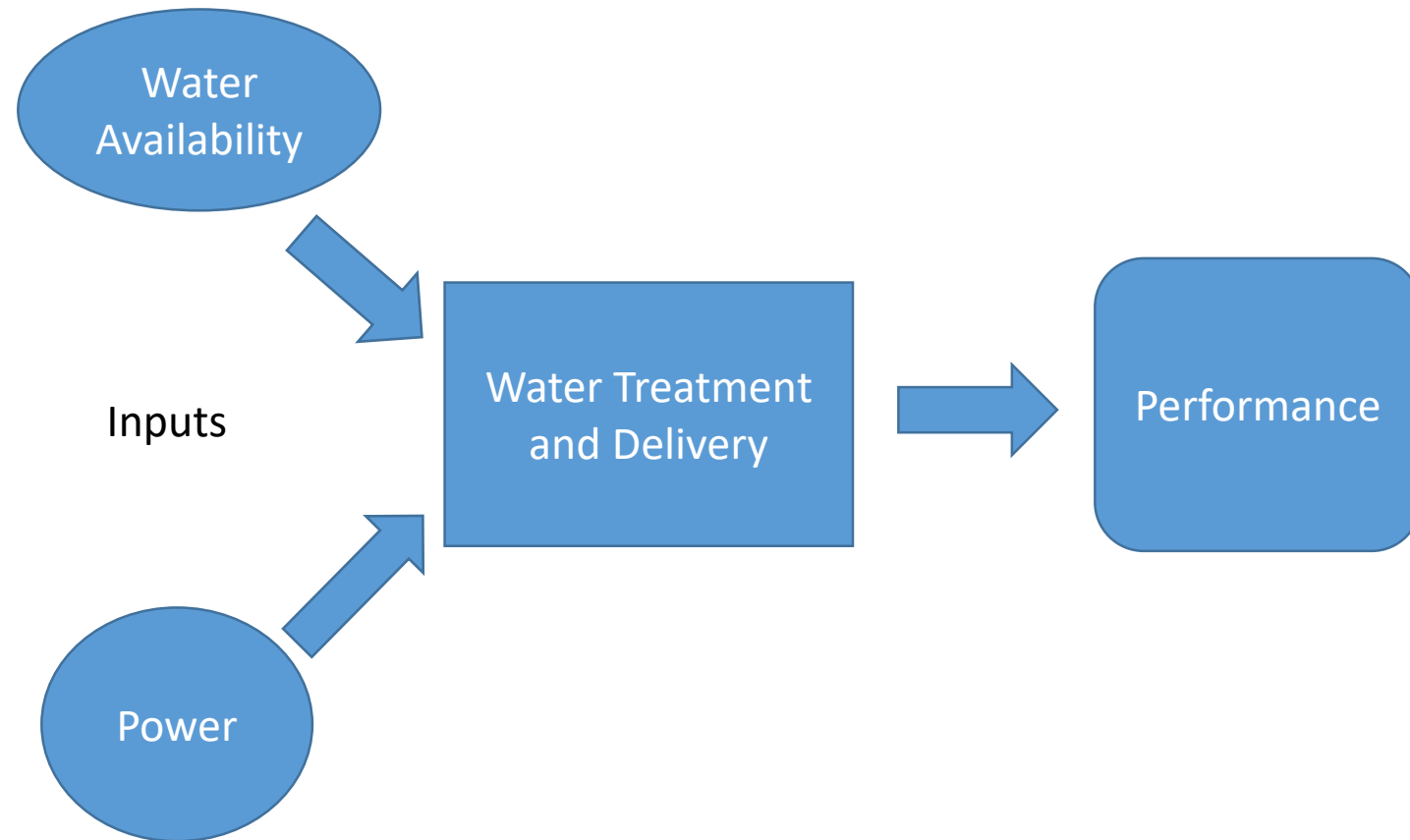


1. Decision Context

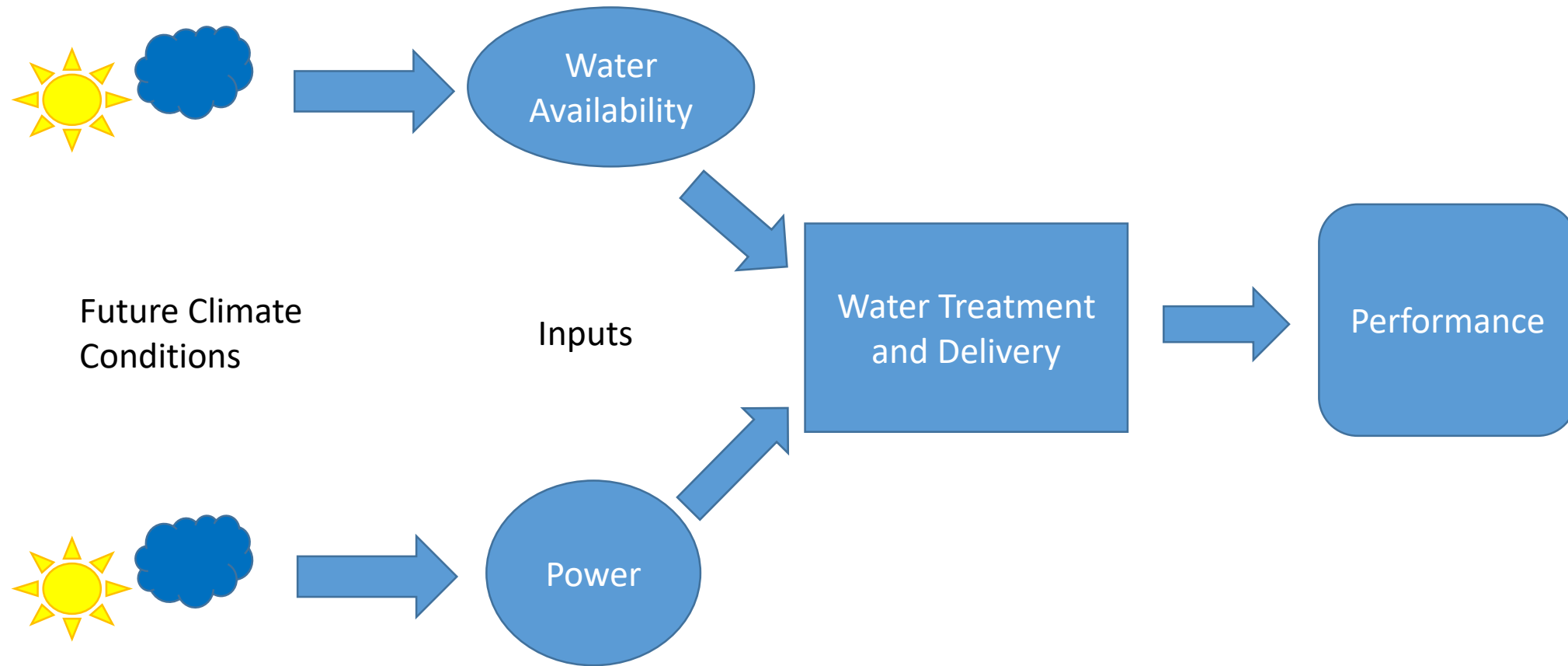
The plants current performance is unacceptable. There is need to define a baseline level of investment (e.g. the investment one ought to make regardless of climate change)

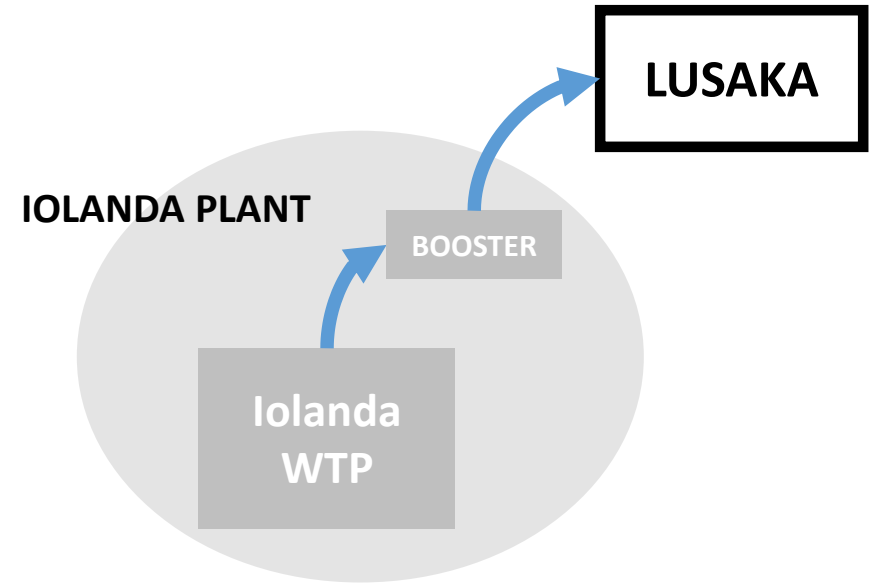


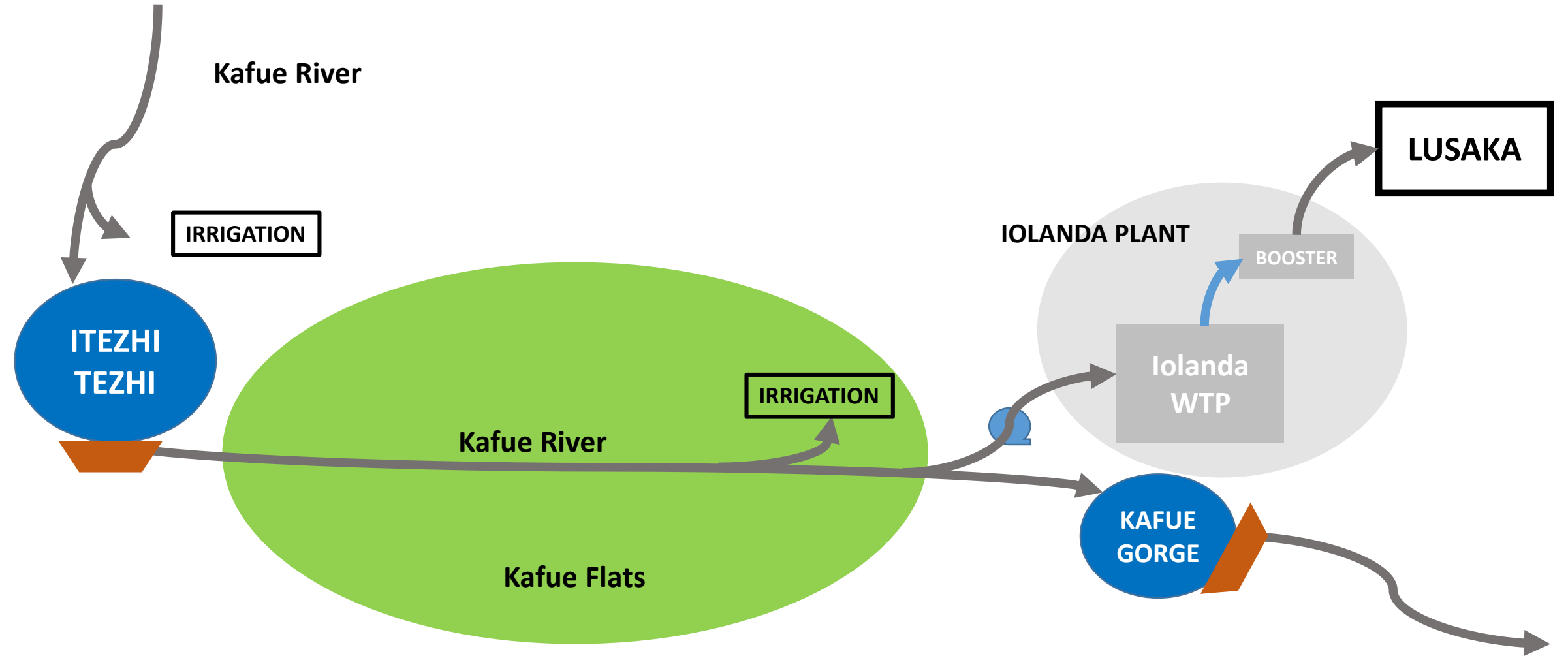
2. Describe the System

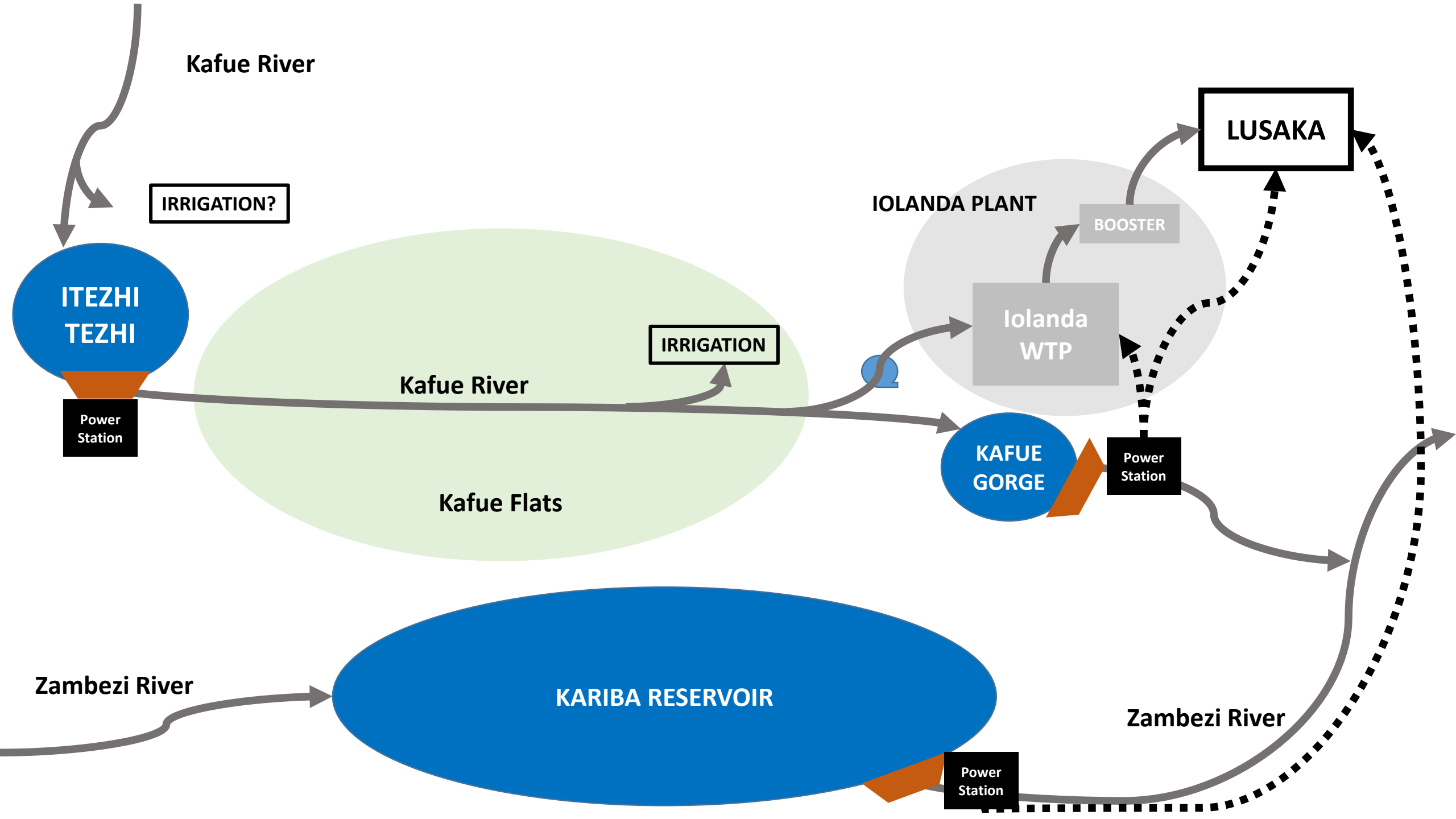


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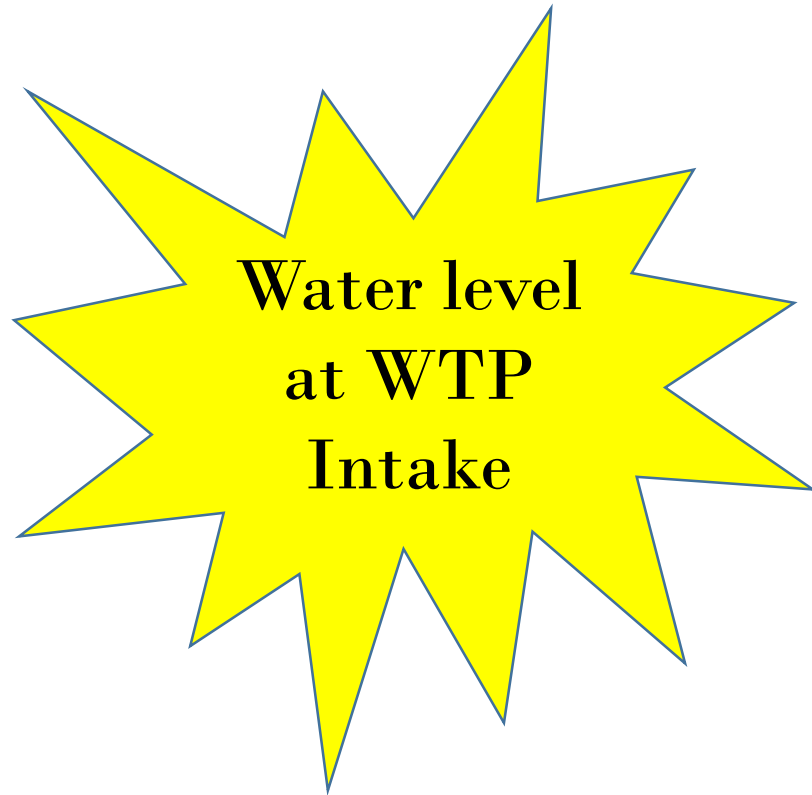






2. Vulnerability Analysis: Power

Exit Point: Water level at Intake.



3. Develop Climate Mitigation Strategies

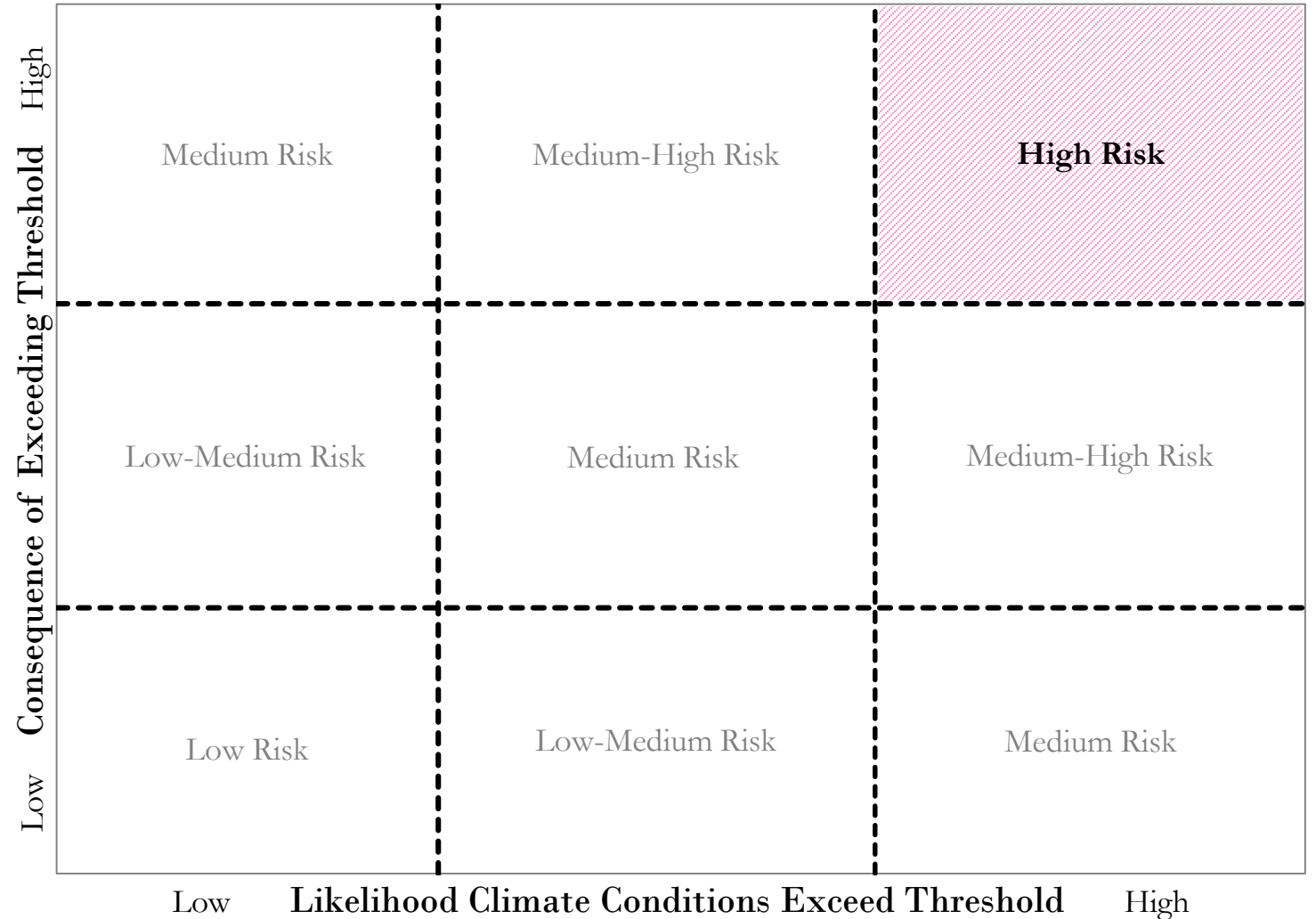
Likelihood

- Any reduction in stream flow (predicted by most GCMs) will violate performance thresholds under baseline investment conditions

Consequence

- Increase childhood mortality, stunting, various waterborne disease, lost wages productivity and income.

Climate Risk Matrix



3. Develop Climate Mitigation Strategies

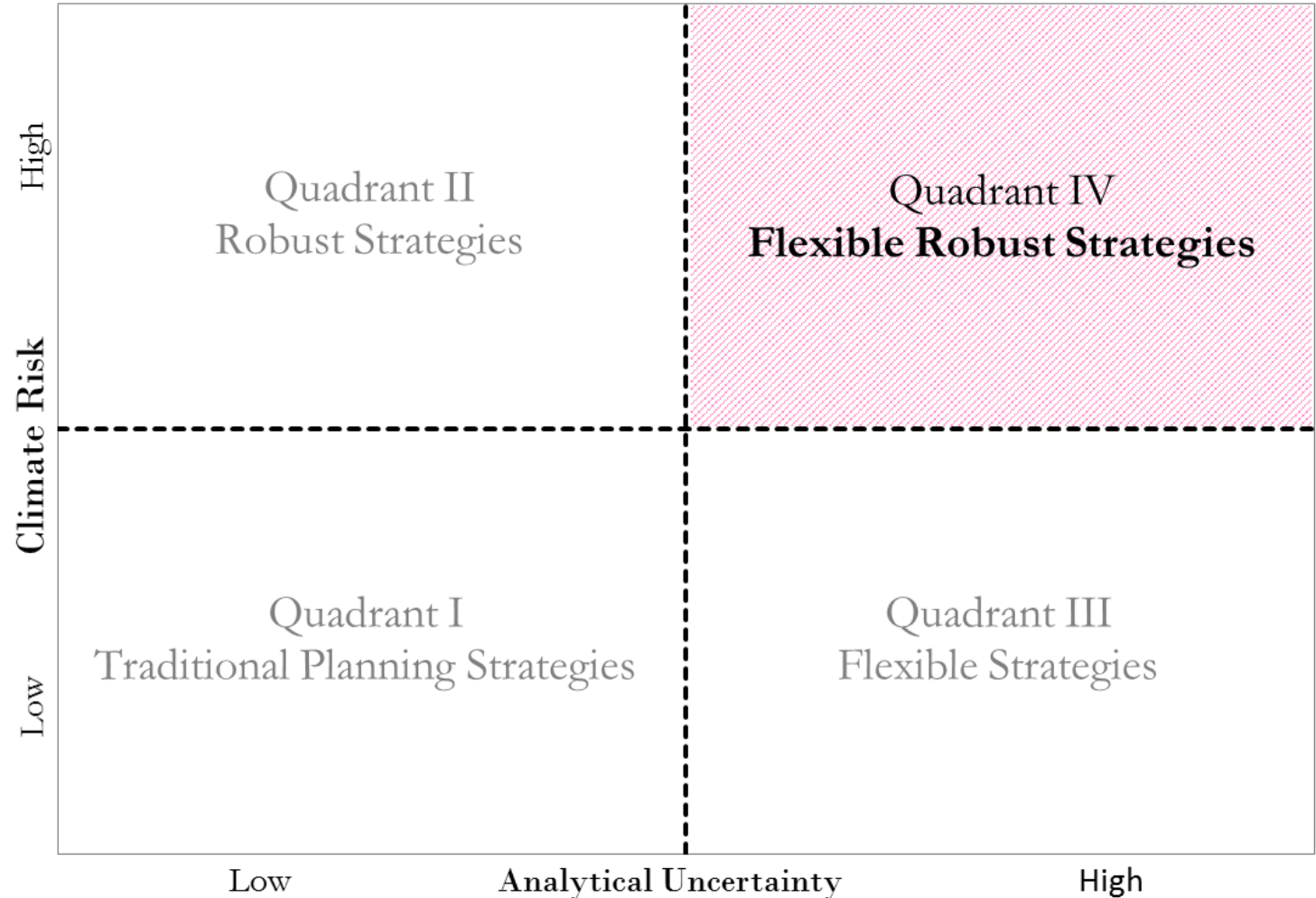
Climate Risk

- High climate risk should favor robust strategies

Analytical Uncertainty

- The analysis is based on poor quality data, low resolution models, and there is relatively little convergence in the GCM predictions.
- This favors flexibility (adaptive solutions).

Level of Concern Matrix



3. Develop Climate Mitigation Strategies



Generators for
Pumps

3. Develop Climate Mitigation Strategies



Generators for
Pumps



New Power
Agreement

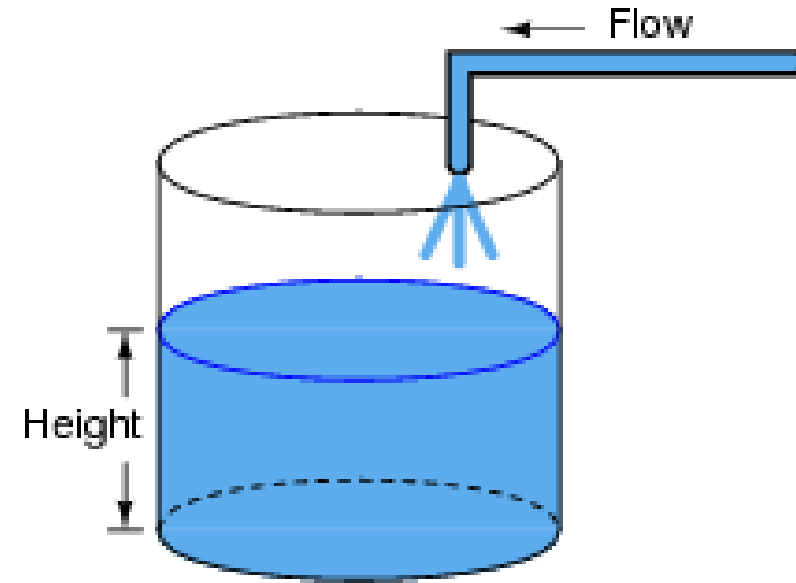
3. Develop Climate Mitigation Strategies



Generators for
Pumps



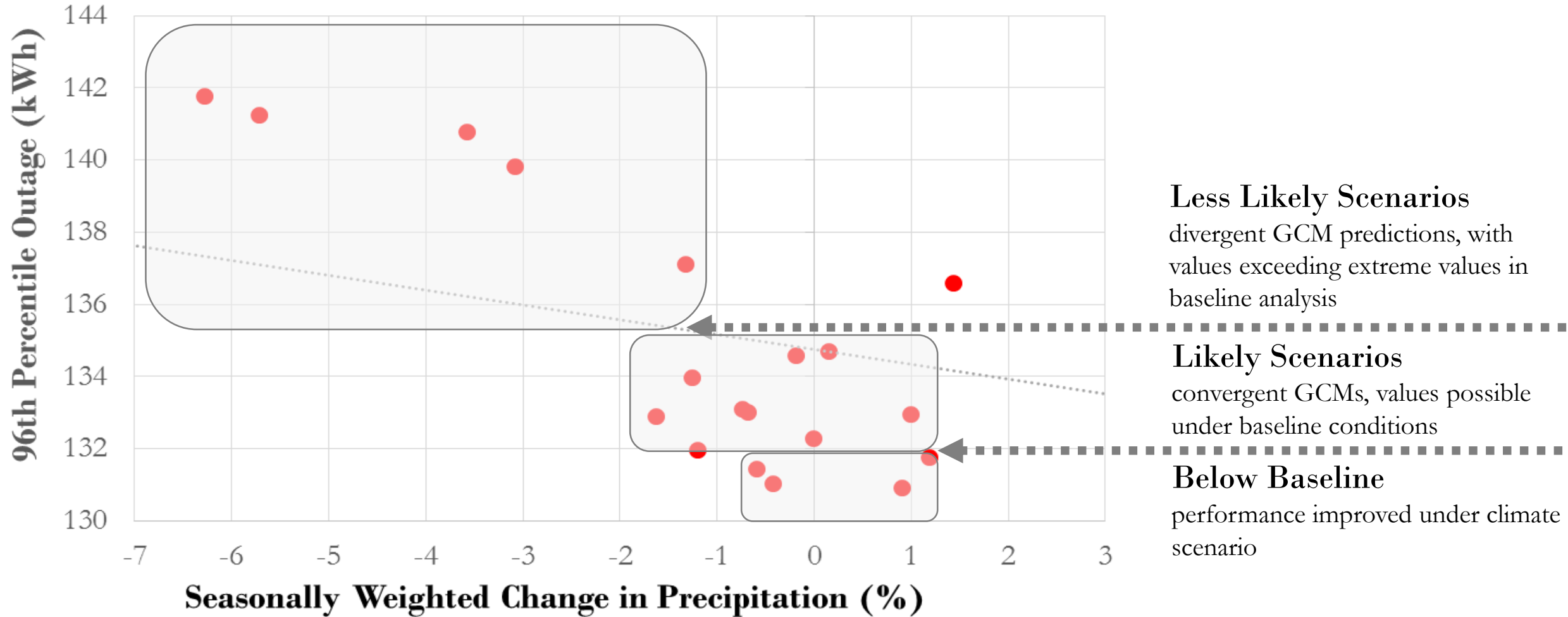
New Power
Agreement



Larger Transfer
Tanks

4. Formulate Climate Robust Actions

Climate Scenario Bins



5. Develop Final Strategy (and 6. Implement)

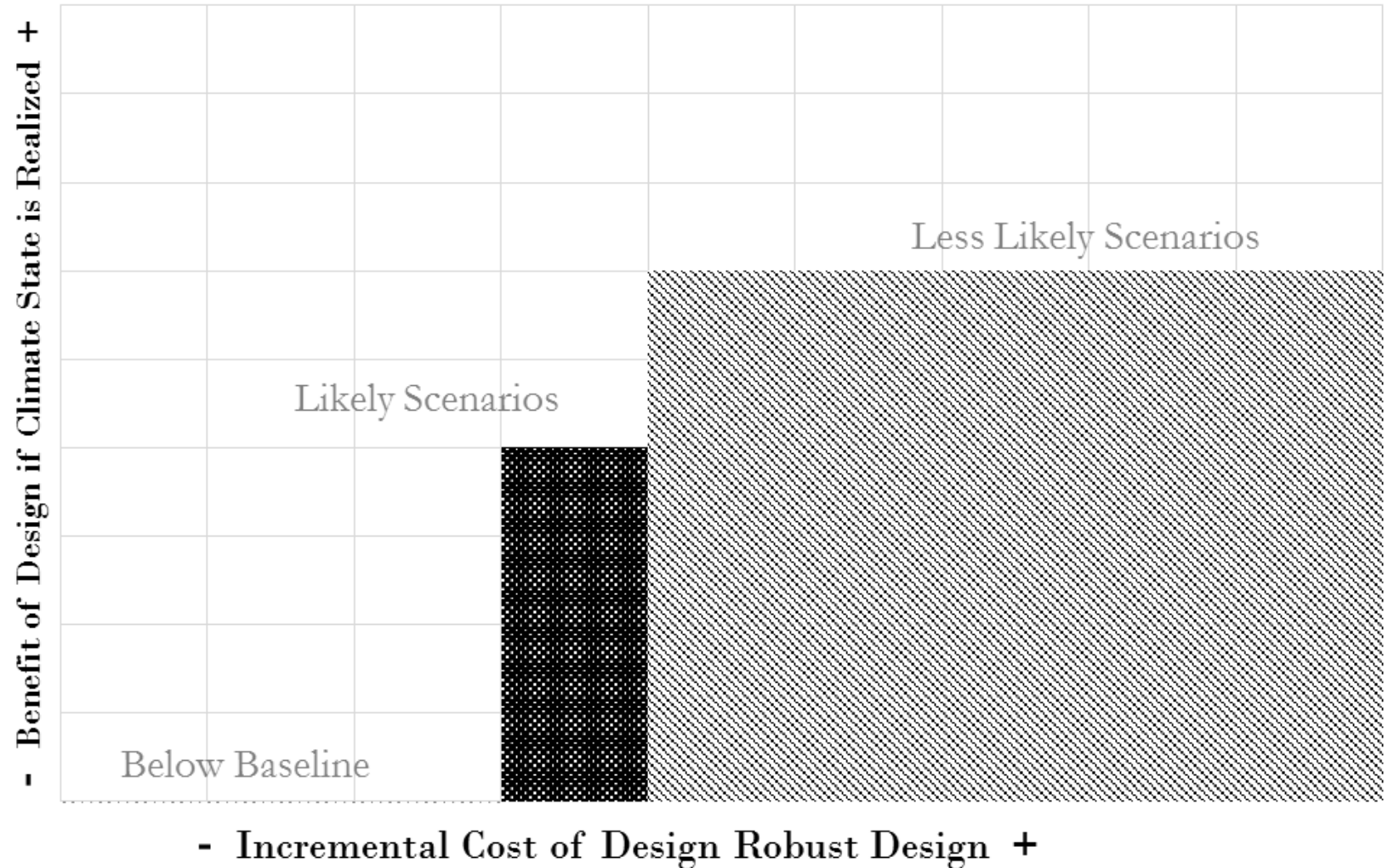
Cost Effectiveness

- The lowest cost plan robust to each bin is retained

Incremental Cost Analysis

- A plan is selected by comparing the incremental cost to the qualitatively assessed incremental probability that the benefit is realized

Incremental Cost Analysis



Key Points

- Not Modeling Intensive
- Time Savings
- Inexpensive
- Expanding Our Effort

