IRENE

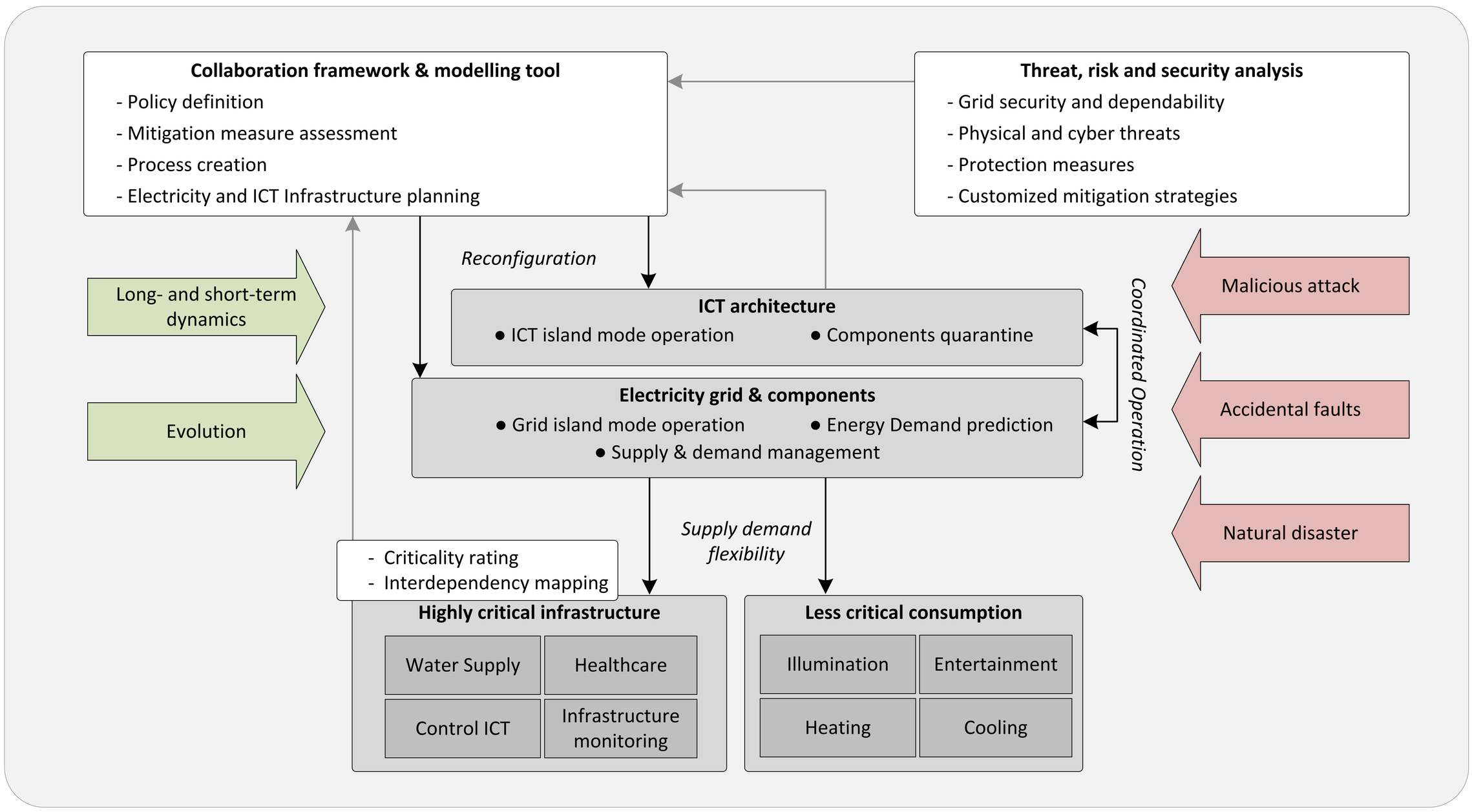
Improving the Robustness of Urban Electricity Networks

Motivation

- Modern cities are most vulnerable to the loss of critical infrastructures
- Prolonged power outages cause severe societal and economic consequences
- Threats for urban electricity grids include:
  - Accidental faults
  - Malicious attacks (on Smart Grid IT infrastructure)
  - Natural disasters
- Distributed Energy Resources (DER) can supply critical infrastructures in case of power outages
- Amount of DER is continuously increasing and building owners are encouraged to equip buildings with energy generation facilities (photo voltaic, cogeneration units, etc.)

City benefits

- Run critical infrastructure even in case of long term power outages
- Identify vulnerable groups of citizens and assign available energy to them (elderly, handicapped, children,...)
- Increased city resilience when faced with an incident that impacts a city's power supply
- Improved city resilience planning capabilities
- Improved stakeholders engagement in key areas of disaster/resilience planning
- Improved understanding of the implications (policy, societal, technical and legal) associated with island operation and component quarantining



Research questions

- What are the relevant threats and their impacts on critical infrastructures?
- How can islanding solutions (microgrids, quarantining) help to mitigate the impact of faults and attacks?
- What are the technologies and policies needed to operate the infrastructure under normal and fault conditions?
- What kind of policy levers could be applied to encourage collaboration between stakeholders to make the city's energy supply more resilient?

Expected results

An integrated collaboration framework and tools to allow stakeholders to collaborate in developing an appropriate response to possible threats to their electricity supply and to evaluate its effectiveness.

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