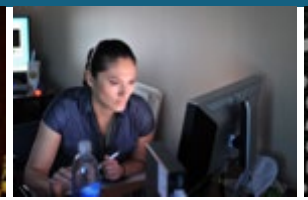
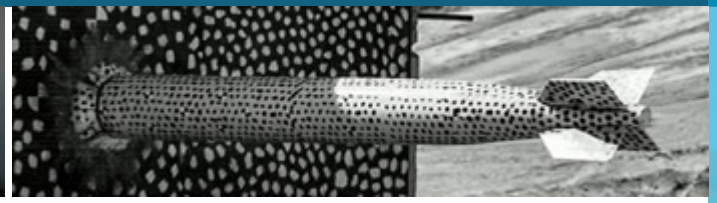
City of San Antonio/ CPS Energy Analysis Demonstration Methodology





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Step 1: Resilience Drivers Determination

Step 1 Description

Multi-stakeholder definition of:

1.1. System

- City of San Antonio, initial focus on Brooks Innovation Zone

1.2 Threats

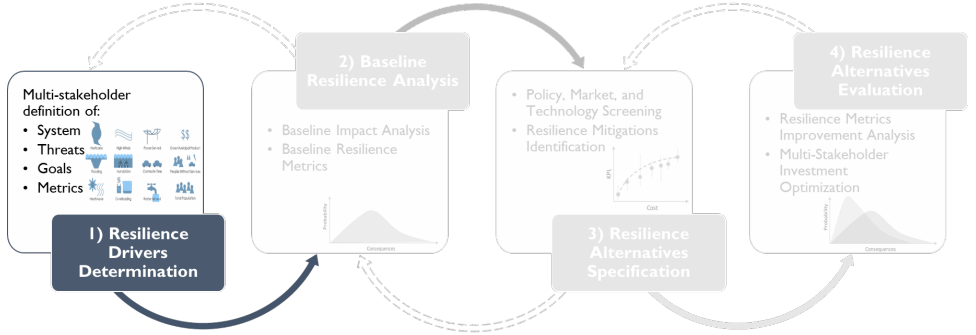
- Flood
- Large scale regional transmission outage

1.3 Goals

- Reduce carbon footprint of San Antonio's transportation system by accelerating adoption of EVs
- Minimize societal impact of major disruptions
- Find co-beneficial designs for the CPS system that improve community and EP system resilience as EV adoption increases

1.4 Metrics

- EV volume that can be supported under proposed investment plan
- Access to water, power, food shelter, and medical care



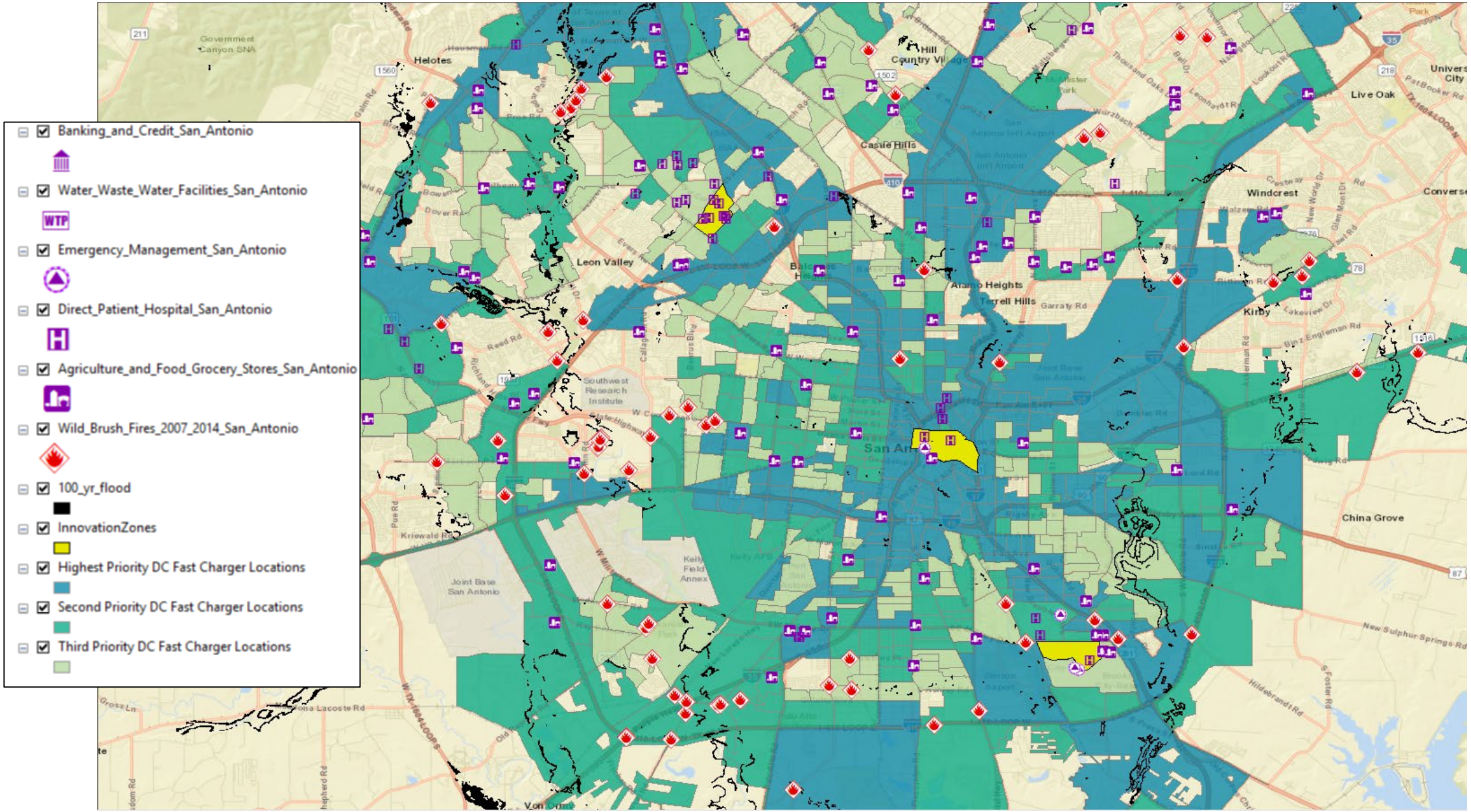
Stakeholders, Tools, and Resources

City of San Antonio Office of Sustainability
City of San Antonio Office of Emergency Management
CPS Energy

ArcGIS

Critical infrastructure GIS Data
Historical threat events (flood, fire, etc.)
FEMA Flood layer
Electric power infrastructure

Relevant Infrastructure Sample and Potential Fast Charger Locations



Resilient Community Design Framework Step 2: Baseline Resilience Analysis

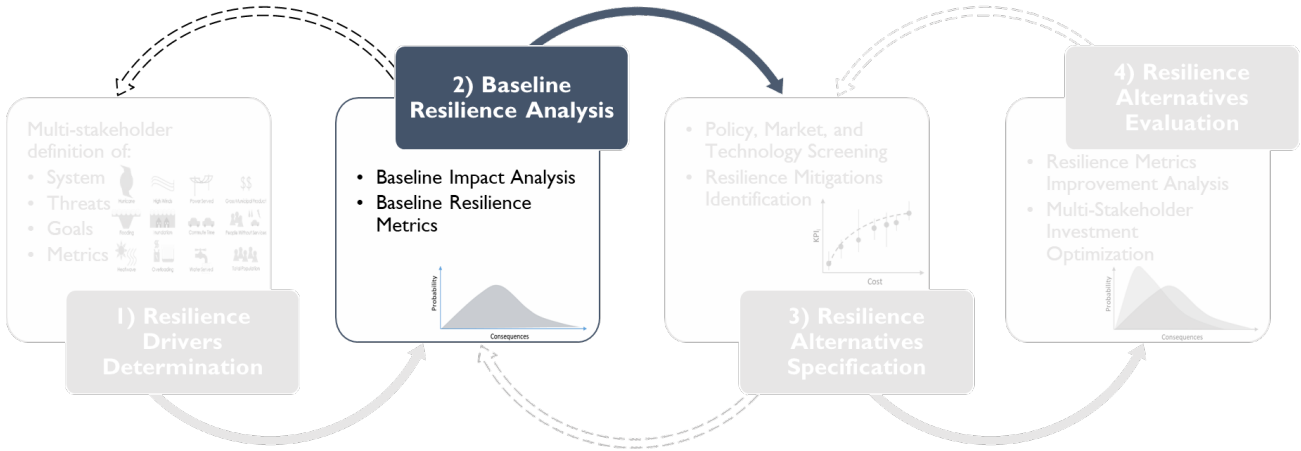
Step 2 Description

2.1 Baseline Impact Analysis

- Using historical/observational data and/or simulation, probabilistically forecast (over the planning horizon):
  - Threats/disruptions
  - Component impacts and aggregation to infrastructure system impacts
  - Multi-infrastructure impacts

2.2 Baseline Resilience Metrics

- Calculate consequence-focused performance metrics (*without* mitigations under consideration)



Stakeholders, Tools, and Resources

Historical outage data, restoration times

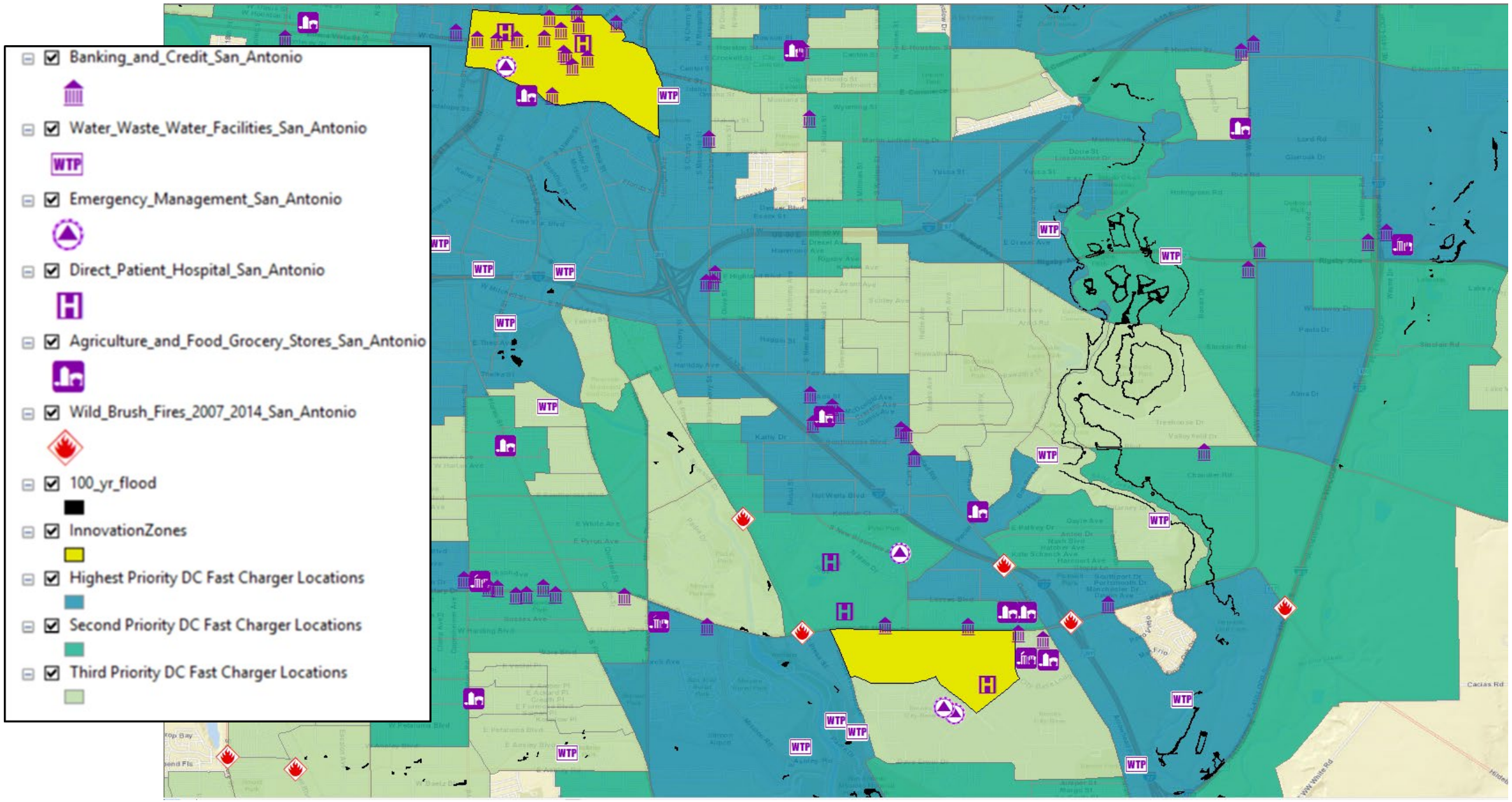
Results of previous analysis recommending EV charger locations under "blue sky" conditions

Current and projected EVs

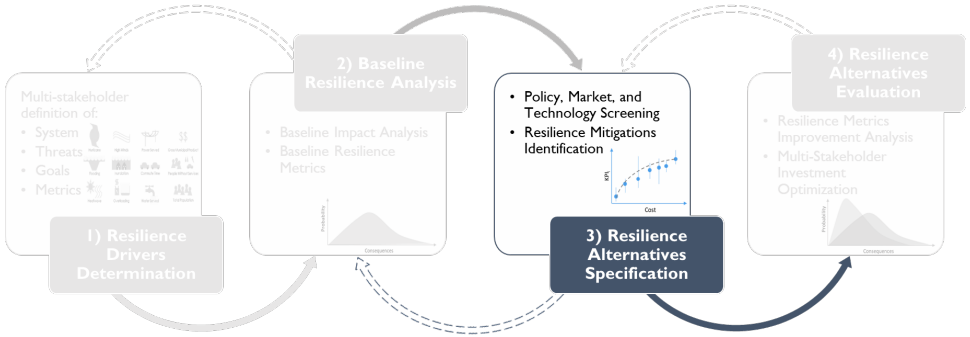
Relevant CPS emergency management assets

Power Flow Data

Initial Focus - Brooks Innovation Zone



Resilient Community Design Framework Step 3 and 4: Resilience Alternatives Specification



Step 3 Description

3.1 Technology, Policy, and Market Screening

- Begin with screening of alternative technologies to meet goals (e.g., resilience, sustainability, reliability) of planning process identified in step 1.1 (e.g., city sustainability plan, utility integrated resource plan)
- Consider system constraints (e.g., regulatory frameworks, utility business models) and potential evolution of constraints
    - These may be alternatives in subsequent phases

3.2 Resilience Mitigations Identification

- Specify technology investment portfolios (i.e., potential planning, operational, and policy actions/designs that enhance the system's ability to prepare, withstand, respond, and/or recover)

Step 4 Description

4.1 Resilience Metrics Improvement Analysis

- Evaluate resilience mitigations by calculating consequence-focused performance metrics (repeating steps 2.1 and 2.2 *with* mitigations identified in step 3.2)

4.2 Multi-Stakeholder Investment Optimization

- Engage relevant stakeholders to negotiate weights for multiple resilience metrics
- Prioritize investment portfolio through multi-metric optimization

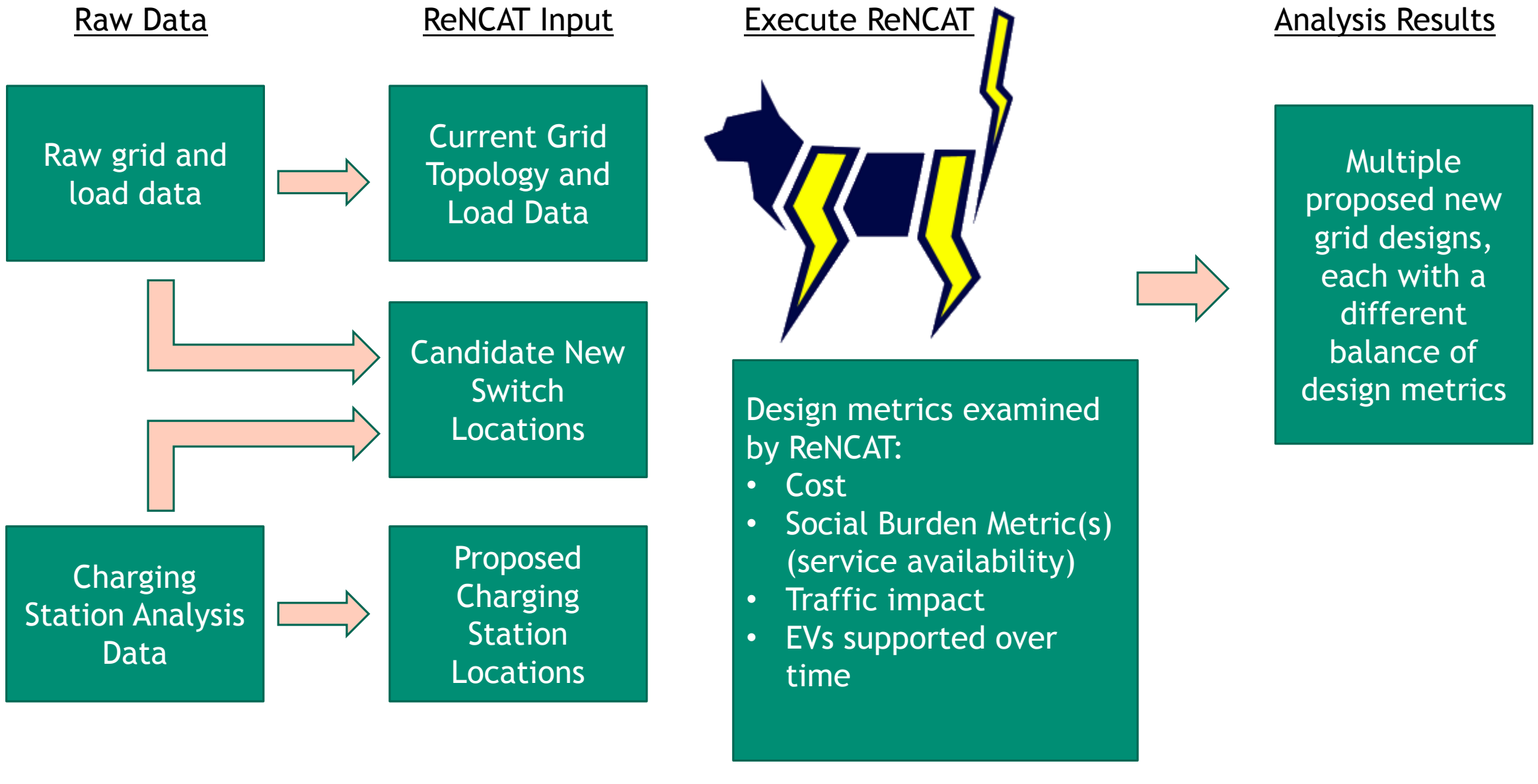
Stakeholders, Tools, and Resources

Resilient Node Cluster Analysis Tool (ReNCAT)

Microgrid Design Toolkit (MDT)

CYME

Analysis Process Using ReNCAT



Path Forward

Iterative analysis process working with all stakeholders

Identification of investment alternatives

Lessons learned from and input to upcoming tabletop exercises

Expansion from Brooks to full CoSA example

Funded by the U.S. Department of Energy's (DOE) Grid Modernization Laboratory Consortium (GMLC). This presentation is an account of research funded by DOE; it summarizes work-in-progress for which feedback is solicited. The presentation describes objective analysis; any subjective views or opinions that might be expressed in the presentation do not necessarily represent the views of DOE or the United States Government.