The economics of a resilient power grid

Fred V. Carstensen
Peter Gunther
Marcello Graziano

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2 Main Objectives/Projects

OBJECTIVE 1 (2021-2022): *To quantify the economic impacts of the electrification of the transport sector in CT via its link to the electric grid.*

OBJECTIVE 2 (2021-2023): *To generate portable macroeconomic and synthesis metrics for ascertaining the economic effects of the resilience outputs and scenarios developed by teams at EEC.*

Longer term: 7 WPs

1. Identify and possibly survey major customers for identifying their backup strategies and incurred costs under business as usual scenario and likeliness to remain with utility. (WP1). [Optional]

2. Integrate current work on EV adoption and energy transition scenarios under development by CCEA and Eversource Energy Center in to current analysis. (WP2)

3. Implement REMI analyses (3 to 5 scenarios) based upon the action and intervention scenarios based on UConn System Performance Model (WP3).

4. Perform counterfactual analysis of power outages and economic indicators without Estimated Time to Recovery (ETR) or other interventions. (WP4)

7 Action Items

5. Implement REMI analysis for different levels of pricing and derived demand for electricity under different resilience actions and savings transmission systems identified by partnering teams. (WP5)

6. Identify an optimal scenario for utility-specific and region-wide economic benefits under ‘most-likely’ weather, hardening, and renewable energy scenarios out to 2035. (WP6)

7. Synthetize findings through the development of two economic metrics: “Region-system return on resilience” (RESTRESS) and the “Utility Return on hardening” (URD) measuring the return on investing on resilience to the region (i.e. Connecticut) and the utility company (Eversource) based on WPs 1-5. (WP7).

Research Design 1

1. Create a ZCTA-level database of EVs and sociodemographic variables. (*So far: acquired data up to 2017).*

2. Perform an analysis to identify current drivers of adoption > split into 2 phases 2001-2015 and 2015-2020 to reflect technological changes.

3. Project further adoption up to 2030.

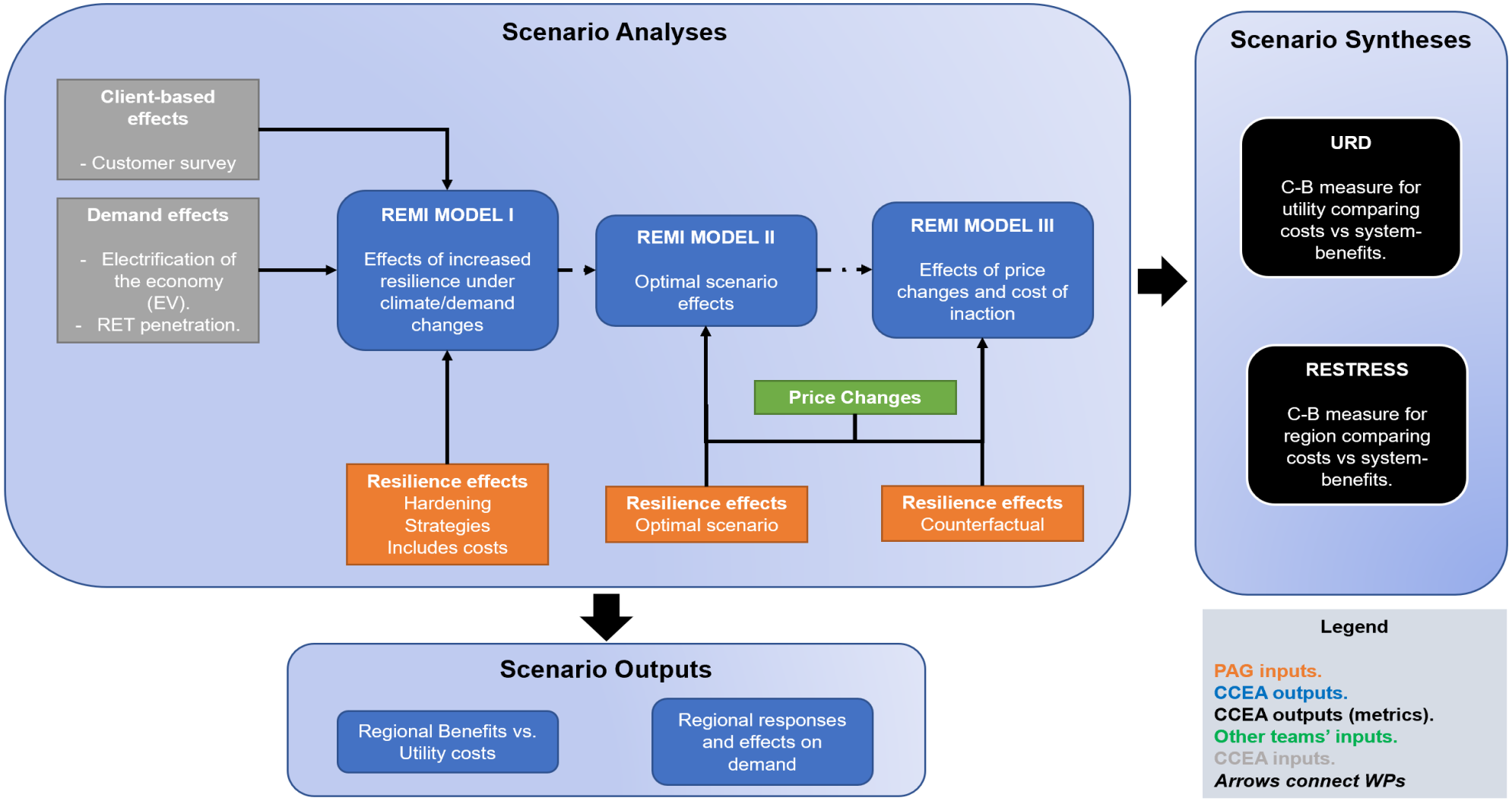
4. Identify increased demand for electricity and its effects on state's infrastructure.

5. Compute economic and fiscal impacts via REMI.

Update

- Created State-wide dataset of all EVs adopted in 2013-2017 (by model, type, year, zipcode).
- **NEXT STEPS**:
  - Secure data up to 2021 via IHS.
  - Add on pre-compiled annual sociodemographic dataset (ready 2013-2015).
  - Add commuting data.
  - Work includes mentoring student part of the URM EEC Internship Program (Enrique Casa, Pacific University).
  - Proximity analysis to understand drivers and prepare projections.
  - Projections to 2030 based on adoption patterns.

Research approach 2



Output 1

1. Comprehensive regional economic analysis of drivers and effects of EV adoption.

2. 2 peer-reviewed paper > Journal of Cleaner Production & ERSS.

3. 2 Conference presentations > RSAI World Congress & USAEE.

4. Initial inputs for Project 2.

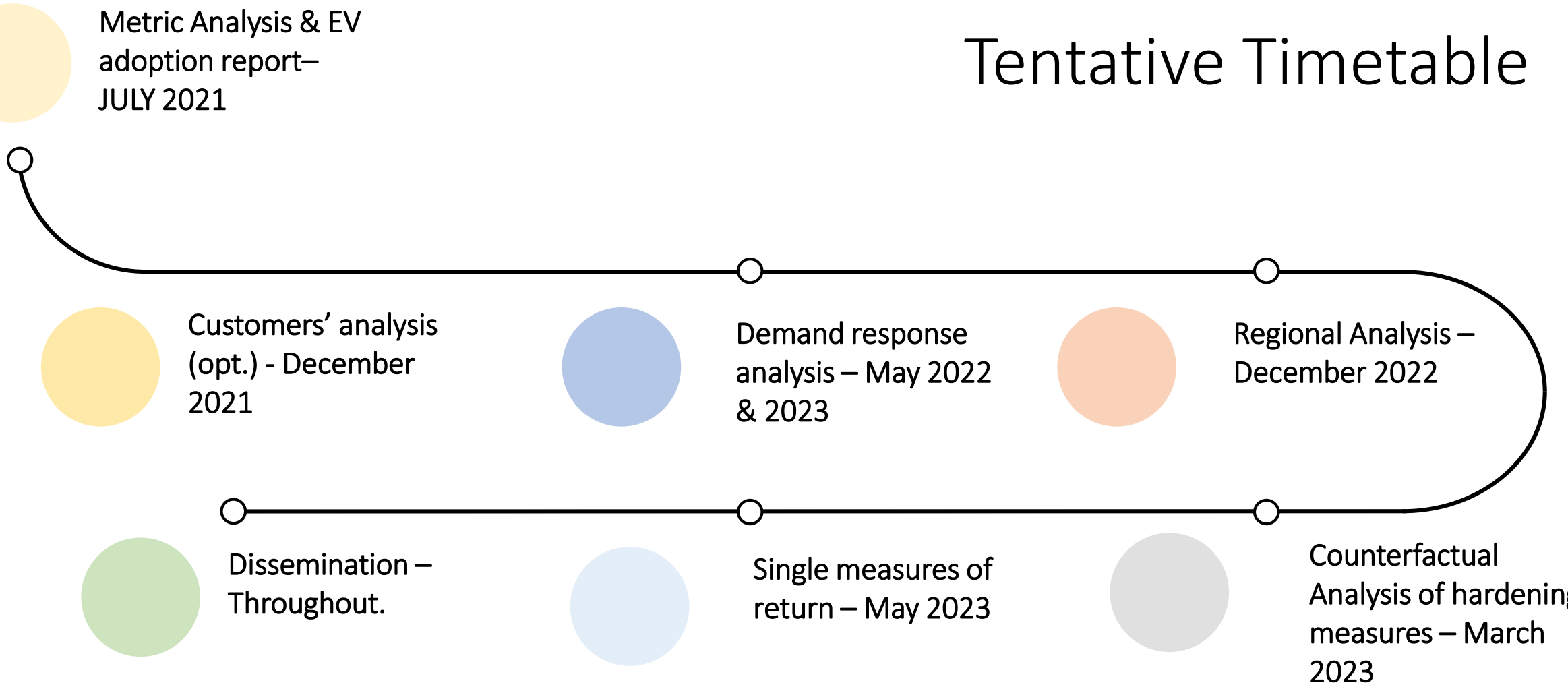
Output 2

1. Metrics Analysis report.
2. Marginal rate of return report.
3. Single measures of return on resilience for utility company and region-system.
4. Comprehensive regional analysis based on dynamic scenarios for energy prices, demand, and resilience measures.

Overall:

- 2 synthesis reports.
- Portable metrics frameworks.
- 2 peer-reviewed scientific papers > ERSS & Renewable and Sustainable Energy Reviews.
- 2 conference presentations > USAEE & IAEE (2022, 2023).

Tentative Timetable



EACH MILESTONE WILL PRODUCE 1 REPORT IN 2 FORMATS: DRAFT FOR FEEDBACK, AND FINAL FOR CIRCULATION.

SCIENTIFIC OUTPUT: 2 PEER-REVIEWED PAPERS (MIN.).

Q&A

("This is more of a comment than a question" thing is welcome)

Thank you

Contact: grazianom5@southernct.edu / marcello.graziano@uconn.edu