The Energy Resilience and Efficiency Working Group
Meeting Minutes

Tuesday, June 18, 2024, 9:00am-10:30am E.T.

Meeting Location: Johns Hopkins University and Online via Google Video

Attendees

Members

Member type	*Name*	*Present*
Sen. Katie Fry Hester	Maryland Senate	X
Del. Lorig Charkoudian	Maryland House of Delegates	X
Andrew Place	Maryland Department of the Environment	X
Landon Fahrig	Maryland Energy Administration	X
Maurice Simpson Jr.	Constellation	X
Christine Csizmadia	Nuclear Energy Institute	X
Carol Lane	X-Energy	
Jeff Shaw	SMECO	X
Nancy Sopko	US Wind	X
Mark Zucca	Potomac Edison	X

Participants: Stephanie Vo, Cindy Osorto, John Gloninger, Richard Ortt, Matt Bernstein, Bob Sadzinski, Mariana Rosales, Roger Austin, Allison Brown, Benjamin Baker, Bob Sadzinki, Boyu Yao, Bridget O'Toole, Christian Riordan, Emma Stoney, Haley Kotzker, Jamie Lopp, Jared DeLuccia, Joyce Lombardi, Kathryn Hastings, Layla Horeff, Mariana Rosales, Mark Stewart, Rachel Lamb, Stephanie Wilcox, Stu Widom, Yury Dvorkin, Ziting Huang, Jeff Silva

Introduction

Andrew Place: This working group has two main responsibilities: MCCC recommendations and a study.

Grid 101 - Benjamin Baker, PSC

High Level Overview of the Grid

- The grid is composed of main parts: (1) generation, (2) transmission, and (3) distribution.
- In Maryland, the PSC only has regulatory jurisdiction over distribution systems. Generation and transmission systems are overseen by the FERC and operated/planned by PJM.

Electrification & Modernization Grid Impacts

- **Modernization:** The integration of recent innovations into grid operations and planning (e.g., energy storage, renewables, smart inverters, etc.).
- **Electrification:** Convert applications that currently rely upon fossil fuels to electricity.
    - Peak management and load shape shifting will be important as Marylanders electrify (efficient measures should be deployed when electrifying).

Happenings at the PSC

- **Distribution System Planning Process:** The PSC is creating a more transparent stakeholder process. This report has been submitted to the Commission for next steps in the planning process.
- **EmPOWER:** A law has been passed incentivizing customers to electrify appliances within EmPOWER.
- **Workgroups:** The PSC has an ongoing effort to address the resiliency concerns of decarbonization.
    - Energy Storage Program
    - Electric Vehicle Pilot
    - Time-of-Use
    - Interconnection
    - Net Metering and Community Solar
    - Resiliency

Questions & Responses

Sen. Hester: Could you talk about the Brattle Report? What will be the impact of data centers coming online?

Baker: The Brattle Report found load growth to be manageable (using existing systems) until 2031. However, the study did not evaluate the cost of managing that growth nor did it take into account the current expectation for the volume of new data centers since that is an emerging issue.

Place: This working group could recommend funding a new study accounting for costs and data centers under various scenarios.

NREL ReEDs Tool - Trieu Mai, NREL

Background

- The ReEDs Tool is a *generation & transmission system* planning model developed by NREL.
- The difficulty in bulk systems planning is considering both physics and economics.

Reliability

- These four pillars of reliability are vital for effective planning:
    - **Capacity:** Generation & transmission capacity must meet peak demand.
    - **Flexibility:** Systems must be flexible to address variability/uncertainty in load demand and generation resources.
    - **Frequency:** Systems must maintain steady frequency.
    - **Voltage:** Systems must be able to maintain voltage within an acceptable range.
- There are three main elements of grid reliability:
    - **Resource Adequacy:** Sufficient long-term planning for load growth.
    - **Operational Reliability:** Contingency events and short term supply & demand variability/uncertainty.
    - **Resilience:** Recovery from extreme weather events or cyberattacks.

The ReEDS Tool

- ReEDs performs a least cost optimization framework which simulates evolution and operation of generation, storage, transmission, and distribution.
- The model includes load growth for recent federal and state policies, various renewable technologies (and future technologies), various transmission types (e.g., high voltage)
- **The Starting Point:** Existing & Planned Capacity
    - The model uses a zonal framework, aggregating generation and transmission data into 134 "balancing zones."
- **Inputs:** A Strategic Design Provides the Best Cost Optimization
    - Renewable energy resource and land availability
    - Demand (hourly) projections
    - Technology availability
    - Cost projections
    - Federal and state policies
    - Transmission representation
- **Outputs**
    - The ideal mix of resources
    - The capacities of different technologies
    - Which power plants to retire/replace
    - System costs

NREL's Research Efforts

- **Decarbonization:** NREL, broadly, is working to find decarbonization pathways for the power sector at various scales and paces.
    - **Example:** How much clean energy generation and transmission upgrades are needed?
- **Impacts of Technological Innovation**
    - **Example:** If the focus is on offshore wind, how should the transmission system (especially the export cable) be designed?
- **Standard Scenarios:** An annual report on a wide range of possible futures for the electric sector. This includes data on current policies, power prices, hourly emissions data

Questions & Responses

Csizmadia: What federal and state policies are included in this model? Specifically, are the IRA Investment Tax Credits included?

Mai: Federal policies are integrated real-time into the model, and the IRA is included. State policies are updated annually.

Del. Charkoudian: Current cost-benefit analyses often assume single-direction power flow, and often we try to solve future problems with older models. Offshore wind appears to be an integral piece of decarbonizing Maryland, but many worry about its associated transmission costs. How should we think about cost-benefit analyses considering offshore wind's crucial role in decarbonization?

Mai: Our model looks at different transmission configurations for offshore wind to find the most cost-effective implementation plan. The model also considers alternatives if offshore siting or transmission issues become cost-prohibitive.

Electrification Futures Study

- EVs ***dominate*** incremental growth in annual electricity demand.

- Electric space heating has the most pronounced impact on peak load demands.
- A lot of money can be saved by implementing demand-side flexibility (e.g., smart meters, managed EV charging) in a highly electrified system.

EREWG Member Discussion

Sen. Hester: What do we want the charge of this working group to be? It appears to be ensuring the lights wont go out as we meet climate goals.

Place: We need to illustrate what guardrails exist allowing us to make incremental policy changes without compromising resilience. Do we need regulatory/statutory clarification, or incentives to drive us towards electrification and renewables, or incentives for additional generation or storage?

Del. Charkoudian: My concern is that we have not done analyses given long term investments. We will be in trouble down the road if we incentivize air-source heat pumps rather than geothermal variations because of its lower upfront installation cost but higher operating cost.

Zucca: It's also important to recall the jurisdictional split between the generation and transmission system and the distribution system. Data centers will be interconnected at the transmission level, so there is no impact on the resiliency of the distribution system.