Analyses on Energy Resiliency and Efficiency

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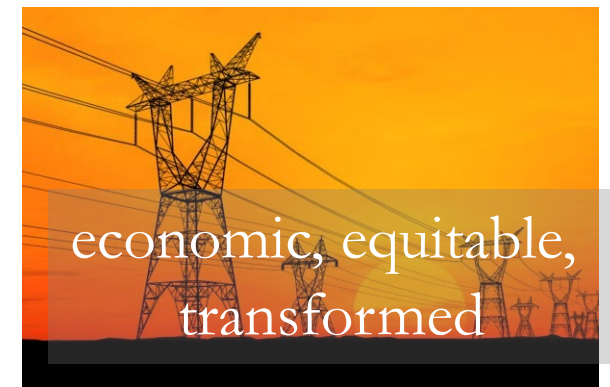# Analysis of Energy Resiliency and Efficiency

- **Goal**:
  - Provide analyses to support the mission of the Energy Resiliency & Efficiency WG of the Maryland CCC
    - WG's mission: "*Advise the commission on issues and opportunities related to energy infrastructure improvements, transmission efficiency improvement, and battery backup viability*"
  - Identify solutions to improve resiliency of Maryland's electric infrastructure
  - Advise Commission on issues and opportunities related to energy infrastructure improvements
- **Team at Hopkins**:
  - Ben Hobbs (bhobbs@jhu.edu), Yury Dvorkin (ydvorki1@jhu.edu)
  - Students: Ziting Huang, Stephanie Wilcox, Boyu Yao
  - **HOPE-MD team**: Mahdi Mehrtash, Shen Wang, Zoe Song

ROSEI Research Pillars and Power Grid Research

captured, upcycled repurposed

integrated, sustainable, safe

efficient, scaled, reliable

economic, equitable, transformed

Community   Education   Policy   Translation

EPICS
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ARROW

GLOBAL PST CONSORTIUM

Maryland Energy Administration

Maryland ENVIRONMENTAL SERVICE

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Project Goal & Tools

- **Goal:** Analyze battery storage capacity needed for resilient & efficient grid operations in Maryland

  - Resiliency benefits
  - Locational & temporal value
  - Identify existing power plant sites for effective deployment
  - Simulation-based system-wide impacts & recommendations

- Holistic Optimization Program for Electricity in Maryland (HOPE-MD) is a **configurable** & **modularized** tool

  - Explore cost, emissions, & technology implications of power sector transition strategies

  - Modes of use:
    - **PCM** mode: *production costing* of user-provided investment scenarios
    - **GTEP** mode: gen & transmission *expansion* optimization

- HOPE-MD targets **State-level Carbon & RPS policies** that support transition paths for the electric power sector

HOPE — HOLISTIC OPTMIZATION PROGRAM FOR ELECTRICITY

SCAN HOPE!

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Support to Energy Efficiency & Resilience WG

- **What questions do you have about the role of storage & its effects on system performance?**

- **Example questions about *criteria & technology characterizations*:**

    o What dimensions of *resiliency* that should be prioritized?

    o What *storage characteristics* should be prioritized?

    o What *cost factors* should be carefully modelled?

- **Example questions about *scenarios*:**

    o Plausible trajectories for load & renewable growth over the years?

    o Timing & amounts of retirements?

    o What are "known unknowns" and "unknown unknowns"?

- **Any input is welcome**

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