The Grid – Survey of Modernization and Decarbonization Impacts

Ben Baker
Senior Commission Advisor
Maryland Public Service Commission
June 18, 2024

Overview

Disclaimer: The views expressed in this presentation are my own and do not necessarily reflect those of the Commission.

- High level review of the electric grid
- Grid modernization/electrification
- Survey of efforts at the Commission to address grid modernization

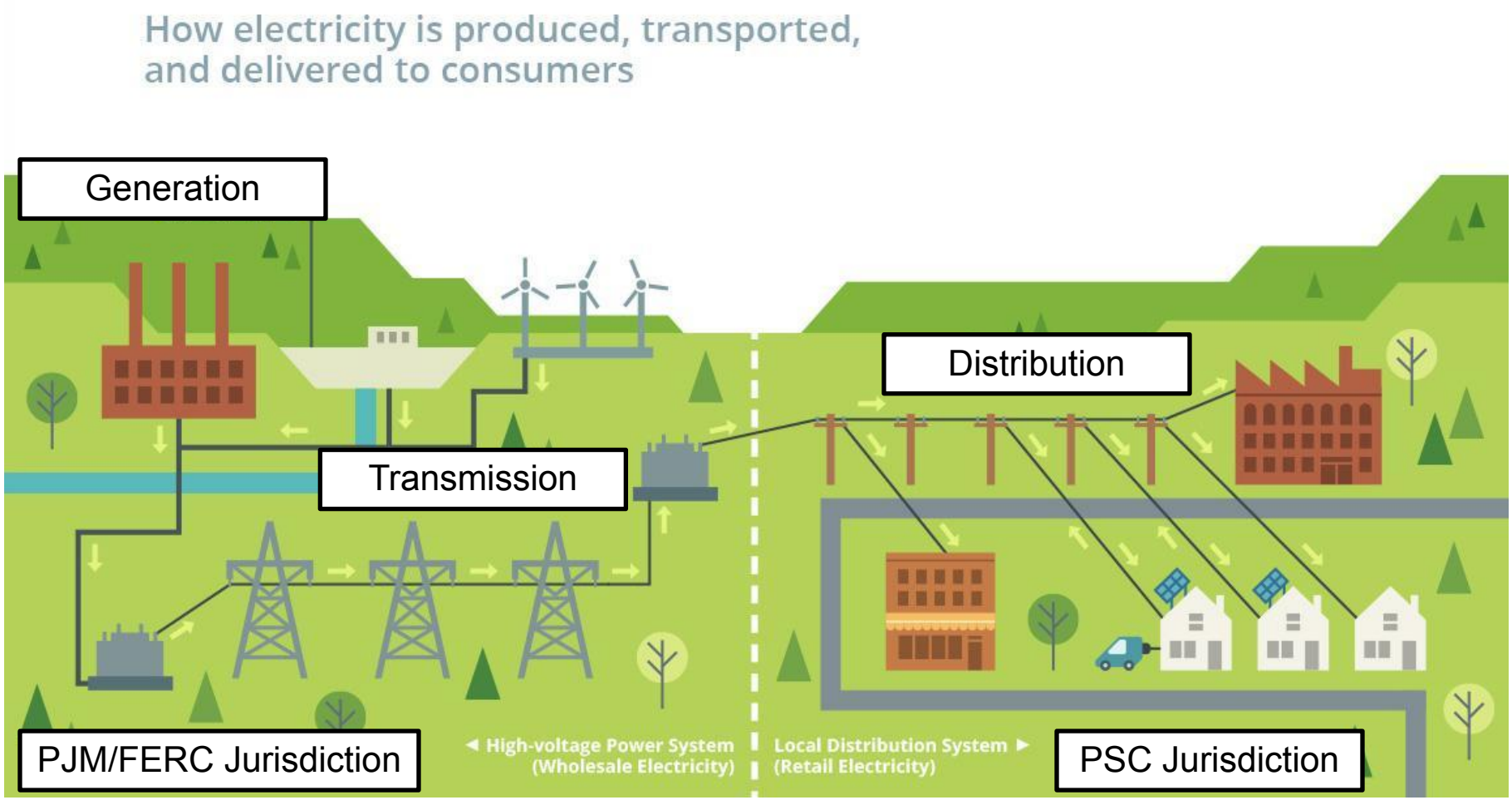
Electric Grid

- Utility systems consist of three parts: **Supply**, **Transmission**, **Distribution**
  - Electricity flow has traditionally been single direction. With advent of distributed generation, flow of electricity can now go both ways (e.g. solar)
  - Need to ensure there is enough supply and a sufficient network to move the supply to instantaneously meet customers demand within reasonable parameters

- MD PSC has regulatory jurisdiction over the utility **distribution** system, e.g. rate setting
  - Mission of the Public Service Commission is to ensure safe, reliable, and economic public utility and transportation service to the citizens of Maryland.

- PSC has limited authority over **supply** and **transmission**.
  - Jurisdiction of FERC and planned and operated by PJM
  - Supply + Transmission = Wholesale Market
  - Maryland utilities procure capacity, energy, and other ancillary services from wholesale market.

High Level Electric System Example



ISO New England
(https://www.iso-ne.com/about/what-we-do/in-depth/how-electricity-flows-from-wholesale-to-retail)

Grid Modernization

- Means many things but effectively the integration of recent innovations into grid operations and planning
  - Examples include real time information (e.g. AMI), distributed generation, renewables, energy storage, smart inverters, and bi-directional flow of electricity among other things
- PSC has led and continues to lead various efforts to modernize the grid
- State has passed several laws that influence the modernization of the grid
- Electrification

Grid Planning Considerations for Electrification

- Convert applications that currently rely upon fossil fuel to electricity
- Peak management and load shape shifting will be important when pursuing electrification (and other grid planning in general)
- May increase need to deploy generation capacity and the ability to move energy simultaneously
  - Think of grid like your house circuit breaker
- Examples of mitigation measures include, but are not limited to:
  - Deploying efficient measures when electrifying
  - Price signals for customers to not use energy at peak load hours
  - Make-ready programs

Examples of Grid Modernization and Electrification Efforts at PSC

- Distribution System Planning Process
- EmPOWER (Energy Efficiency, Demand Responses, Beneficial Electrification)
- Workgroups
  - Energy Storage Program
  - Electric Vehicle Pilot
  - Time-Of-Use
  - Interconnection
  - Net Metering and Community Solar
  - Resiliency

Thank you and Questions?

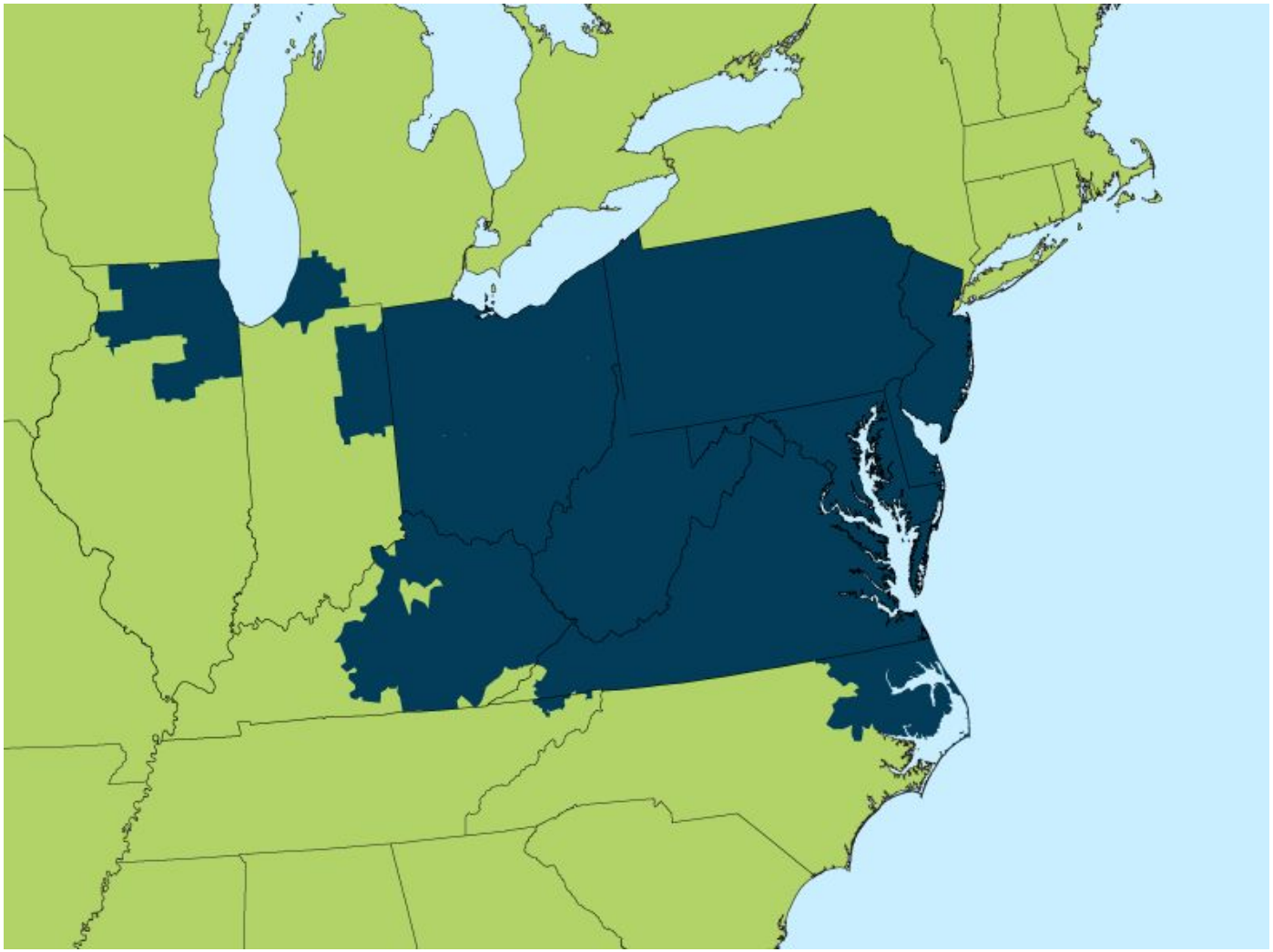
Appendix

FERC/PJM

- Federal Energy Regulatory Commission: Regulates the interstate commerce and reliability of electricity and gas
  - Wholesale markets for sale of electricity
  - Transmission of gas and electricity.

- PJM: Oversees the reliability and safety of the bulk electric power system and the operations of the power market serving 13 states and D.C. (including MD)

PJM Footprint



PJM Website:
https://www.pjm.com/about-pjm/who-we-are/territory-served#:~:text=PJM%20Interconnection%20coordinates%20the%20movement,and%20the%20District%20of%20Columbia.

Types of Generation

- Solar
- Wind
- Geothermal
- Nuclear
- Coal
- Hydro
- Natural Gas
- Biomass

RPS

- Renewables 52.5% of retail sales by 2030
  - Specific carve outs for solar, offshore wind, and geothermal
  - Can be generated in PJM or a PJM adjacent state if delivered into PJM
  - Certain fuels only qualify if connected to the Maryland grid
- RPS compliance does not necessarily mean delivery of renewables to Maryland
  - Company obligations can be fulfilled by purchasing Renewable Energy Credits
  - RECs are certificates that show renewable energy was produced. These are used to monetize the green aspect of renewables and show compliance with the law.

Commission Oversight of Distribution Utilities

- Setting Utility Rates
- Setting standard utility practices via tariffs
- Safety and Reliability Standards
- Implementing programs required by the legislature
- Low-Income programs

www.psc.state.md.us