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Assessing the Resource Adequacy and Community Impacts of an Evolving Grid: Considerations for State Regulators

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Assessing the Resource Adequacy and Community Impacts of an Evolving Grid: Considerations for State Regulators

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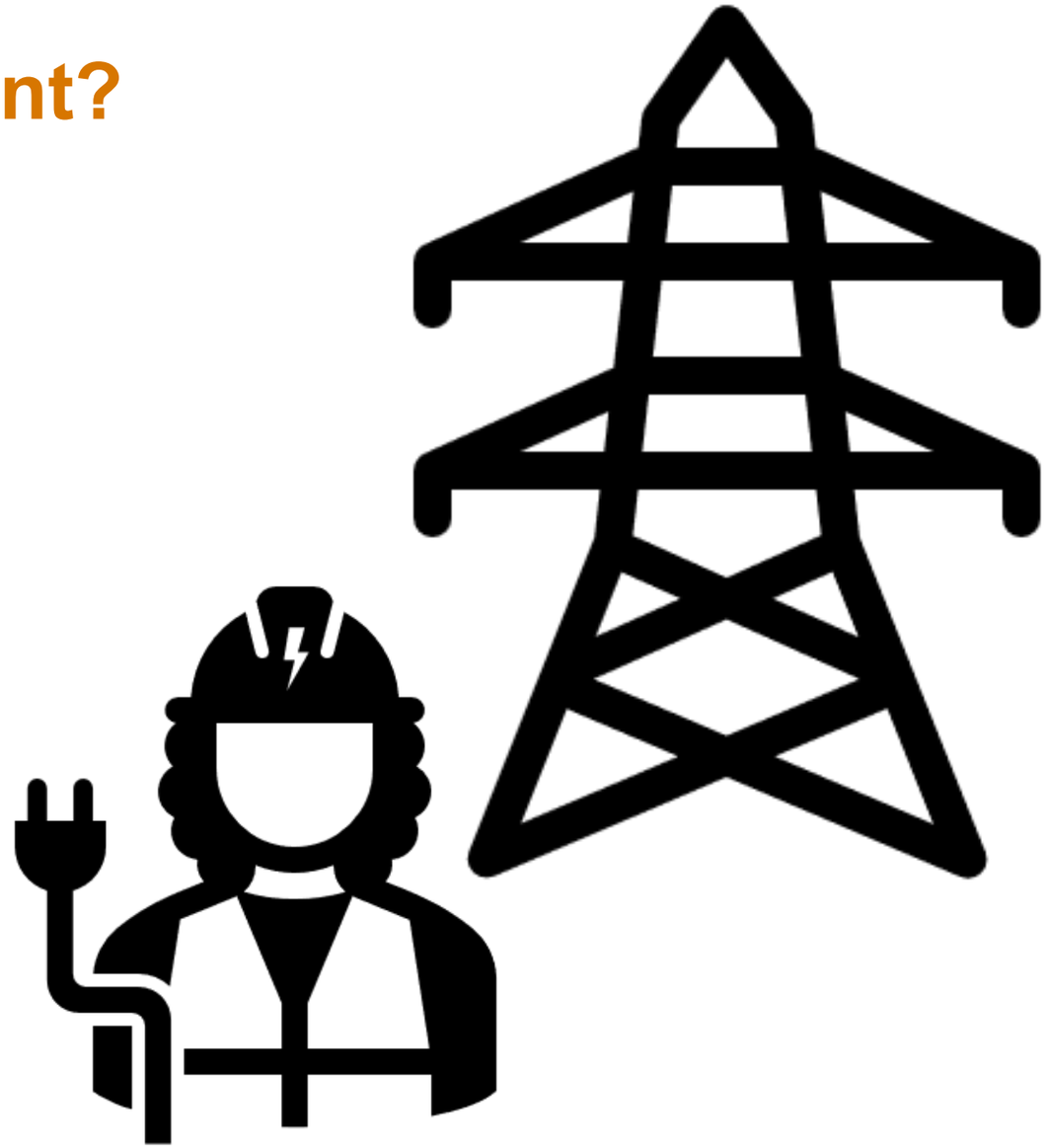
Why is this important?

Decarbonization efforts are increasing throughout the United States, therefore, it is important for state regulators (and other relevant stakeholders) to be prepared and understand the steps and processes of decommissioning traditional power systems.

In this presentation, we will discuss the considerations and challenges for state regulators in the context of a fossil fuel plant retirement.



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Overview

1) Resource Adequacy & Power System Models
2) Resource Adequacy in a Decarbonized Future
3) Challenges & Considerations
4) Applicability to PNW

The Colstrip Generating Station, a coal-fired power plant in Colstrip, Mont., is a major source of greenhouse gases. | Matt Brown/AP Photo

Link: https://www.eenews.net/articles/a-green-state-tosses-a-lifeline-to-a-major-coal-plant/

Background

Wind and solar power continue to fall in price, making more and more of the world's fossil fuel power plants uncompetitive. GETTY
Link:
https://www.forbes.com/sites/mikescott/2020/04/30/solar-and-wind-costs-continue-to-fall-as-power-becomes-cleaner/?sh=4d3fab50785f

- U.S. power systems continue to decarbonize
- State regulators must be able to assess the cost and reliability implications of proposed fossil retirements and the corresponding resources coming online to replace them
  - Proposed infrastructure investments are sufficient to ensure the long-term reliability of the system
  - Protecting rate-payers by ensuring investments are necessary
- Maintaining long-term resource adequacy at the lowest cost, while ensuring other social and environmental objectives are satisfied

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Definitions

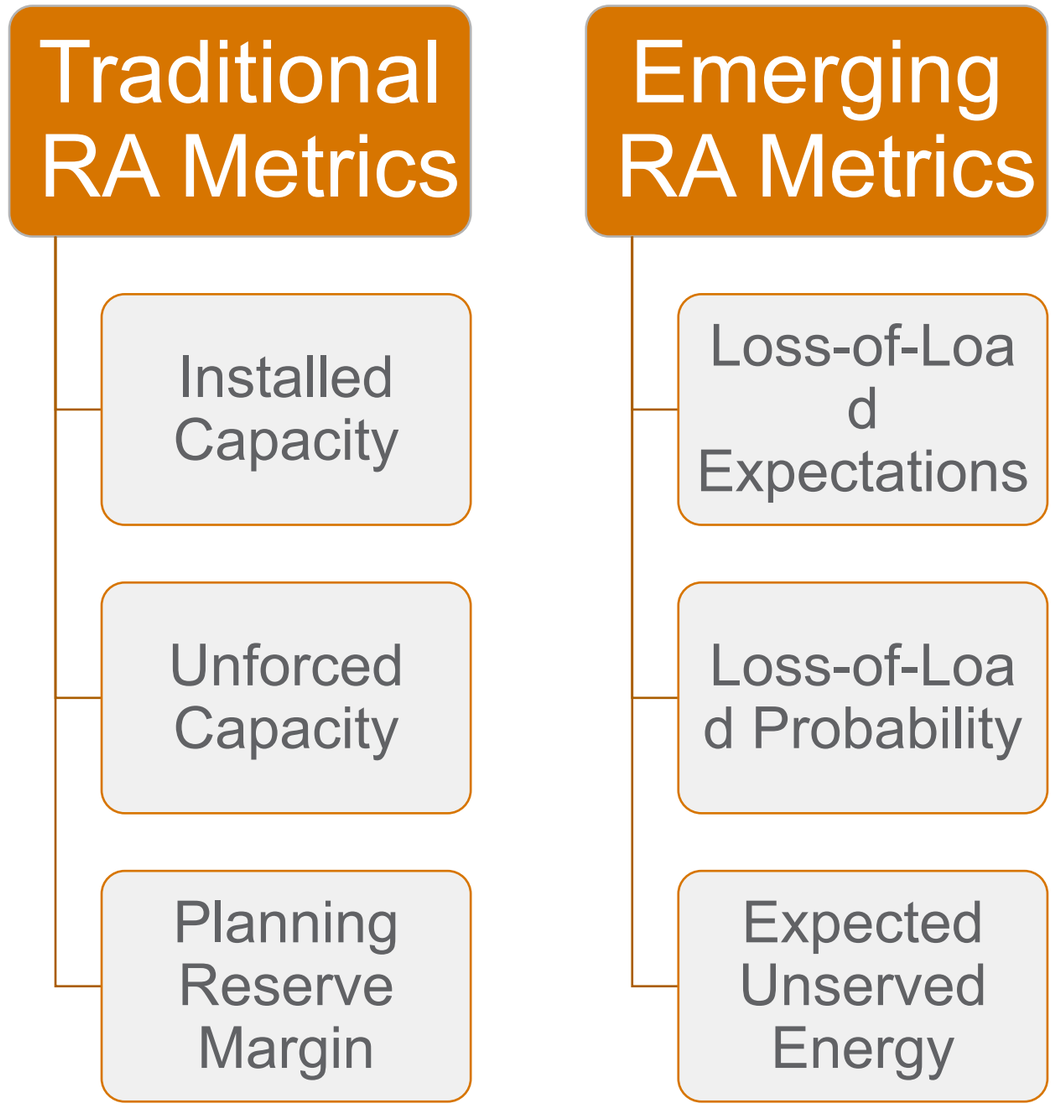
"Resource adequacy is one component of reliability that reflects the ability of a power system to always meet the demand of its consumers, while accounting for both scheduled and unscheduled outages of generation resources." [1]

"Resource adequacy ensures there is enough capacity and reserves for the grid operator to maintain a balanced supply and demand across the electric system." [2]

"One of the most important aspects of grid reliability is resource adequacy, or the ability of a power system to supply enough electricity—at the right locations—to keep the lights on during all hours of the year. This means system planners must ensure the mix of resources can meet demand during hot summer afternoons and cold winter nights." [3]

Issues and Solutions

- System planners utilize analytical tools to evaluate the cost-benefit trade-offs of different system investments and operations to assess resource adequacy
- Most tools and associated metrics were developed with traditional power systems in mind
- New metrics and modeling approaches have been developed and are being utilized to meet clean energy transition



Power System Models and Who Uses Them

Capacity Expansion Models

- Used to determine the portfolio of generation, storage, and transmission infrastructure that will satisfy user-defined resource adequacy targets

Production Cost Models

- Typically executed with greater temporal and geographic resolution and are used to provide higher-fidelity operational assessments of resource portfolios generated by CEMs

Power System Stability Models

- Used to understand the reliability implications of new demand or generation and transmission infrastructure in terms of how it will affect system frequency and voltage at certain locations under specified operating conditions

Modeling provides insight into how power systems may evolve over time under different future scenarios and conditions.

- Utilities
- System Planners
- Policy Makers
- Researchers
- Other Stakeholders

Resource Adequacy in a Decarbonized Future

Emerging resources

- Variability and uncertainty
- Inverter-based resources
- Demand-side resources
- System requirements

Resource adequacy metrics and modeling

- Resource adequacy metrics
- Assessing resource adequacy

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Challenges and Considerations Beyond Resource Adequacy

- Community impacts
- Equity and just transitions
- Stranded costs, plant level financing issues
- Regulatory process and filings

Slow Down Warning Sign stock photo
Link:
https://www.istockphoto.com/photo/slow-down-warning-sign-gm185118776-19438675

Community Impacts

- Baseload plant retirement generally includes a shutdown, decommissioning, remediation, and redevelopment with stakeholder involvement throughout [4]
  - Community impact considerations and stakeholder involvement are critical
- Positives include:
  - Benefits to environmental and human health [5]
- Negatives include:
  - Community-wide layoffs [6]
  - Loss in tax revenue [6]
- Can be alleviated through siting replacement resources → community can benefit from jobs provided + other economic and environmental benefits
- No “one-size-fits-all” → important for regulators to understand +/- of plant retirements because equitable retirements are community-based [7]

Equity and Just Transitions

- A “just transition” describes the shift from non-renewable energy production and consumption to renewable energy; it promotes equity and fairness, and aims to provide economic and environmental benefits for affected communities [8]
- Environmental justice/injustice, energy justice, and equity are factors that can be considered when weighing options associated with baseload plant retirements

1. Immediate financial relief for coal workers and communities
2. Reclamation of coal sites to facilitate economic recovery
3. Reinvestment in coal communities to diversify the local economy and establish long-term growth

[9]

Stranded Costs, Plant Level Financing Issues

- In the event of an early plant retirement, the facility is being decommissioned before the end of the expected operational lifespan of the plant and before costs are recovered through utility rates
- Accelerated depreciation
  - Decreases the amount of taxable income while the plant is still within its expected operational lifespan and tax liabilities are deferred
- Securitization
  - A form of ratepayer-backed bond that is used to address the costs incurred from early retirements

Regulatory Process and Fillings

- Baseload plant retirements and selection of replacement resources, if necessary, often happen in the context of utility integrated resource plans (IPRs)
- To fully understand the decommissioning process for a specific state/region, it is important to know the current corresponding rulings that address the creation of IPRs
- IRPs can include future load forecasts, resource procurement options, and power costs/resource management information

Federal Legislation to Help Small Businesses
Link:
https://bigideasforsmallbusiness.com/federal-legislation-to-help-small-businesses/

Applicability to Pacific Northwest

- The COAL Act (HB 4083 2024)
  - Oregon State Legislature
  - State treasurer to divest from thermal coal
  - Will continue to invest if coal company transitions to clean energy
- Centralia Power Plant
  - Lewis County, Washington
  - Owned by TransAlta Corporation
  - Decommissioning coal mine and replacing with renewables
- Idaho Power
  - Committed to 100% clean energy
  - 2025 forecast: 14% coal

Concluding Remarks

- RA refers to the ability of a power system to meet consumer needs
- As fossil retirements increase, state regulators must be able to assess the cost and reliability implications of the corresponding resources coming online to replace them
- This can be done through power system modeling, new RA metrics are being utilized to reflect emerging resources (traditional RA metrics are based on traditional power systems)
- Beyond RA, state regulators can consider community impacts, equity and just transitions, stranded costs and plant level financing issues, and regulatory processes and filings to help facilitate a seamless decommissioning

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Thank you

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[1] A. Schleifer, A. King, J. Homer, T. Levin, “Assessing the Resource Adequacy and Community Impacts of an Evolving Grid: Considerations for State Regulators,” Argonne National Laboratory, 2023. https://publications.anl.gov/anlpubs/2023/07/183578.pdf

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[7] B. W. Tarekegne, K. Kazimierczuk, and R. S. O’Neil, Coal-dependent Communities in Transition: Identifying Best Practices to Ensure Equitable Outcomes, Pacific Northwest National Laboratory, Richland, WA, Technical Report PNNL-31909, Sep. 2021. https://doi.org/10.2172/1821478

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Abstract – PNREC 2024

As decarbonization efforts continue, state regulators must be able to broadly assess the cost and reliability implications associated with fossil retirements and the corresponding replacement resources. State regulators are responsible for determining whether proposed infrastructure investments can maintain long-term system reliability while also being fair to rate payers. This paper discusses the metrics and models that go into maintaining long-term resource adequacy at the lowest cost, while also ensuring that other social and environmental objectives are satisfied. Lastly, we demonstrate additional considerations related to assessing the implications of fossil retirements with a case study review of the current situation in New Mexico. These considerations include community impacts, equity and just transitions, economic impacts, securitization, and regulatory processes and filings. Since there is no “one-size-fits-all” decommissioning/development plan, it is important for regulators to understand the potential positives and negatives of a plant retirement as equitable retirements are community-based (1).

References

1. B. W. Tarekegne, K. Kazimierczuk, and R. S. O’Neil, Coal-dependent Communities in Transition: Identifying Best Practices to Ensure Equitable Outcomes, Pacific Northwest National Laboratory, Richland, WA, Technical Report PNNL-31909, Sep. 2021. https://doi.org/10.2172/1821478