Large Industrial Loads

Katie Rogers
Manager, Reliability Assessments, WECC

Enoch Davies
Manager, Reliability Modeling, WECC

Electric Reliability
& Security for the West

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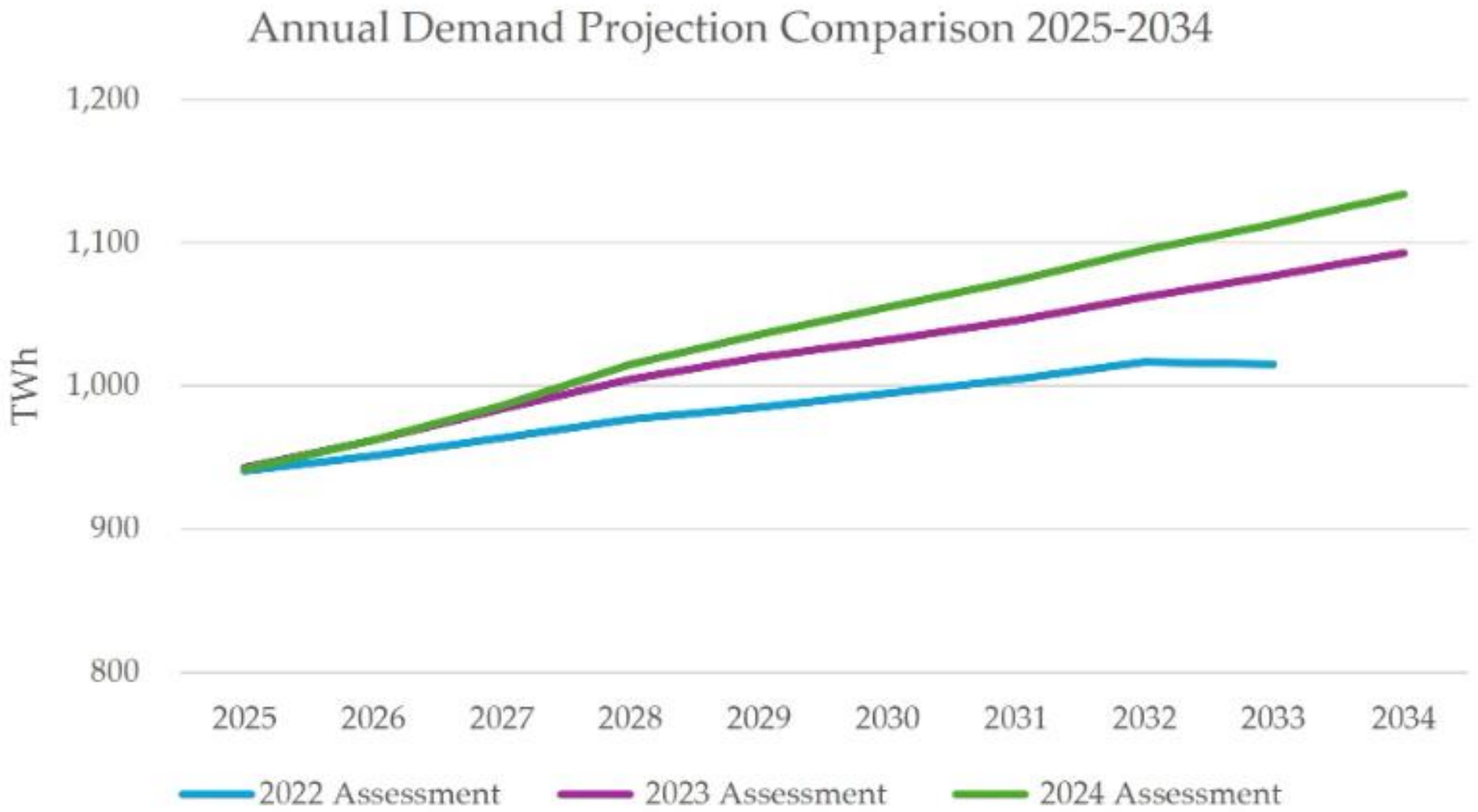
Load Forecast Growth



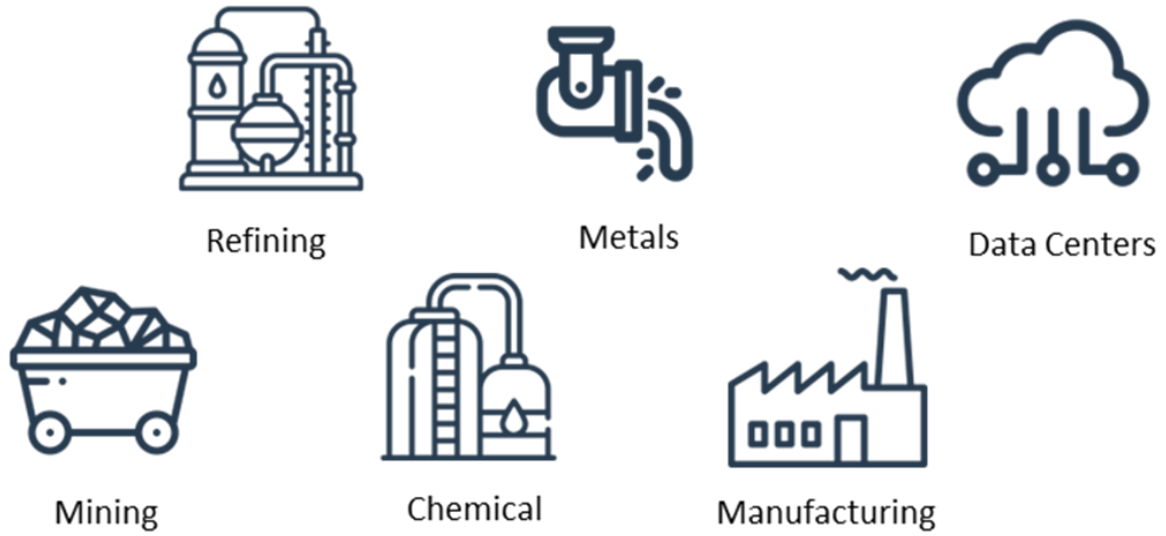
Western Electricity Coordinating Counsel. (2024). *Western Assessment of Resource Adequacy. https://feature.wecc.org/wara/*

What are Large Loads?

What are Large Loads?

Medium Commercial Loads (10s of kWs to 10s of MWs)

Large Industrial Loads (10s to 100s of MWs)



Quint, Ryan; Zhao, Jiecheng, & Thomas, Kyle (2025). *An Assessment of Large Load Interconnection Risks in the Western Interconnection*. https://www.wecc.org/sites/default/files/documents/products/2025/Report_WECC%20Large%20Loads%20Risk%20Assessment%204.pdf

What Has Changed?

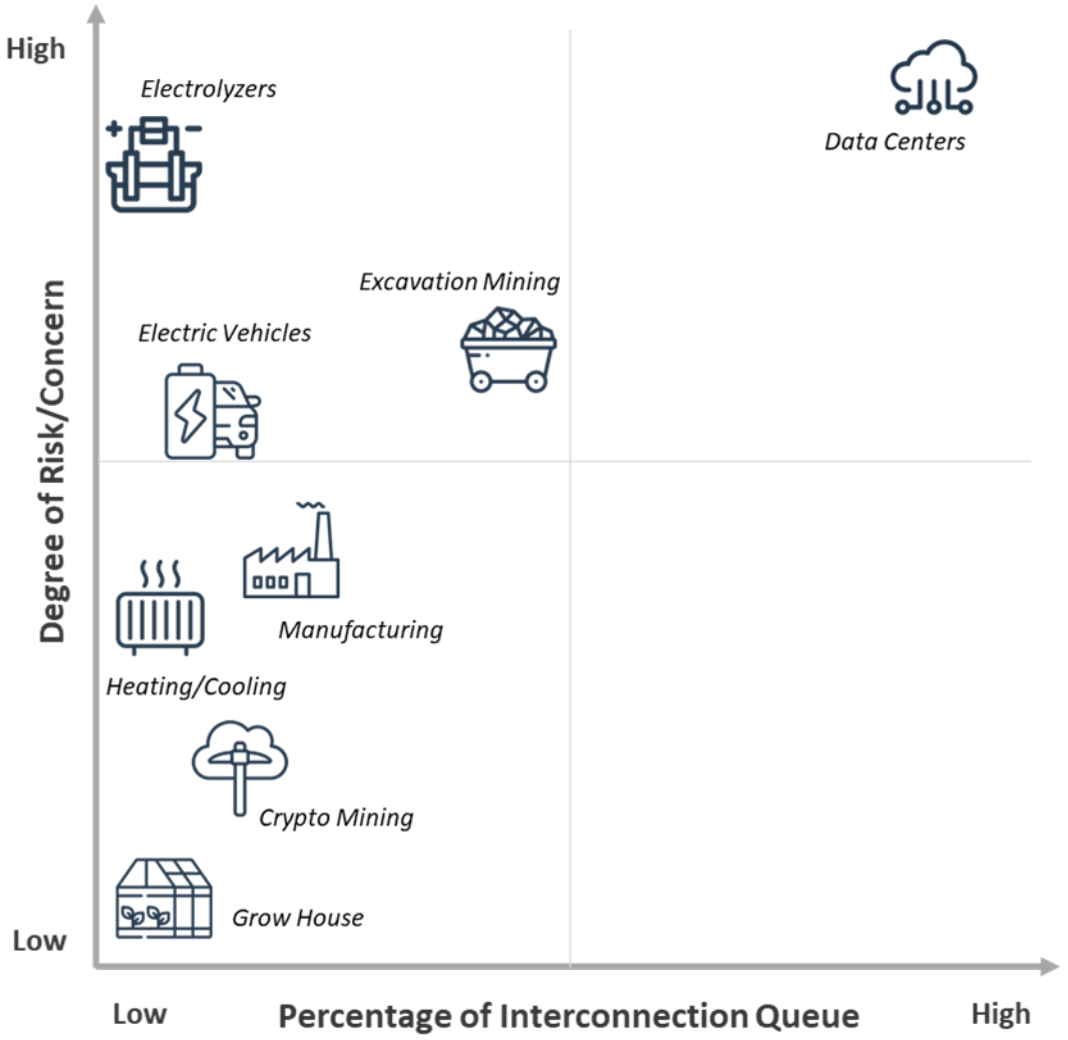
	Past	Current
Facility Size	1 MW to 400 MW	Some surpass 1,000 MW
Load Patterns	Regular, predictable	May not be predictable
Advanced Notice	Sufficient time to plan, design, and construct	Minimal, could be ~18 months

WECC Stakeholder Advisory Group

Stakeholder Advisory Group

- Early 2024—end of year
- Transmission providers across the Western Interconnection
- To foster sharing information regarding
    - large load forecasts
    - interconnection queue practices
    - areas of BPS concerns and risks where increased
- Self-administered questionnaire with two questions:
    - The estimated large load interconnection queue size and breakdown by large load category.
    - The relative rank priority of each large load category in terms of growth, system impact, and effects on business operations.
- 10 survey respondents

Interconnection Queue Degree of Concern



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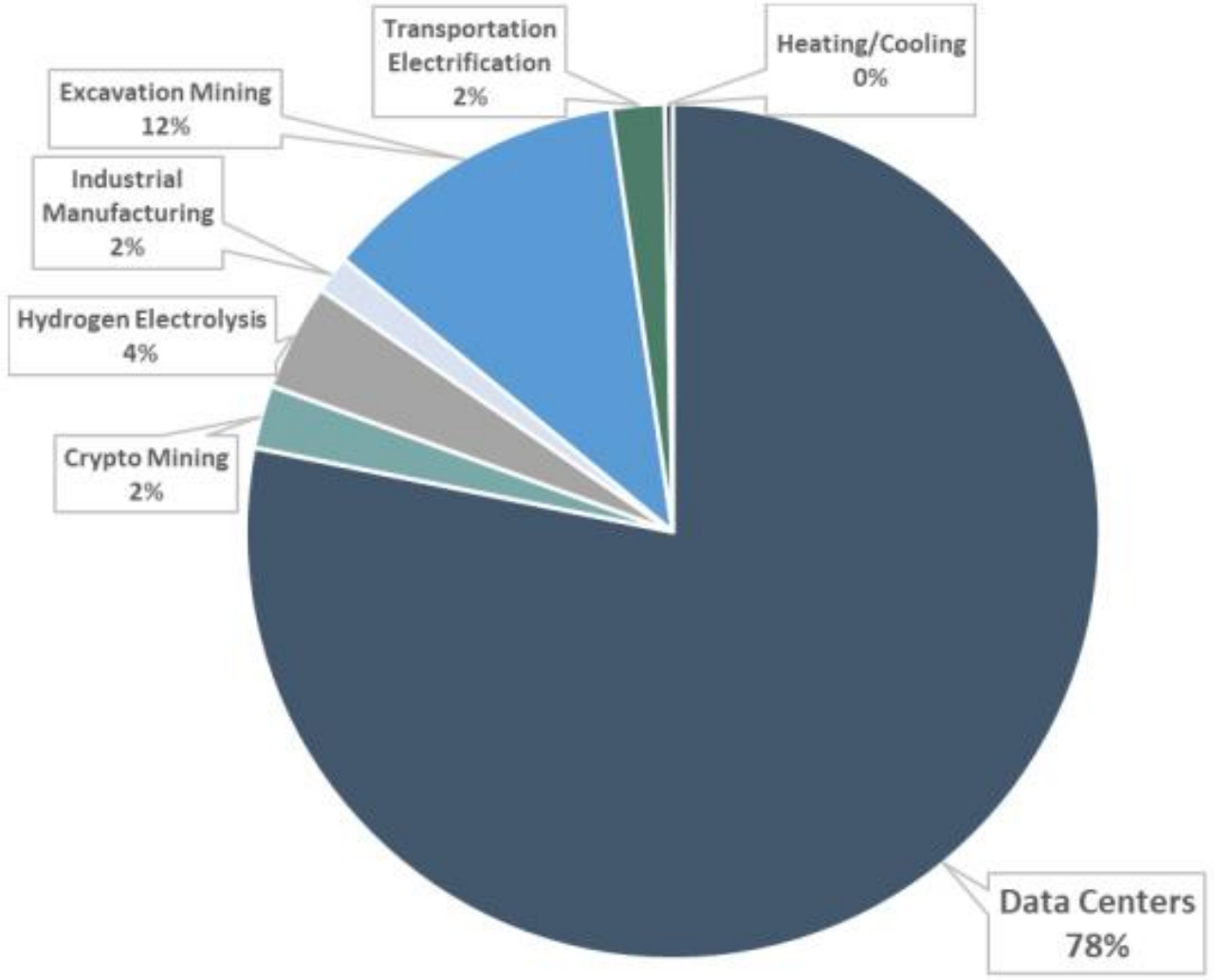
Interconnection Queue Composition



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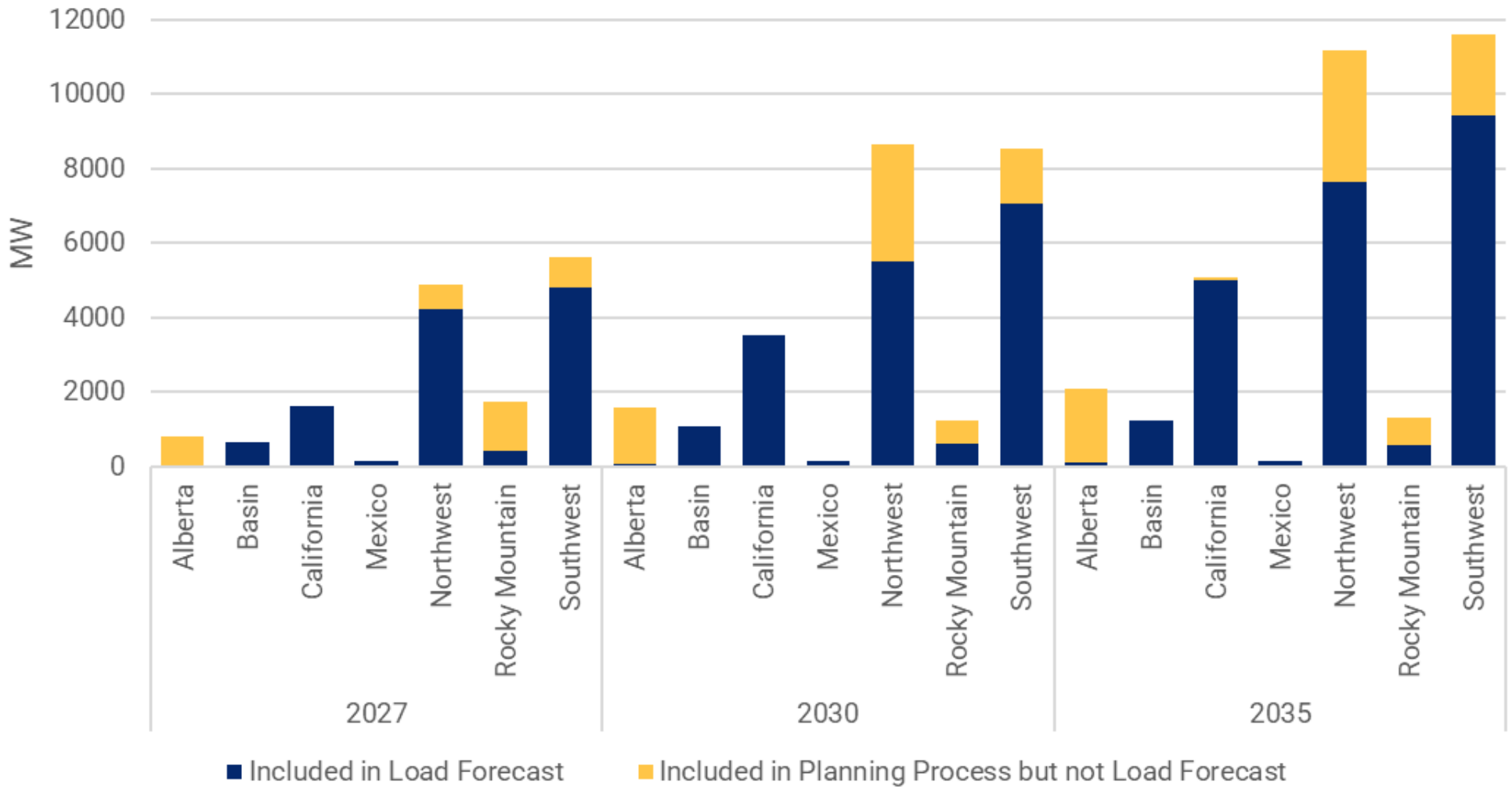
Risks

Demand Forecast Challenges

- Load interconnection queues overloaded—won't all come to fruition
- Lack of operational information and/or data
- May not include electrification efforts (or other aggregate impacts)
- Some may shift load profiles
- Behind-the-meter not always known or accounted for
- Demand response participation

2025 Large Load Additions

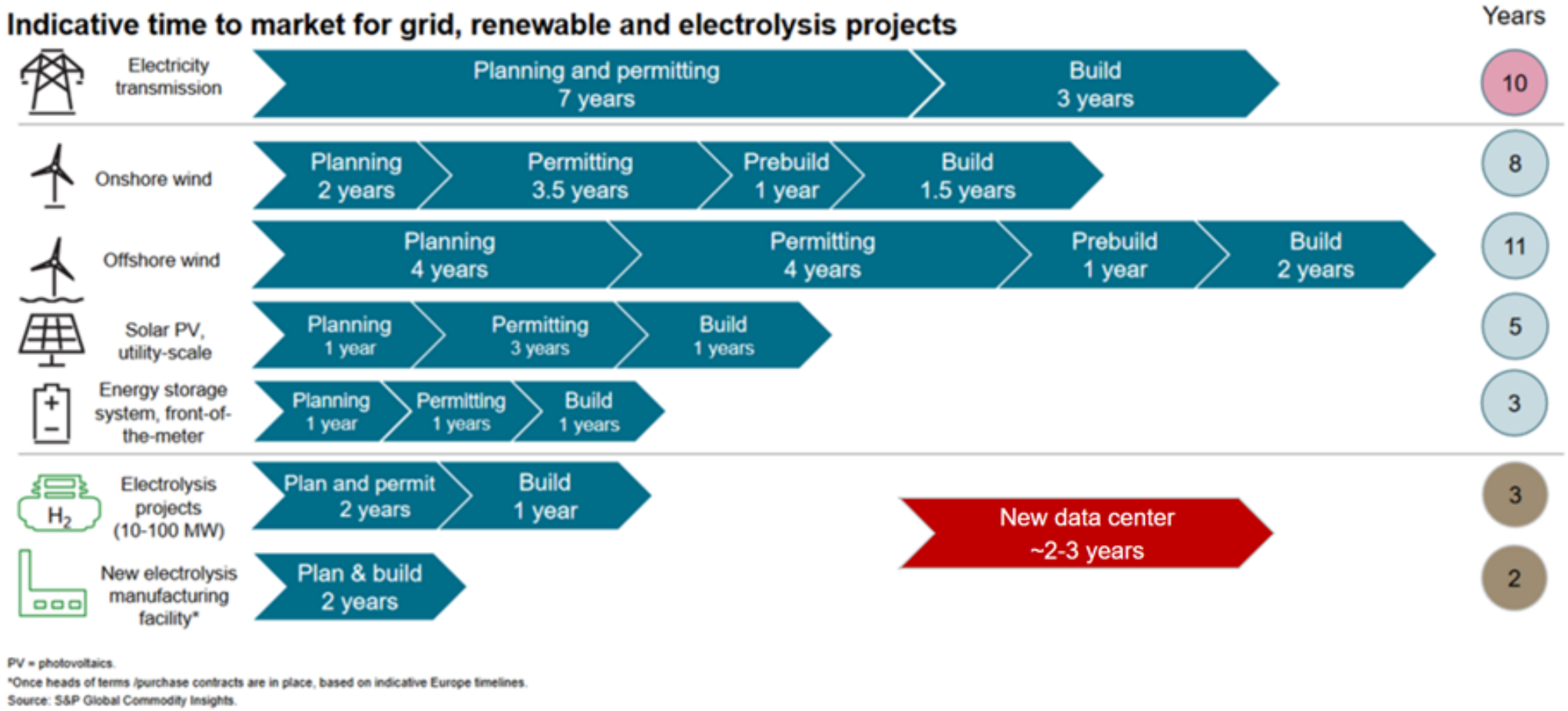


Western Electricity Coordinating Counsel. (2025). *Loads and Resources Data Collection*

Accurate Model Challenges

- Lack of data on large load behavior, composition, and performance
- Simplified static load models don’t capture the characteristics of large load performances
- May underestimate impacts during ride-through events
- Lack of phasor domain transient (PDT) and electromagnetic transient (EMT) models

Misaligned Timelines



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System Planning Challenges

- May exacerbate existing resource adequacy risks
- Distribution system may not be able to keep up with multi-sector electrification
- High uptime limits time available for maintenance

Challenges to Variability and Flexibility

- Increased need for reserves
- Limits available energy
- Unpredictable behavior and operational characteristics
- Current ramping abilities may not be sufficient for large power fluctuations
- Fast ramps and spikes could cause oscillations, flicker, frequency deviations, oscillations, and other risks

Ongoing Efforts

NERC Large Loads Task Force

- Two white papers
  1. Characteristics and Risks of Emerging Large Loads
     - Unique characteristics and risks associated with emerging large loads
     - Published July 2025
     - https://www.nerc.com/comm/RSTC_Reliability_Guidelines/Whitepaper%20Characteristics%20and%20Risks%20of%20Emerging%20Large%20Loads.pdf
  2. Assessment of gaps in existing practices, requirements, and Reliability Standards for Emerging Large Loads
     - Assessing whether existing engineering practices, requirements, and Reliability Standards can adequately capture and mitigate reliability impact(s) of large loads interconnected to the BPS
     - Anticipated Q4 2025
  3. Reliability Guidelines
     - Identify risk mitigation including improvements to existing planning, and operation processes and interconnection requirements for large loads
     - Anticipated Q2 2026

ESIG Large Loads Task Force

- Eight project teams
  - Data collection
  - Load forecasting
  - Interconnection process and performance requirements
  - Modeling requirements
  - Transmission planning
  - Wholesale market operations
  - Resource adequacy

NERC Level 2 Alert

- The purpose of this alert is to address the risks observed from the analyzed large load behavior and to assess the status of industry preparedness related to large loads
- Released: Sep 9, 2025
- Acknowledgement of receipt: Sep 16, 2025
- Response Submissions: Jan 28, 2026
- Large Load Interconnection, Study, Commissioning, and Operations

WECC

WWW.WECC.ORG | (801) 582-0353

155 N 400 W, Salt Lake City, UT 84103, USA