Large Loads in the West

Prepared for the Western Interstate Energy Board

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- Western Interconnection
- Who Cares? (Everyone)
- Definition
- Additions by Region
- Additions by Type
- Why Head West?
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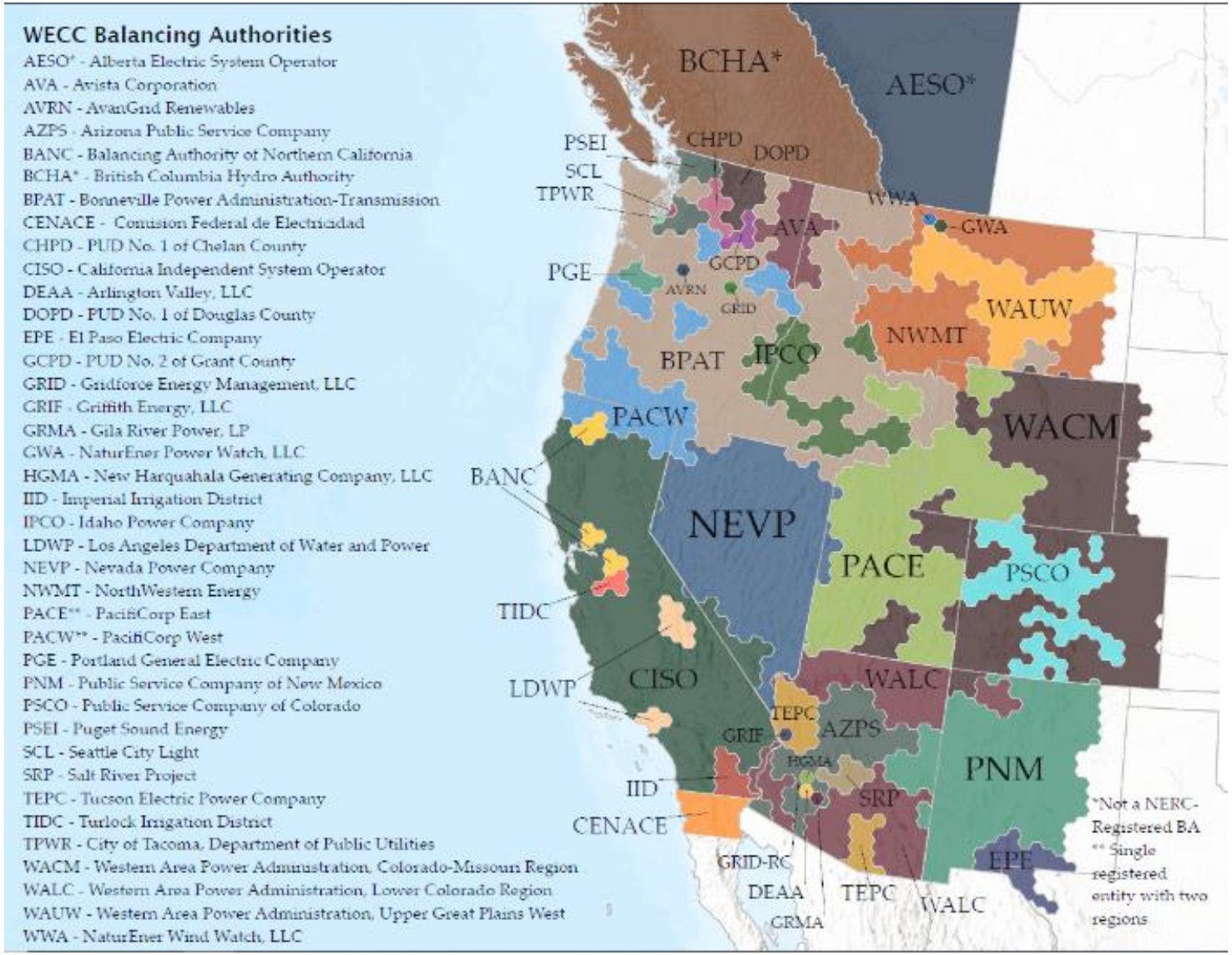
- Additional Information

Western Interconnection at a Glance



158,332 TOTAL

Miles of transmission lines

90+ MILLION

People living in the Western Interconnection

168.2 GW

Interconnection peak demand

448

Registered Entities

329

Generation Owners

52

Transmission Operators

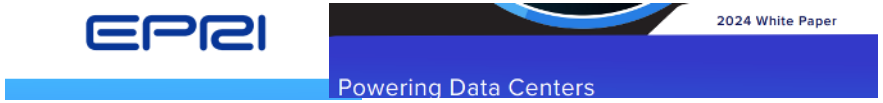
37

Balancing Authorities

4

Reliability Coordinators

Large Loads: Who Cares? (Everyone)



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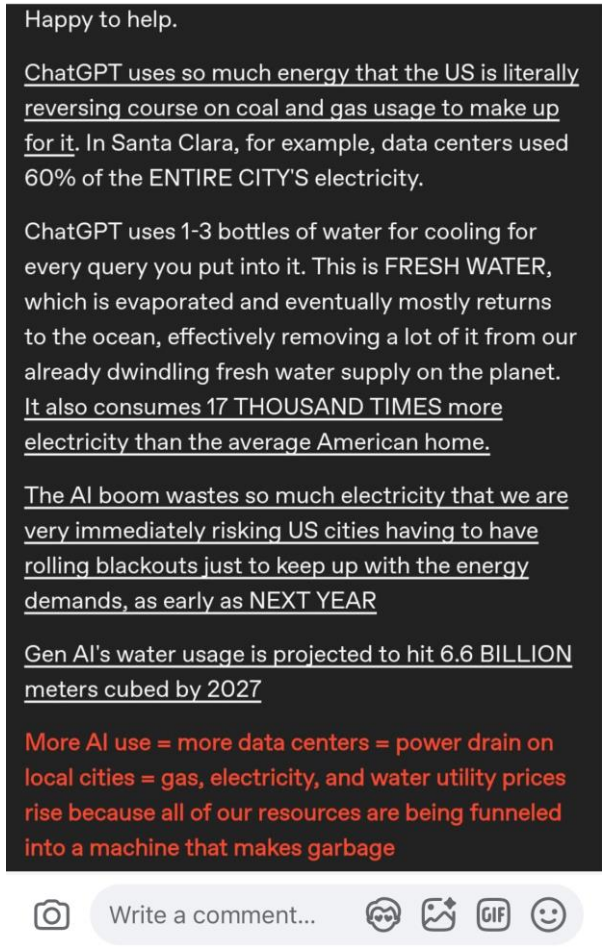
ELEVATE ENERGY CONSULTING

An Assessment of Large Load Interconnection Risks in the Western Interconnection

Technical Report



White House Launches AI Data Center Task Force with Industry Experts

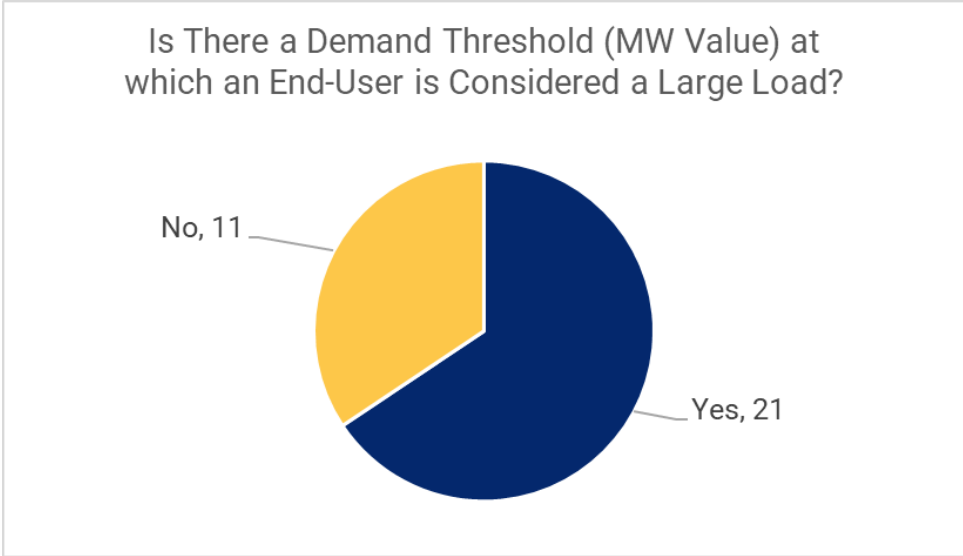
OpenAI and Nvidia executives discussed AI's soaring infrastructure needs with Biden officials last week.

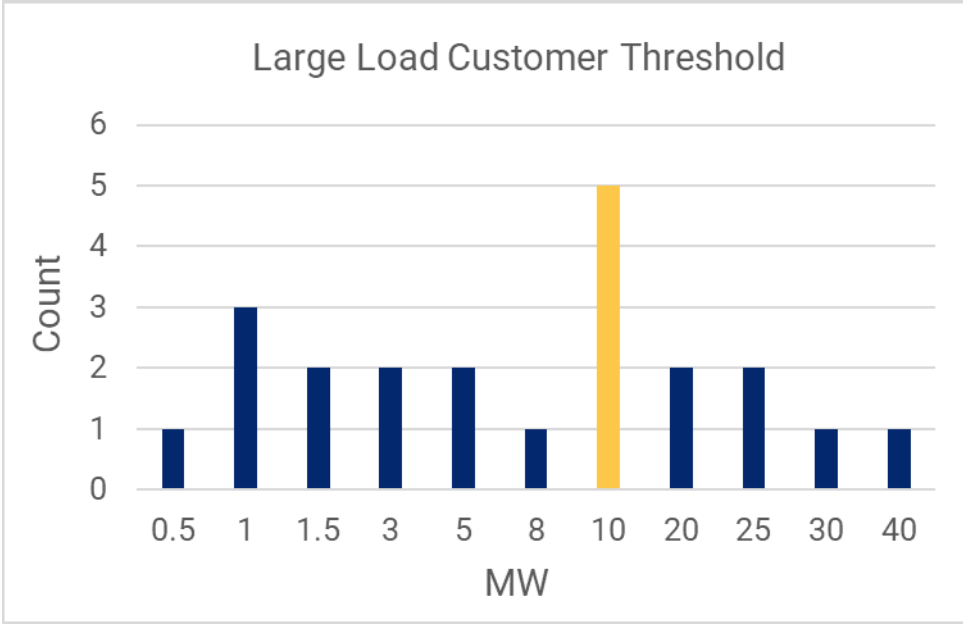
Bloomberg News
September 16, 2024
3 Min Read

DATA CENTER COALITION

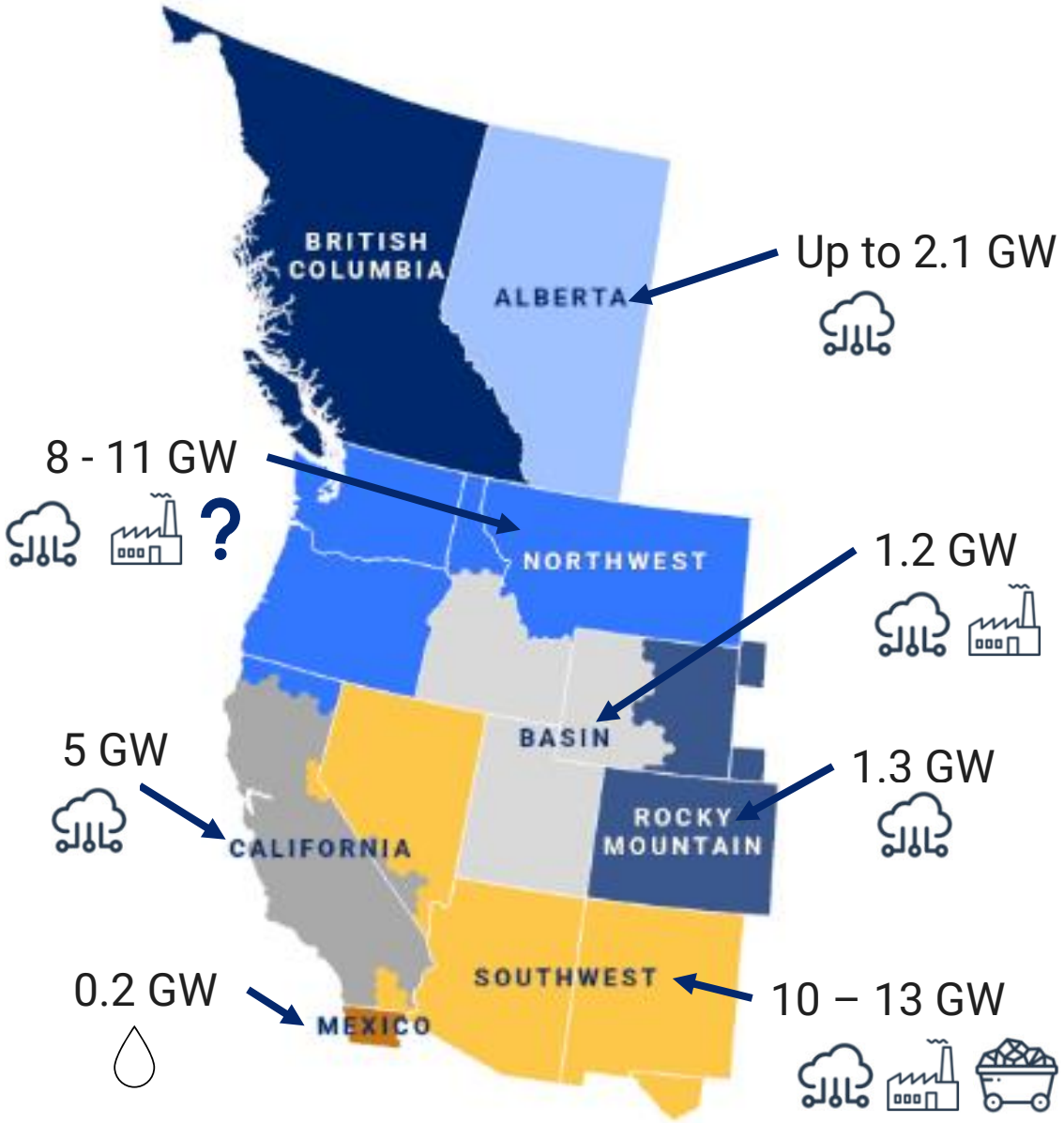
Definition(s) of Large Load

- **Definitions of "large loads" vary:**
  - Size thresholds: 0.5 MW–40 MW
  - 66% of respondents have a threshold of demand that categorizes a customer as a "large load"
- **Reasons for classification:**
  - Need for interconnection study
  - Substation at the transmission level
  - Exceeds a capacity of a given circuit
  - Specified by tariff
- **NERC task force "large load" definition:**
  - *"Any commercial or industrial individual load facility or aggregation of load facilities at a single site behind one or more point(s) of interconnection that can pose reliability risks to the BPS due to its demand, operational characteristics, or other factors."*





Large Load Additions by Region

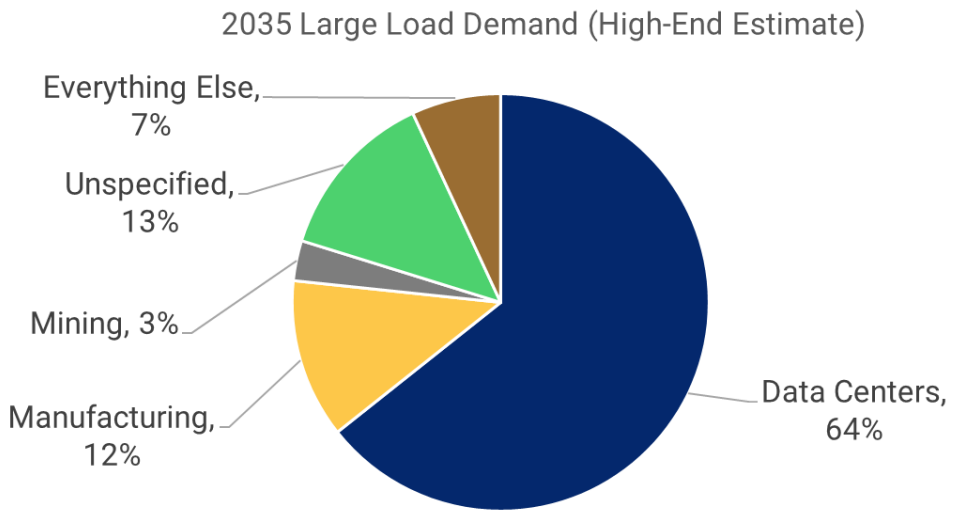


2022–2035 Western Interconnection Large Load Growth

- 2022 = 7 GW
- 2024 = 8 GW
- 2027 = 12 to 16 GW
- 2030 = 18 to 27 GW
- 2035 = 24 to 34 GW
- Interconnection Queue (2024) = 45 GW

Data Centers
Manufacturing
Municipal
Mining
? Unspecified

Large Load Additions by Type

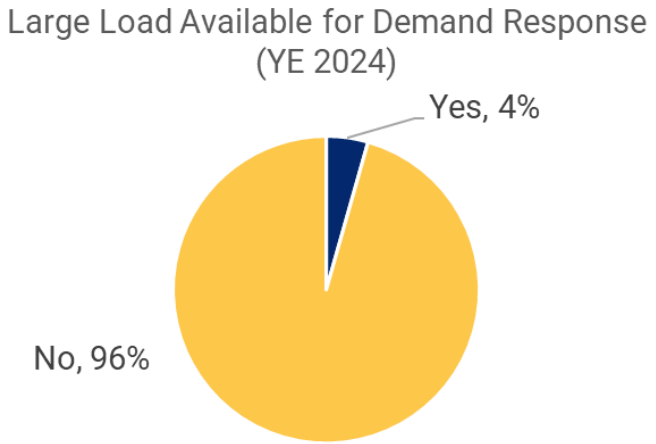


Large Load Demand by Type (GW)	
Data Centers	22.1
Manufacturing	4.2
Mining	1.1
Unspecified	4.6
Everything Else	2.4
Total	34.4

Everything Else: Agriculture, Cryptomining, Hydrogen Electrolysis, Irrigation, Municipal, Natural Gas Processing, and Oil Extraction.

Large Load Diversity (YE 2035)

- Data centers and manufacturing account for 76% of large load customer demand
- Minimal crypto demand (≈ 0.3 GW)
- <400 MW stated as available for demand response (YE 2024)

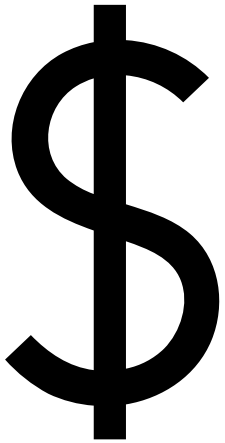


Large Loads and the Western Frontier

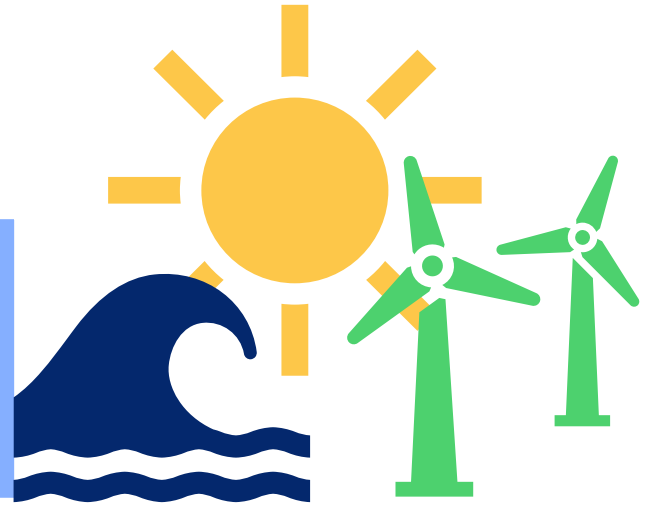
Abundant and affordable land

Low risk of natural disasters

Tax incentives and competitive power prices

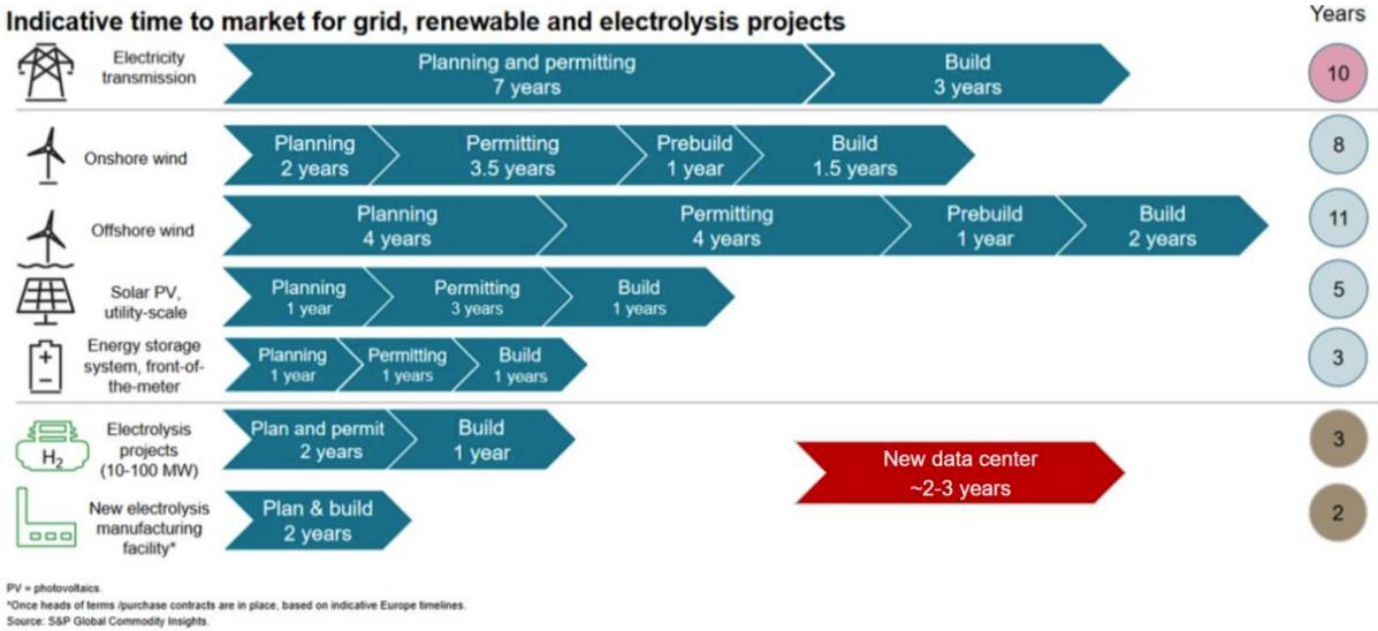


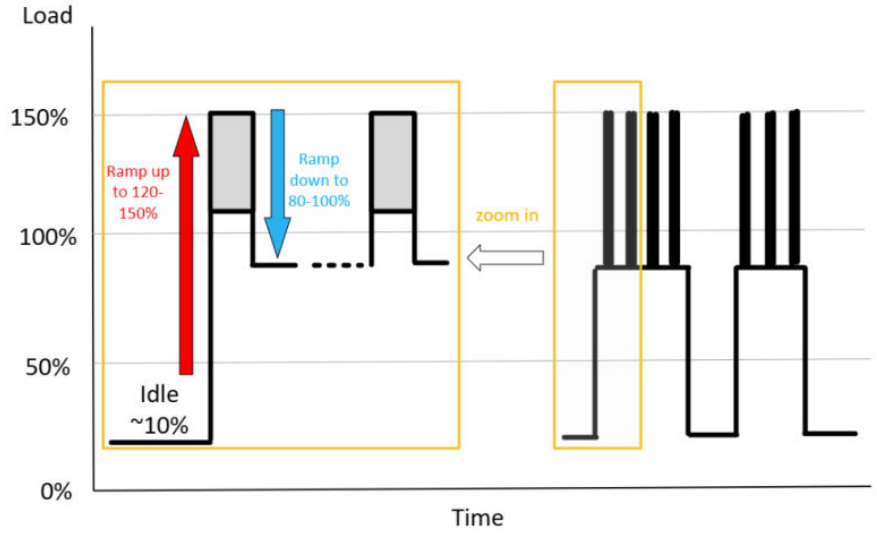
Large investment in renewables



Large Load Concern

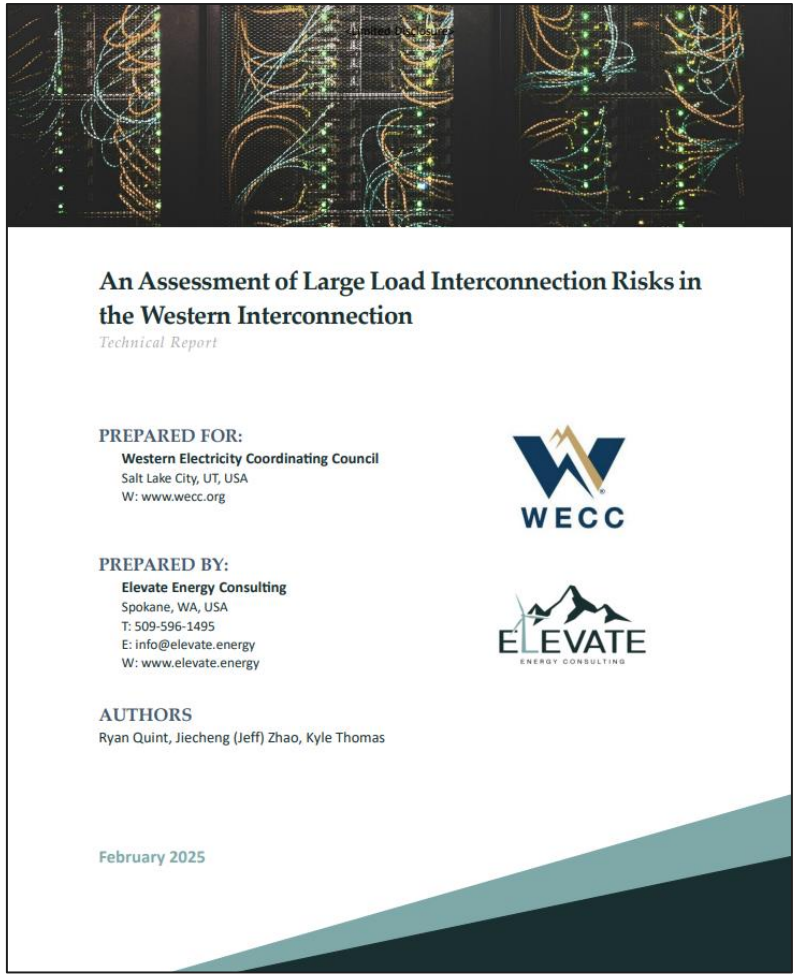
- **Customer Materialization**: Resource adequacy concern if demand is under forecast, or economic risk if demand is over forecast
- **Lack of Data Transparency**: Ramping, price sensitivity, variability, uptime, frequency and voltage protection settings, uninterruptable power supply (UPS) configuration, dynamic controls, harmonics
- **Rapid Changes in Demand (AI)**: Inter-area oscillations, flicker, large deviations in frequency and intertie flow, large swings in voltage, and reducing lifespan of BPS equipment
- **Ride-through Performance**: Instability, uncontrolled separation, and cascading





Additional Information

WECC Large Loads Risk Assessment



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