Perkins Coie

DATA CENTER WEEK 2025

Powering the Cloud: Energy Procurement Strategies for Data Centers

Energy Procurement Strategies for Data Centers

Agenda

1. ***Why is this a hot topic?***
   Key drivers of data center power procurement

2. ***What makes power procurement so challenging?***
   Industry faces headwinds as its power appetite grows

3. ***How are parties transacting in this dynamic environment?***
   6 structures to consider

Presenters

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Key Drivers of Data Center Power Procurement

Data centers run numerous servers, storage systems and networking equipment, all of which need constant, reliable electric supply

Cooling systems are essential to maintain optimal temperatures for hardware that generates a lot of waste heat

Growth in digital content and cloud services, crypto mining, and AI (training and queries) contributes to ever growing demand

"Hyperscale" data centers need 1+ gigawatts of power (equivalent to a small city)

Data centers may account for up to 44% of U.S. electricity load growth through 2028

Key Drivers of Data Center Power Procurement

Microsoft

Carbon negative, water positive, zero waste, and protect more land than Microsoft uses by 2030

Google

Net-zero emissions across all operations and value chain, including running on 24/7 carbon-free energy on every grid where Google operates by 2030

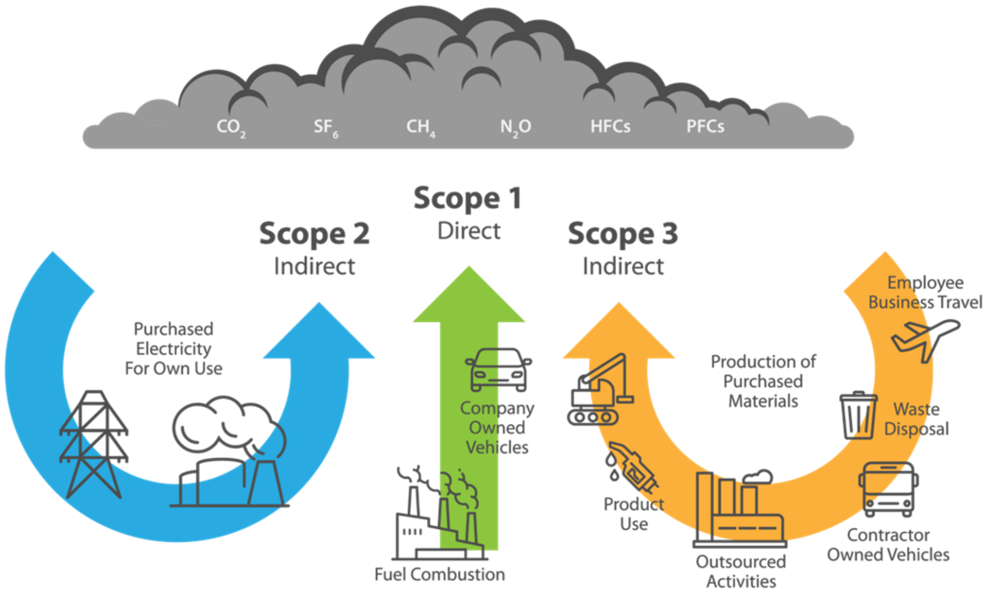
Equinix

Net-zero GHG emissions across the value chain by 2040, including 100% clean and renewable energy across global portfolio by 2030

Schneider Electric

Net-Zero across entire value chain by 2050, including 90% electricity sourced from renewables by 2025

Many data center operators have sustainability goals focused in part on reducing their carbon footprint



Source: apexcos.com/blog/nothing-ventured-nothing-gained-value-in-the-pursuit-of-a-scope-3-inventory/

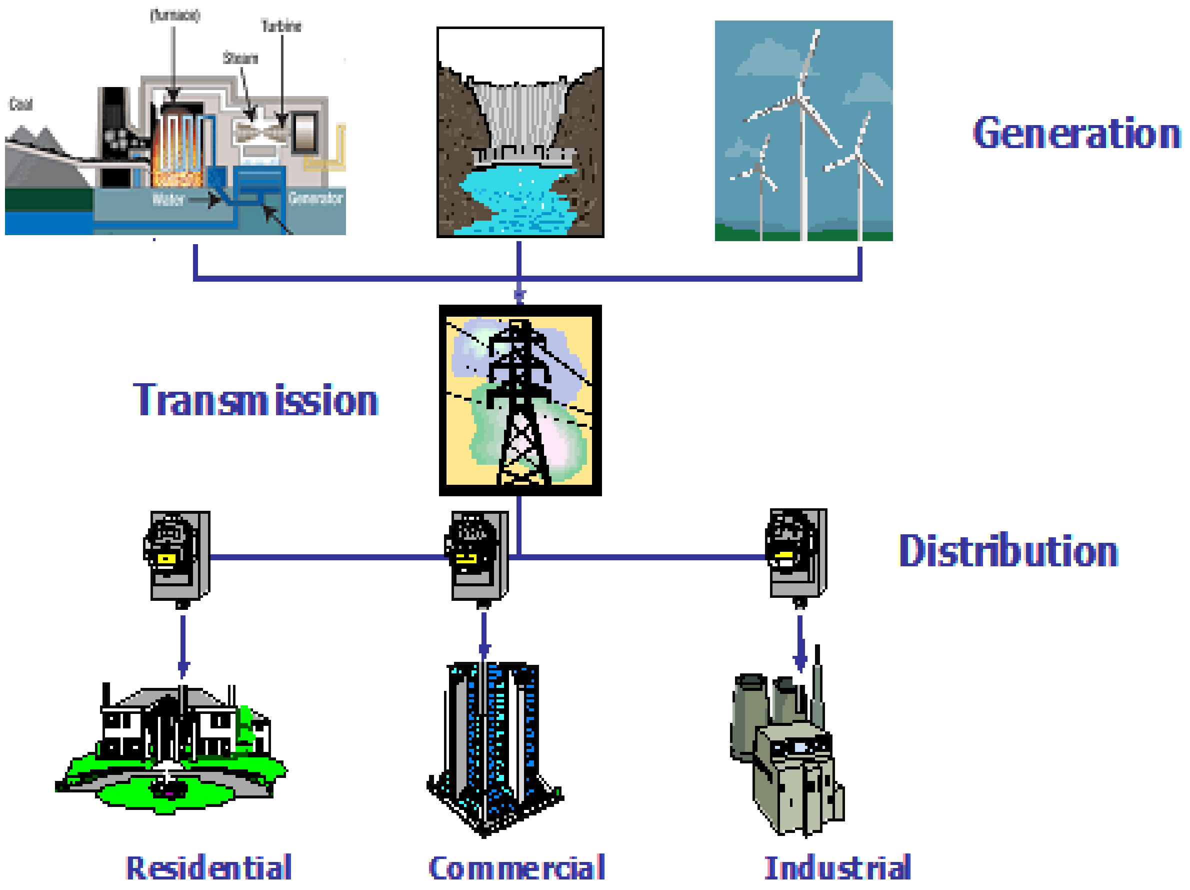
Challenges to Power Procurement For Data Centers

- Time-to-power drivers:
  - Demand for load interconnection
  - Grid constraints
  - Lead times for key equipment

- Tariffs and supply chain issues are complicating things further
  - Tariffs add uncertainty
  - Supply chain is strained for major equipment (transformers, substation equipment, gas turbines…)

Challenges to Power Procurement For Data Centers

Complex regulatory environment with federal and state interrelated jurisdiction



- Federal regulation of wholesale sales
- State regulation of retail sales to end users

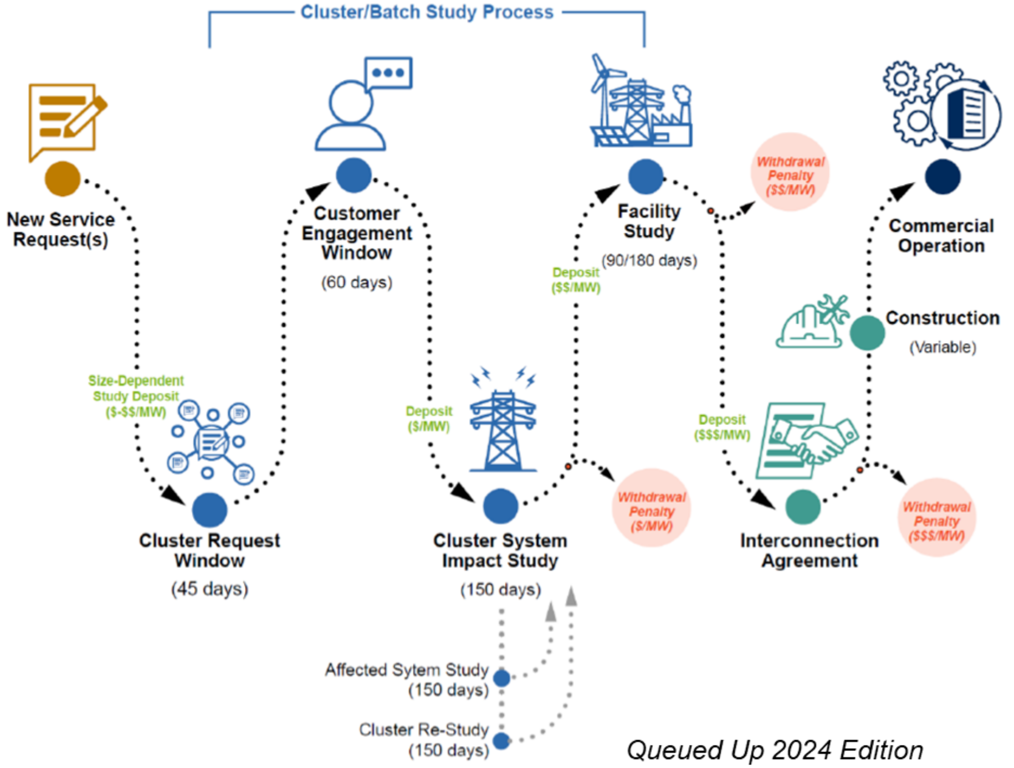
- Interstate transmission regulated by FERC

- Distribution regulated by the states

Challenges to Power Procurement For Data Centers

Generator interconnection queue exacerbates time to power delay

- Connecting a resource to the grid requires a long and complex study process
  - Median duration from request to commercial operation approaches 5 years
- Surge in interconnection requests over the last decade
  - Over 900 GW of *new* requests in 2023 alone
- Cumulative active capacity in the queues across the US is about 2.6 terawatts (TW)
- 95% of active capacity is solar, wind, and storage
  - 3% is gas-fired



Queued Up 2024 Edition
Lawrence Berkeley National Lab

6 Procurement Transaction Structures to Consider

Tolling Agreements

Monthly capacity payments in exchange for control

- Common for dispatchable generating facilities (e.g. gas-fired) and battery storage.
- Parties may agree that buyer procures the fuel or charging energy, or seller may do so at buyer's direction.
- Fixed monthly payment for use of the facility within agreed operating parameters. Typically requires the buyer to have significant working knowledge of fuel supply markets and energy market operations. Monthly payments are often subject to a formula that reduces payments for poor project availability.
- For gas-fired or other facilities with significant variable operating expenses, a separate variable energy payment is often included based on buyer's usage of the project.

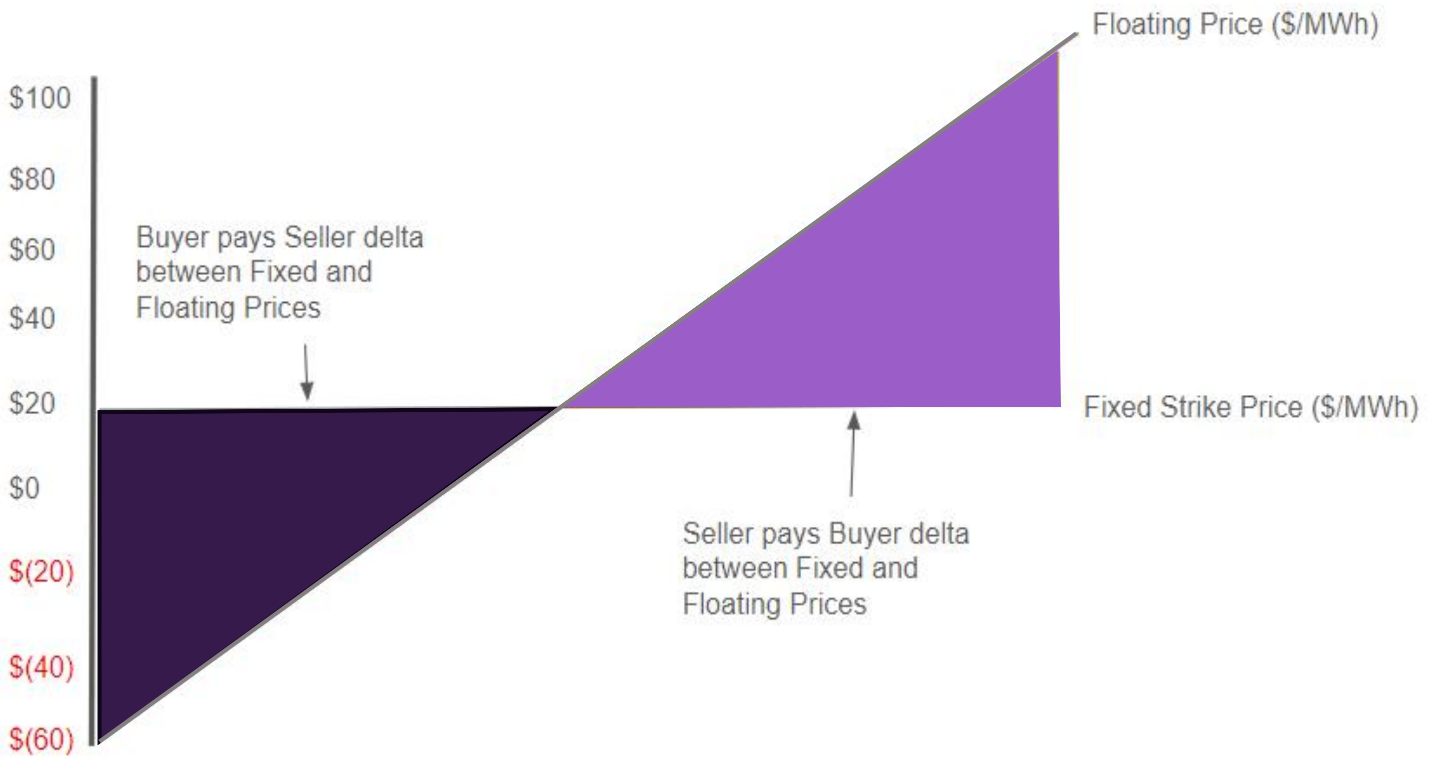
Virtual Power Purchase Agreements (vPPAs)

vPPAs are financial contracts that also transfer title to RECs

No physical delivery of energy or capacity. Guarantees fixed price for renewable energy credits from the project.

Seller handles all power market operations, absorbs risks unless passed through in vPPA.

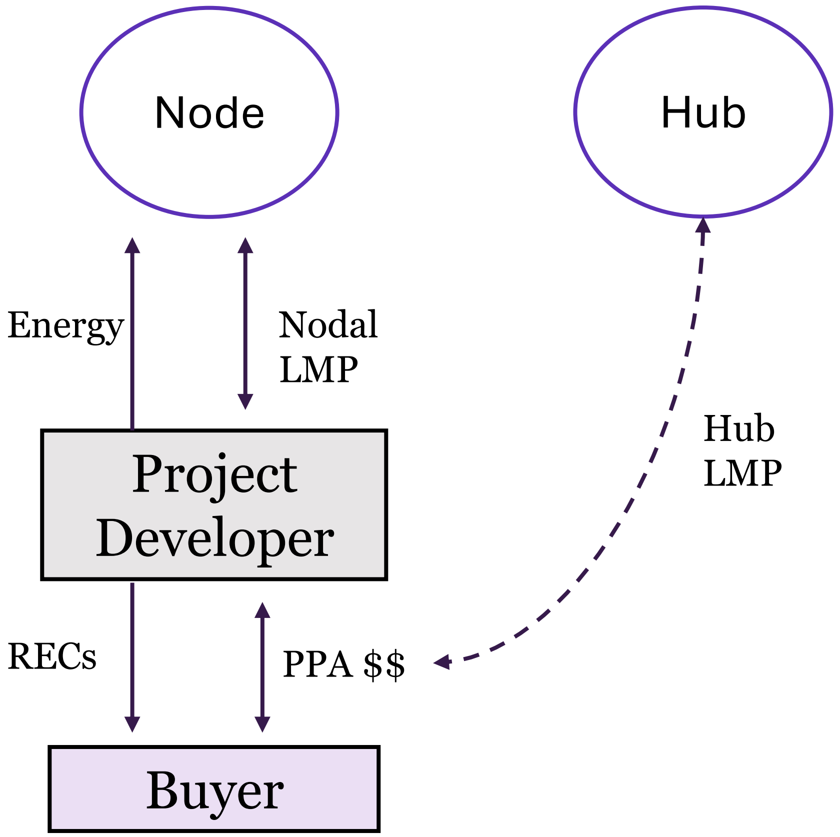
vPPAs are often structured as a "contract for differences" that settle based on a fixed contract price and a designated day ahead or real time energy market price.



Virtual Power Purchase Agreements (vPPAs)

Negative Price Risk & Curtailment

- Energy markets can produce negative prices, in some cases requiring a party to pay hundreds of dollars per MWh to deliver energy in a settlement interval.
- Buyers often seek to limit exposure by placing a floor on financial settlement, shifting some risk back to Seller.
- Sellers often want flexibility to curtail deliveries – either physically, or by the way they bid the project into the energy market – when the LMP is so negative it's a losing proposition to generate (even taking into account the vPPA and tax credits).
- Negative price risk is exacerbated if the settlement price for the vPPA is a trading hub price, because the nodal LMP and Hub LMP can diverge.



Physical Power Purchase Agreements (PPAs)

Physical delivery of energy, capacity, ancillary services, as well as RECs

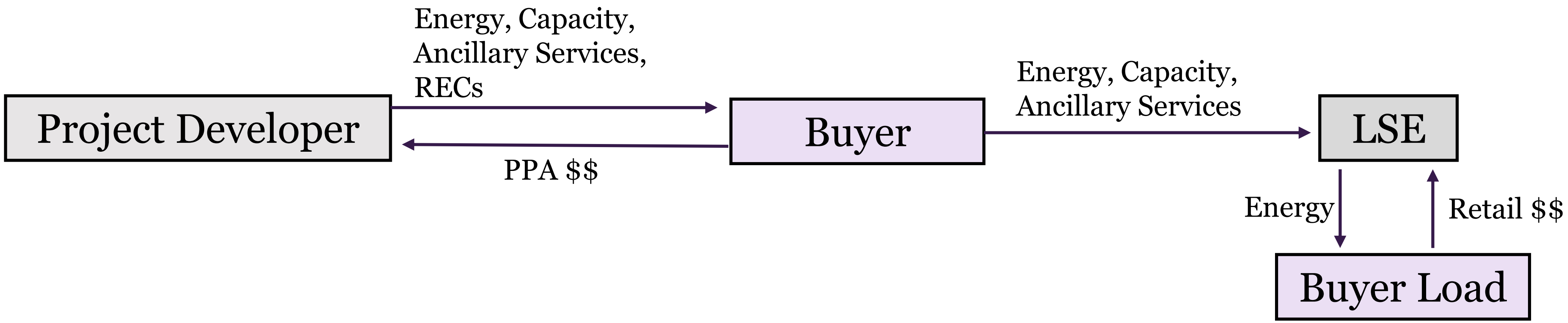
- Physical energy is delivered to buyer in the market, so the buyer must have a market participant who can liquidate or otherwise transport the energy from the delivery point.
- Guarantees fixed price for all product produced by the project.
- Negative price risk and basis risk arise in a physical PPA as well. Who bears the risk depends on the stated delivery point:
    - "Node settled" = energy transferred at interconnection point, buyer bears market risk in first instance
    - "Hub settled" = energy transferred at a trading hub, seller bears risk of pricing at the interconnection node, and either seller or buyer may take basis risk from congestion between hub and node

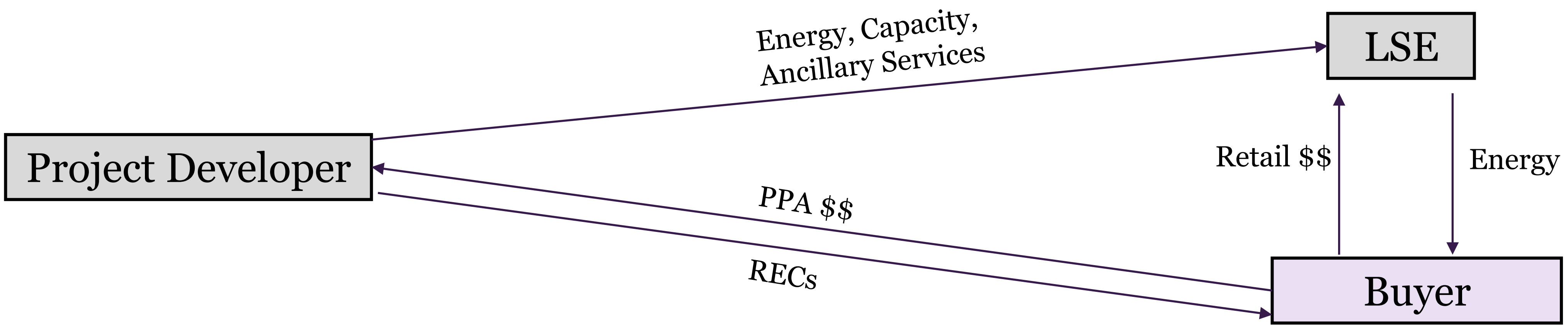
Physical Power Purchase Agreements (PPAs)

Capacity value from projects: a critical trending issue

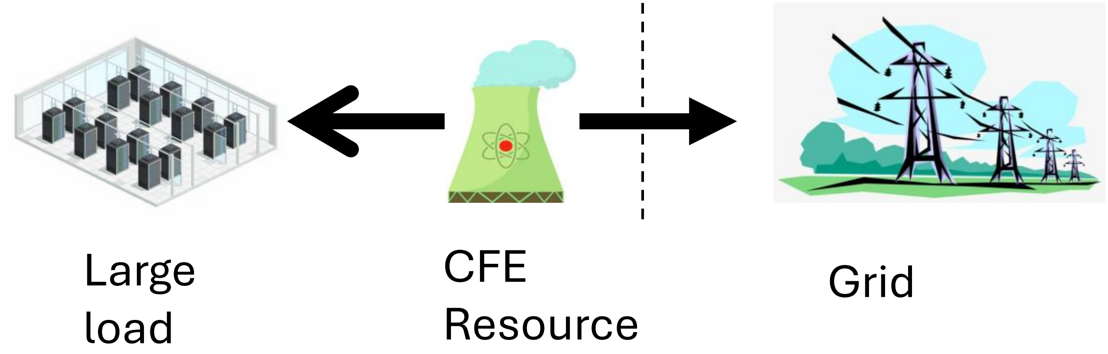
- Capacity has value as a measure of resource adequacy on the grid.
- Buyers can resell capacity purchased from a project developer to their LSEs to help reduce time to power delays.
- Capacity accreditation is based on two components:
  - Technology type
  - Performance testing
- Capacity accreditation methodologies are changing:
  - Some grid operators impose seasonal capacity requirements, others annual
  - Some procurement of transmission service to receive capacity value, others require a project to undergo studies prior to operation to receive capacity value
  - Methodology for how much capacity a project is allocated varies by grid operator and is complex

Sleeved Transactions with Load Serving Entity





Co-Located Generation + Load



- Existing and new generating resources seek to serve large new loads behind the resource meter.
- In some cases, existing clean energy resources (such as nuclear) want to remove capacity from the markets (serving general grid reliability) in order to serve behind-the-meter loads directly.
- Raises unresolved regulatory questions:
    - Is it fair to allow large loads to divert capacity that otherwise serves the grid?
    - Are those loads still receiving grid benefits for which they ought to pay? If so, how much?
    - How do grid operators plan for reliable service with proliferating structures?
    - Who regulates the connection to the transmission system – FERC (jurisdiction over transmission service) or the state (jurisdiction over end use supply)?

Microgrids & District Energy Systems

Deploying generation assets on-site

Commonly associated with heavy industry, increasing trend across industries including data centers.

Many technological options:

- Rooftop solar
- On-site energy storage
- Co-location with grid connected resources like nuclear
- Microgrids combining loads, renewable generation and storage

Some state laws permit non-utility service on site, others do not.

Still others permit an exception for on site generation that is a qualifying facility under the Public Utility Regulatory Policies Act (PURPA) or similar state laws encouraging efficient cogeneration or small renewable resources.

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