Exploring Opportunities for Energy Parks

THE PROMISE AND POTENTIAL OF ENERGY PARKS

PREPARED BY

Andrew Levitt

Johannes Pfeifenberger

PRESENTED TO

NATIONAL ACADEMIES Sciences Engineering Medicine

Forum on Energy Systems Transformation and Decarbonization

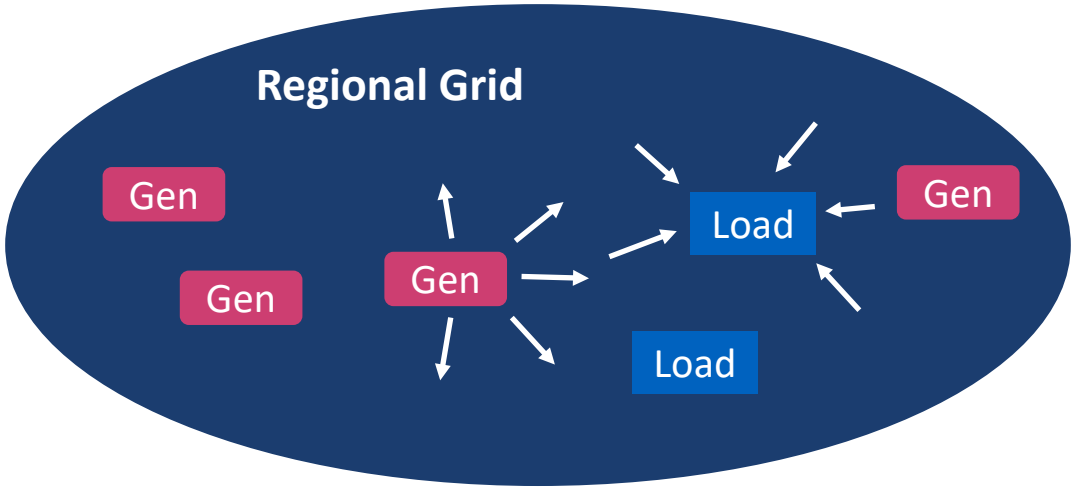
February 12, 2025

Brattle

iStock.com/Hugo Kurk.

Challenges of Expanding the Power System for New Demand

Time-intensive and costly investments in new generation and transmission are often necessary to serve new loads if generation and loads are not coordinated and co-located



New supply resources are needed to meet major growth in electricity demand ("load")

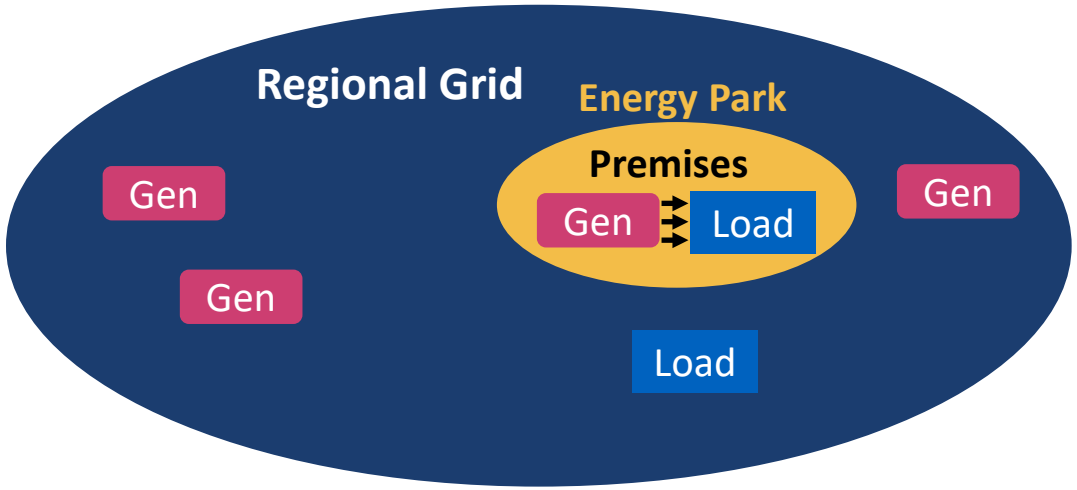
- New generation takes 3 – 7 years to build
- New supply is planned by vertically integrated utilities or (in restructured states) by merchant generators responding to market price signals

New transmission is needed for firm delivery to the regional grid from new generation, and for firm delivery from the regional grid to new load

- Generation and load interconnection processes often take several years of studies to identify transmission upgrades
- Major new transmission may require 4 – 10 years to build

Benefits of Co-locating New Demand and Supply

Adding new load via an Energy Park can save cost and time, but barriers are posed by disparate processes for connecting new supply and new load (without recognizing co-location benefits)



In an Energy Park, new supply is delivered to new load within the same premises, able to solve both supply adequacy and transmission expansion needs

- While power may be exchanged with the grid, such exchange does not need to be "firm" under all conditions, so less "supply adequacy" is ensured less new transmission expansion will be needed
- **This can yield significant cost and time savings**

Barriers to energy park deployment are posed by:

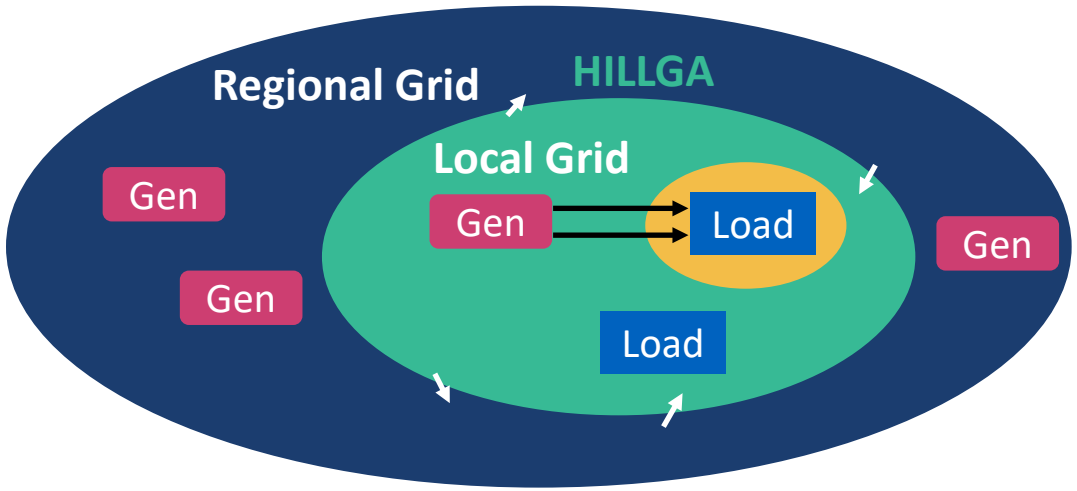
1. Disparate processes for integrating new supply (via generator interconnection process) and load (via utility processes)
2. A lack of clear standards for grid operations and planning for energy parks (with only non-firm exchanges with the grid)
3. Limits on "retail sales" in some states

Reforms to Remove Barriers to Energy Parks Are Underway

Barrier	Reform	Status
Separate interconnection planning processes for grid upgrades necessary to accommodate new generators and new loads	• **SPP High-Impact Large Load Generator Agreement (HILLGA)**: integrates generator interconnection process with load addition process	Approved
	• **MISO Zero Net-Injection Generator Interconnection**: recognizes new load in generator interconnection process, allows non-injection interconnection	In Progress
	• **PJM Interim Network Integration Transmission Service**: potential to recognize new generation in load application process (depending on finalized proposal)	Pending Detailed Proposal
Lack of grid planning and operational standards for Energy Park interactions with the grid (net imports or exports)	• **PJM Non-Firm Contract Demand Service** (non-firm load)	Proposed
	• **FERC Provisional Generator Interconnection Service** (non-firm generation)	Partial
	• **FERC ANOPR** (Advanced Notice of Proposed Rulemaking) for co-located new generation and loads (“hybrid loads”)	Proposed
Restrictions on retail sales	• States have passed laws allowing for on-site power sales, especially for large loads (e.g., NV, WV, NM, OR, etc.)	Complete (partial)

SPP HILLGA: Beyond Energy Parks

The Southwest Power Pool (SPP) has made significant progress toward facilitating the interconnection of nearby new loads and generation through its "high impact large load generation assessment" (HILLGA) framework



- Like energy parks, SPP HILLGA benefits from the same local firm power delivery concept
- Unlike an energy park (which is defined as both load and generation located at the same premises), HILLGA also allows new generation and load to be at separate sites (up to 2 substations away)
- HILLGA load may draw power from the grid, but the corresponding generation may only supply power up to that load
  - This still limits the efficiency benefits of the arrangement by not allowing for net sales to the grid

Main Takeaways

Energy Parks and similarly proximate portfolios of new loads and generation offer significant market and grid planning benefits

- Avoids supply shortages by supplying new loads with co-located new generation
- Reduces and/or defers the need for “firm” service to loads and generation, thereby avoiding grid the costs and delays associated with transmission upgrades (and boosting incentive for new load to bring new supply, easing market tightness)
- Allowing net imports from the grid (when possible and economic) reduces cost of to Energy Park load
- Allowing net exports to the grid (when possible and economic) benefit the rest of the market

Barriers need to be addressed to enable the benefits of such co-location (or near-location) of load and generation

- Separate grid planning processes for generation and load do not capture of co-location benefits
- Operational standards do not yet exist to enable reliable and controllable “net” interactions of co-located loads and generation with the grid (without which planners cannot assume reliably-controlled interactions)
- Co-location also needs to be enabled in resource adequacy frameworks (to ensure sufficient supply)

Progress is being made (slowly) by grid operators, FERC, and the states

Thank You!

Author Bio

Andrew Levitt

SENIOR CONSULTANT | WASHINGTON, DC

Andrew.Levitt@brattle.com

+1 (202) 419-3305 Ext. 3305

(webbio and publications)

Andrew Levitt is a Senior Consultant at The Brattle Group specializing in wholesale electricity market design and policy. With 15 years of experience, he advises system operators, state agencies, investors, and market participants on market design reforms, resource valuation, transmission interconnection, and reliability on an evolving grid. Before joining Brattle, he was Senior Lead Market Designer at PJM Interconnection, leading capacity and ancillary services market reforms and integrating hybrids, storage, and distributed resources. His research has been published by the IEEE and Energy Policy, and he frequently speaks at industry conferences. He holds an MA in Policy from the University of Delaware (where he studied at the Center for Carbon-Free Power Integration) and a BSc in Physics from the University of Toronto.

Author Bio

Johannes P. Pfeifenberger

PRINCIPAL | BOSTON

Hannes.Pfeifenberger@brattle.com

+1.617.234.5624

(webbio and publications)

Johannes (Hannes) Pfeifenberger, a Principal at The Brattle Group, is an economist with a background in electrical engineering and over twenty-five years of experience in wholesale power market design, renewable energy, electricity storage, and transmission. He is a Visiting Scholar at MIT's Center for Energy and Environmental Policy Research (CEEPR), a former Senior Fellow at Boston University's Institute of Sustainable Energy (BU-ISE), an IEEE Senior Member, and currently serves as an advisor to research initiatives by the US Department of Energy, the National Labs, and the Energy Systems Integration Group (ESIG).

Mr. Pfeifenberger specializes in wholesale power markets and transmission. He has analyzed transmission needs, transmission benefits and costs, transmission cost allocations, and renewable generation interconnection challenges for independent system operators, transmission companies, generation developers, public power companies, industry groups, and regulatory agencies across North America. He has worked on transmission matters in SPP, MISO, PJM, New York, New England, ERCOT, CAISO, WECC, and Canada and has analyzed offshore-wind transmission challenges in New York, New England, and New Jersey.

He received an M.A. in Economics and Finance from Brandeis University's International Business School and an M.S. and B.S. ("Diplom Ingenieur") in Power Engineering and Energy Economics from the University of Technology in Vienna, Austria.

Selected Brattle Group Publications

A Decade of Beneficial Electrification: Progress and the Path Ahead, November 2025.
Recent Retail Electricity Price Trends: What Do We Know… or Think We Know?, October 2025.
The Demand Side Grid Support Program: An Assessment of Scale and Value, August 2025.
Optimizing Grid Infrastructure and Proactive Planning to Support Load Growth and Public Policy Goals, July 2025.
The Challenges and Opportunities of On-site Resources in Accelerating Data Center Interconnection and Reliability, June 2025.
Affordability, Rates, and Clean Capital Efficiency: A Path for the Power Industry's Turbulent Next Decade, May 2025.
Are Resource Adequacy Markets Adequate?, May 2025.
Unlocking Load Flexibility with Rates, May 2025.
Accelerating Integration of New Co-located Generation and Loads, April 2025.
Incorporating GETs and HPCs into Transmission Planning Under FERC Order 1920, April 2025.
Brattle Consultants Examine the Challenges & Opportunities Associated with Meeting Load Growth Surge, April 2025.
A Wide Array of Resources is Needed to Meet Growing US Energy Demand, February 2025.
Electricity Demand Growth and Forecasting in a Time of Change, November 2024.
The Impact of Data Centers on the Grid, November 2024.
Resource Adequacy Trends of the Energy Transition: Experience from North America, October 2024.
Unlocking America's Energy: How to Efficiently Connect New Generation to the Grid, August 2024.
How Resources Can Be Added More Quickly and Effectively to PJM's Grid, OPSI Annual Meeting, October 2023.
The Benefit and Urgency of Planned Offshore Transmission, January 2023.
Planning for Generation Interconnection, May 2022.

Brattle Group Practices and Industries

ENERGY & UTILITIES

- Competition & Market Manipulation
- Distributed Energy Resources
- Electric Transmission
- Electricity Market Modeling & Resource Planning
- Electrification & Growth Opportunities
- Energy Litigation
- Energy Storage
- Environmental Policy, Planning and Compliance
- Finance and Ratemaking
- Gas/Electric Coordination
- Market Design
- Natural Gas & Petroleum
- Nuclear
- Renewable & Alternative Energy

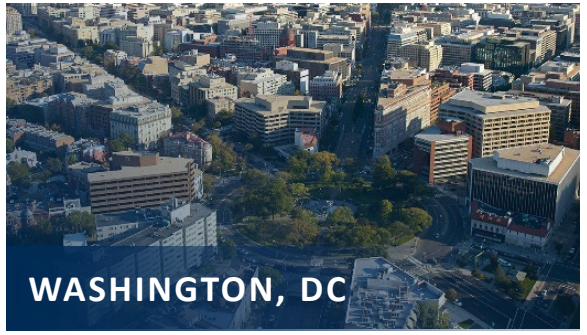
LITIGATION

- Accounting
- Analysis of Market Manipulation
- Antitrust/Competition
- Bankruptcy & Restructuring
- Big Data & Document Analytics
- Commercial Damages
- Environmental Litigation & Regulation
- Intellectual Property
- International Arbitration
- International Trade
- Labor & Employment
- Mergers & Acquisitions Litigation
- Product Liability
- Securities & Finance
- Tax Controversy & Transfer Pricing
- Valuation
- White Collar Investigations & Litigation

INDUSTRIES

- Electric Power
- Financial Institutions
- Infrastructure
- Natural Gas & Petroleum
- Pharmaceuticals & Medical Devices
- Telecommunications, Internet, and Media
- Transportation
- Water

Our Offices



Brattle

Clarity in the face of complexity

The Power of Economics™

Brattle