# **Evolving Resource Adequacy Approaches in North America**

PRESENTED BY Dr. Andrew W. Thompson PRESENTED FOR IEA Power Market Design Expert Workshop Paris, France

MAY 21, 2025



# Resource adequacy is ensured in different ways in North America

### **Centralized Planning**

Vertically integrated utilities or a government entity does resource planning to build or contract new resources

#### Pros:

- Greater control of resource
  mix
- More price stability
- Fewer decision-makers

#### Cons:

- Customers bear investment risks
- Least competitive approach
- Can exhibit barriers to entry of innovative new resources

Regulated utilities & public power entities, Ontario, California, SPP

### Resource Adequacy Markets

Organized market for "capacity" product that reflects sellers' commitment to deliver resource adequacy

### **Bilateral Capacity Markets**

#### Pros:

Enables continuous trade that is flexible to the timeframes and preferences of sophisticated buyers

#### Cons:

- Less ability to implement market power mitigation
- Higher transactions costs
- Less price transparency than centralized auctions

California, SPP, Western Resource Adequacy Program (WRAP)

### Centralized Capacity Auctions

#### Pros:

- Competitively attracts range of resource types
- Enables cross border trade and transparency

#### Cons:

- Market outcomes can be impacted by modeling
- Rules are complex, changing frequently, and yet sometimes still not fast enough

MISO, PJM, NYISO, ISO-NE, Ontario

### Energy-Only Markets

Energy prices (plus "scarcity pricing" during tight hours) is primary mechanism to attract new investments

#### Pros:

- More aligned with "pure market" theory
- Investment risks are borne by investors

#### Cons:

- Insufficiently high price caps lead to "missing money" problem
- Governments tend to intervene when prices spike or remain high

#### Alberta, Texas

\* Elements of each approach are present across many markets.

# Evolving reliability risks require new ways of planning



Source: Pfeifenberger, et. al, Future Energy & Resource Needs Study (FERNS), prepared for SPP, February 2025.

# Planning approaches are undergoing reform...

#### Capacity Adequacy

- Ability of installed asset base to meet peak demand
- Traditional focus of reliability planning

### REFORM New Planning Methods

REFORM More

Flexibility

### Long-Term Energy Adequacy

- Ability of installed asset base to meet demand during stressful, not-quite-peak periods, such as extreme cold or renewable droughts
- Growing in importance

### **Grid Resilience**

Ability to recover quickly from significant abnormal conditions or extreme events

### **Operating Reliability**

- Ability to withstand sudden disturbances (like short circuits and lightning strikes) and avoid cascading blackouts
- Traditionally ensured via generators → wind, solar, and batteries must provide "essential reliability services"



Essential Reliability Services

### Short-Term Energy Adequacy

- Ability of readily-deployed flexible resources to meet rapid or unexpected increases in demand or decreases in supply
- High levels of wind and solar → greater variability and uncertainty
   → increasing value of flexibility

# Brattle



# ...which are impacting capacity (and other) market designs



Sources: PJM, Manual 18: PJM Capacity Market, Revision 58. November 15, 2023, pg. 112, 158; ISO New England, Reconfiguration Auctions, accessed January 17<sup>th</sup>, 2024; ISO New England, Market Rule 1, December 5, 2023. pgs. 177 180; MISO, 2023/2024 Planning Resource Auction Timeline, March 31, 2023; MISO, Business Practices Manual: Resource Adequacy, Revision 28. October 1, 2023, pg. 111; NYISO, Manual 4 Installed Capacity Manual, Version 8.0, April 27, 2023; NYISO, NYISO, Administered ICAP Market Auctions, June 27-28, 2023; IESO, Market Manual 12.0: Capacity Auctions, Issue 16.0, November 29, 2023, pgs. 51-52.

# **Additional Reading**

- Spees, Newell, Thompson, <u>Sixth Review of PJM's Variable Resource Requirement Curve</u>, April 2025
- Pfeifenberger, et. al., <u>Future Energy & Resource Needs Study (FERNS)</u>, February 2025
- Celebi, Levitt, Thompson, Sreenanth, <u>Bulk System Reliability for Tomorrow's Grid</u>, December 2023
- Newell, Spees, Levitt, Higham, <u>MISO Reliability Attributes "Solution Space"</u>, October 2023
- Newell, Spees, Higham, <u>Capacity Resource Accreditation for New England's Clean Energy Transition</u>, June 2022
- Spees, Newell, <u>Efficiently Managing Net Load Variability in High-Renewable Systems: Designing Ramping Products to</u> <u>Attract and Leverage Flexible Resources</u>, February 2022
- Newell, Spees, et al., <u>ERCOT Investment Incentives and Resource Adequacy</u>, June 2012
- Pfeifenberger, Spees, <u>A Comparison of PJM's RPM with Alternative Energy and Capacity Market Designs</u>, September 2009

# About the speaker



## Andrew W. Thompson

ENERGY ASSOCIATE MADRID | BOSTON

andrew.thompson@brattle.com

+34 666.639.197

**Dr. Andrew W. Thompson** is an energy economist with a background in electrical engineering and expertise in wholesale electricity market design, regulatory economics, and policy analysis of network industries, particularly in the energy sector.

He supports electricity system operators, energy regulators, governments, clean energy advocacy groups, market participants, institutional investors, utilities, and other clients in several international jurisdictions including PJM, ERCOT, CAISO, MISO, NYISO, ISO-NE, Non-ISO/RTO United States, Ontario, Alberta, The United Kingdom, Ireland, Spain, Colombia, Saudi Arabia, Australia, and New Zealand.

Dr. Thompson has published thought leadership on energy policy and market reforms to integrate emerging resources (renewables, battery storage, longduration energy storage, distributed energy resources, and flexible load); the regulation of the energy sector; the evolving hydrogen economy; and the economic implications of lithium-ion battery degradation for energy storage and electric vehicle technologies.

He received a Ph.D. in Economics from the Université Paris-Saclay (France), an MS in Energy Economics from the Pontificia Universidad Comillas (Spain), an MSc. in Engineering and Policy Analysis from TU Delft (The Netherlands), and a BSc. in Electrical and Computer Engineering from Rowan University (USA).

# **About Brattle**

The Brattle Group answers complex economic, finance, and regulatory questions for corporations, law firms, and governments around the world. We are distinguished by the clarity of our insights and the credibility of our experts, which include leading international academics and industry specialists. Brattle has 500 talented professionals across North America, Europe, and Asia-Pacific. For more information, please visit **brattle.com**.

Our Services	Our People	Our Insights
Research and Consulting	Renowned Experts	Thoughtful Analysis
Litigation and Support	Global Teams	Exceptional Quality
Expert Testimony	Intellectual Rigor	Clear Communication

# A Global Firm



# Clarity in the face of complexity



