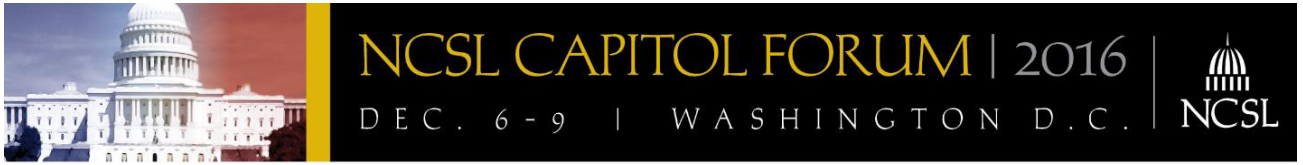
Electricity Market Restructuring: Where Are We Now?

PRESENTED TO

NCSL Energy Policy Forum



PRESENTED BY

Johannes Pfeifenberger

December 6, 2016

THE Brattle GROUP

The views expressed in this presentation are strictly those of the presenter and do not necessarily state or reflect the views of *The Brattle Group, Inc.*

Topics

1. Restructured Wholesale Electricity Markets

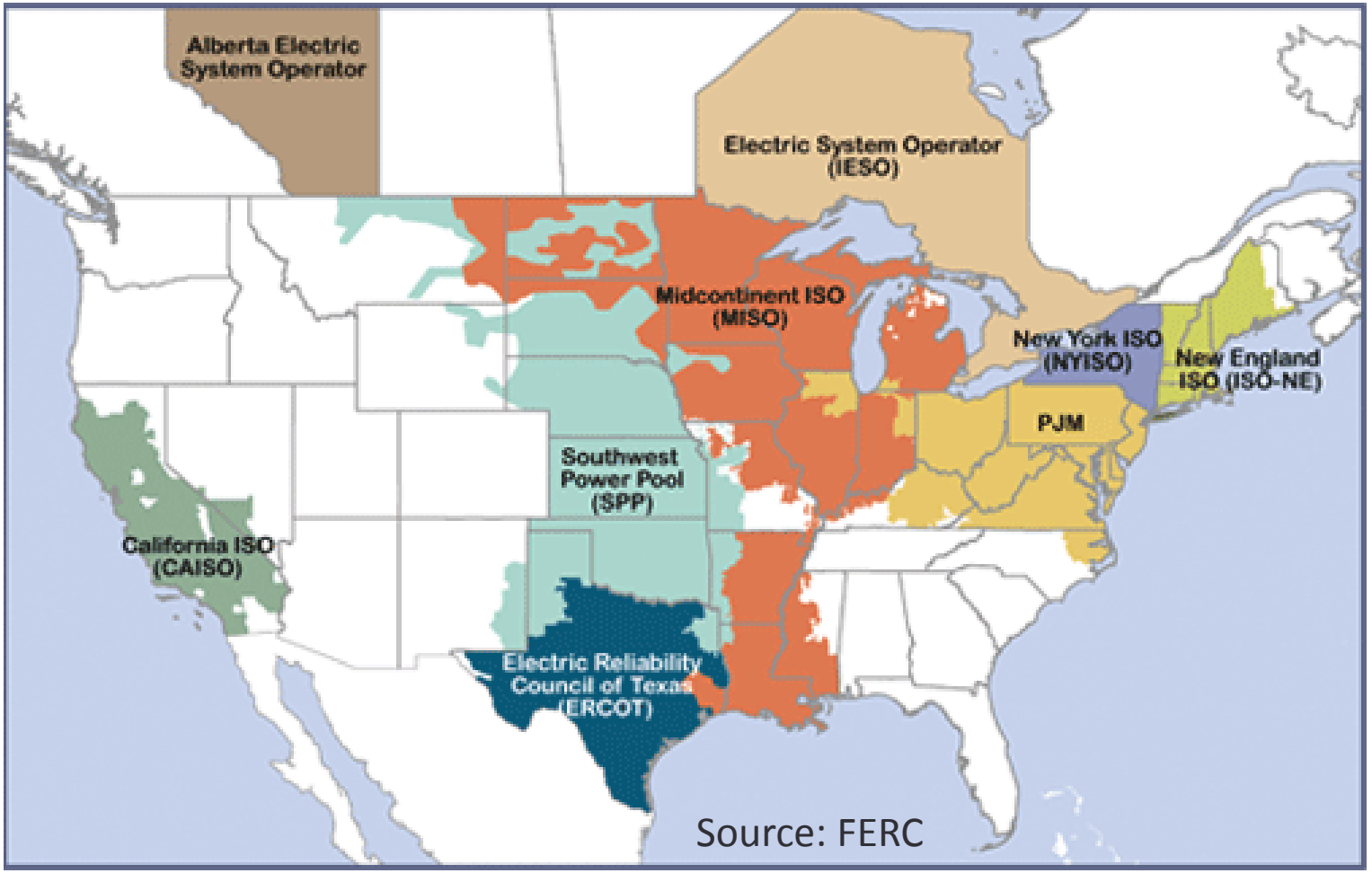
- Overview and Verdict
- Are the markets failing?
- Examples of policy and market initiatives

2. Restructured Retail Electricity Market

- Overview and Verdict on “Retail Access”
- Rate levels and service options
- Examples of policy initatives
- The way forward

Restructured Wholesale Electricity Markets

- Restructured wholesale power markets operated by Regional Transmission Organizations (RTOs) or Independent System Operator (ISOs) cover the majority of 32 U.S. states and two Canadian provinces



Source: FERC

The Verdict on Wholesale Restructuring

While many details of market design remain contested, there is increasingly broad consensus on the benefits of restructured wholesale power markets. For example:

- Southwest Power Pool (SPP) and other RTO/ISO benefit studies show generation **fuel-cost savings** of 3-8%
- Midcontinent ISO (MISO): load and variable generation diversity in larger regional footprint offers $1.2-1.8 billion in annual generation-related **investment-cost savings** (doubling fuel cost savings)
- Expanding Energy Imbalance Market (EIM) in the western U.S. has shown to significantly reduce the **cost of balancing** variable renewable generation
- Regional wholesale power markets have shown to accelerate growth of **demand response** and greatly facilitate **renewable generation investment** in wind-rich states
- Improved transmission access and regional planning for a larger footprint reduces the cost of achieving **state policy objectives**

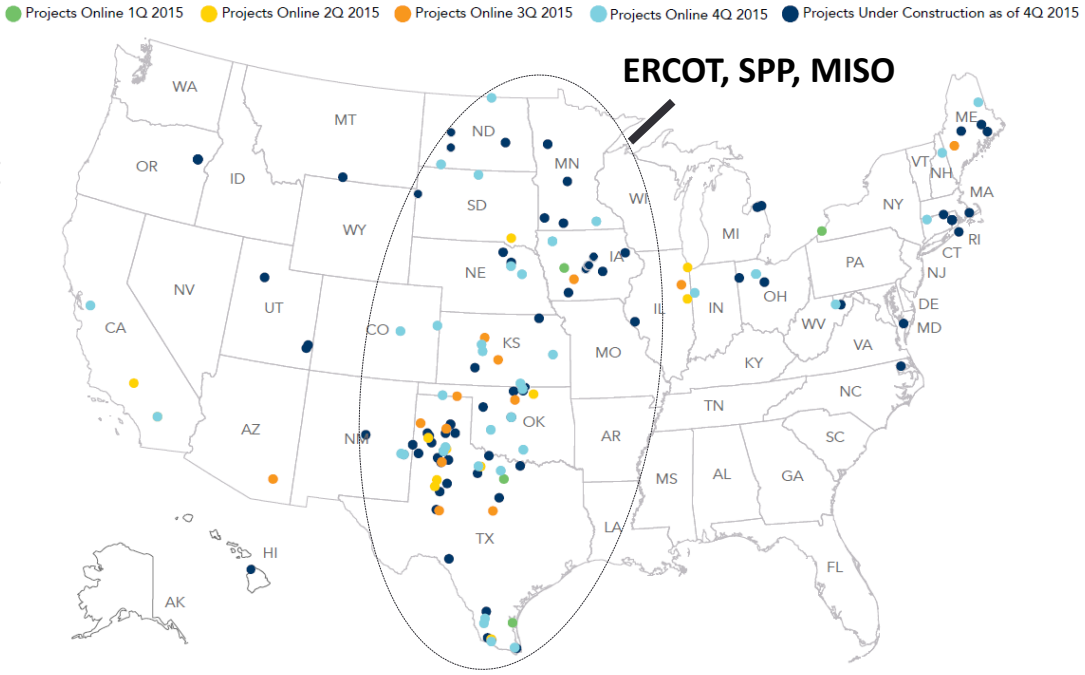
Example: Wind Investments in RTO/ISO Markets

Wind-rich areas in RTO/ISO markets account for most of recent renewable generation development

- Majority of 2015 additions (shown on map) are in areas that offer <u>both</u>:
  - Access to very wind-rich areas
  - ISO-operated markets (ERCOT, SPP, MISO)
- Significantly less development in similarly wind-rich areas without ISO/RTO markets (e.g., WY, CO, MT, NM)

Today, the top 7 states with the most wind generation are all in RTO/ISO markets

Wind Generation Projects Online & Under Construction in 2015



Source: AWEA, "U.S. Wind Industry Fourth Quarter 2015 Market Report," American Wind Energy Association, January 27, 2016.

Are Wholesale Power Markets Really Failing?

Increasingly frequent debates over how existing power markets:

- Fail to guard against retirements of baseload coal and nuclear plants
- Do not provide the right level of fuel diversity
- Do not support certain States' public policy choices

Markets won't achieve outcomes that are not subject to market forces

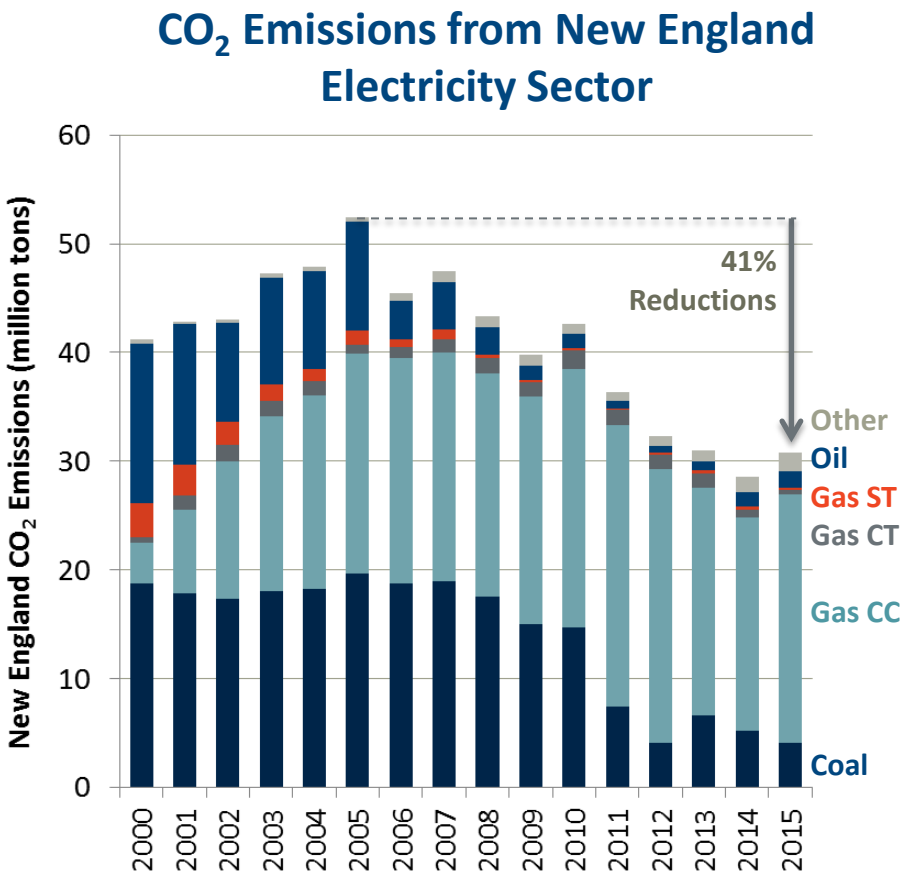
- Won't achieve **reliability** objectives that are not economically based
- Won't value emissions and **environmental** objectives unless designed for it
- Won't protect **baseload** or force **fuel diversity** unless economically justified

Revenue/value sources of resources will shift over time even in well-designed wholesale power markets

1. Average energy prices ↓
2. Scarcity pricing ↑
3. Flexibility and reserves ↑
4. Capacity markets/resource adequacy ?
5. Clean energy attributes (where exist) ↑
6. Trade and diversification across market seams ↑

Example: ISO-NE Integrating Markets & Public Policy

- ISO-NE has been decarbonizing quickly (-41% in 10 years vs. -18% nationally)
- Recognition that **technology-specific procurements may be less effective**:
  - Growing out-of-market contract costs
- **Markets and out-of-market contracts can work at cross purposes**
  - Example: wind gen drives down energy prices, putting existing nuclear and hydro at risk of retiring (unwinding CO_2 abatement)
- Stakeholders now trying to evolve the **market to support policy objectives**. Proposals include:
  - Higher administrative CO_2 price (US $30-$60/ton)
  - New integrated market for capacity and clean-energy procurement
  - Energy/ancillary service market enhancements



Example: New York's Clean Energy Efforts

The Governor's State Energy Plan (SEP)

- Established in Executive Order No. 2 (2008), sets a variety of state clean energy goals
- 2015 SEP set economy-wide (electricity, transportation, industry, commercial and residential buildings) CO_2-equivalent **emission reduction goals** of 40% by 2030 and 80% by 2050

The New York Public Service Commission's Clean Energy Standard (CES)

- Codified SEP goal of 50% renewable generation by 2030
- NYSERDA to procure RECs from new **renewable resources** via long-term contracts (LSEs can also procure qualified RECs from other sources)
- NYSERDA to procure Zero Emission Credits (ZECs) from 3 at-risk **nuclear plants**, based on $43/short ton social cost of CO_2 minus $10.40 RGGI via six two-year contract periods (running from 2017 to 2029), each subject to price adjustments for RGGI and energy

New York ISO's Initiative (kicked off two weeks ago)

- Can wholesale markets help support meeting **state policy goals** more efficiently by internalizing the cost of carbon?
- Are new products needed?

Topics

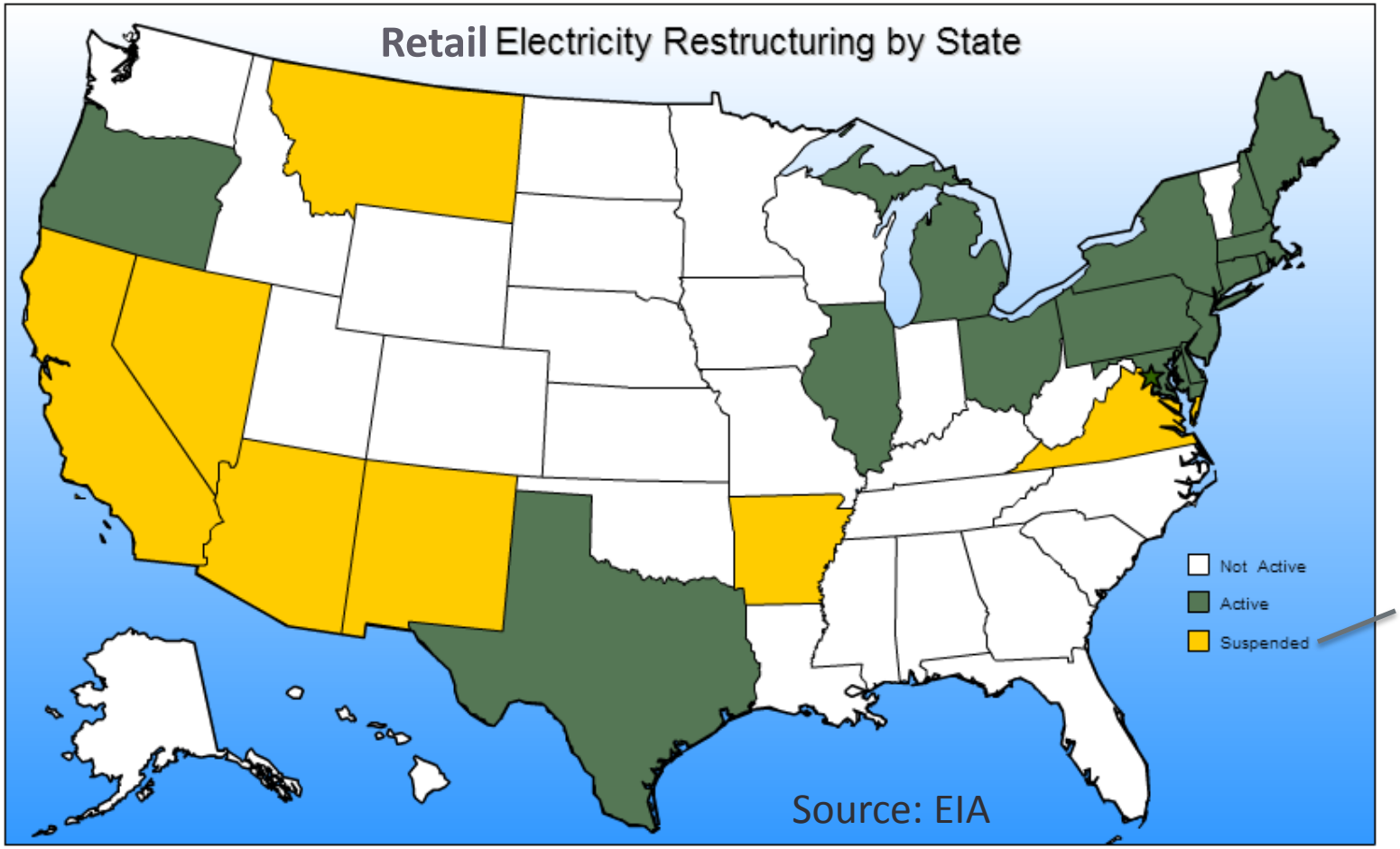
1. Restructured Wholesale Electricity Markets
   - Overview and Verdict
   - Are the markets failing?
   - Examples of policy and market initiatives

2. Restructured Retail Electricity Market

- Overview and Verdict on “Retail Access”
- Rate levels and service options
- Examples of policy initatives
- The way forward

Restructured Retail Electricity Markets

- 15 states have fully restructured retail electricity markets today, providing retail access to competitive suppliers (7-9 suspended retail access after CA power crisis)
- 17 states without full retail access are part of restructured wholesale markets



Note: OR and MI offer only partial retail access

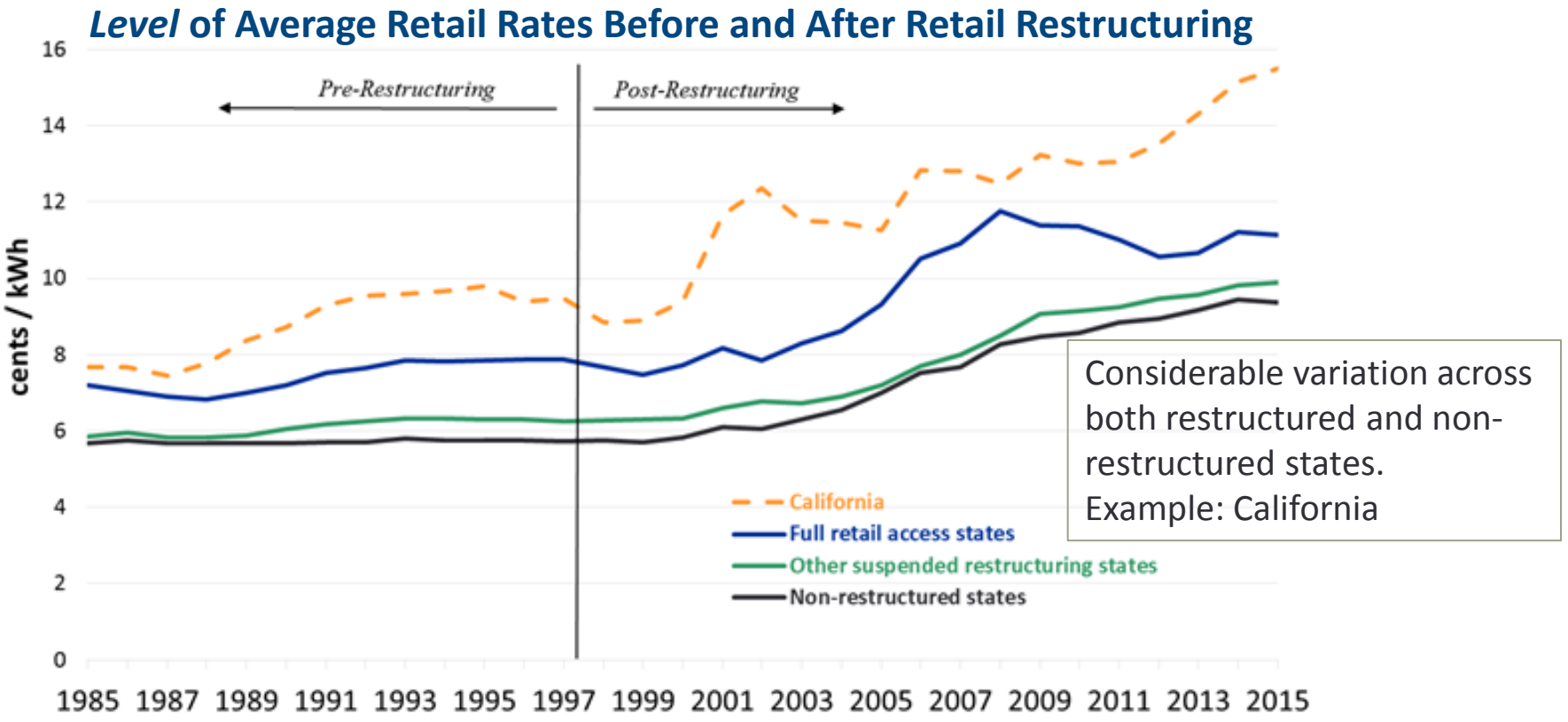
The Verdict on Retail Restructuring

The benefits of retail access are less clear than those of wholesale restructuring:

- **Average rates** remain higher in retail-restructured states
  - Rate increases have slowed compared to traditionally-regulated states (next slides)
  - Rates tend to fluctuate more based on wholesale market conditions (similar to retail rates in other "restructured" energy sectors, such as natural gas and gasoline)
- **Industrial and Commercial Customers** have more choices/service options:
  - Majority of customers have switched to competitive service options
  - Competitive suppliers offer more (and often more innovative) service options (e.g., green power plans; hedges and pricing plans aligned with budgeting cycles)
  - Some large C&I customers directly participate in wholesale markets (e.g., hedging and contracts with renewable generators)
- Benefit to **Residential Customers** remains largely elusive:
  - Other than in Texas, majority of customers remain on regulated default service
  - Relatively small number of competitive retail suppliers offer residential service
  - Customer confusion and claims of abuses by some competitive retail suppliers (e.g., New York discussion of abandoning retail choice)

The Verdict: Average Level of Retail Rates

- Much has been made of the fact that average rates in retail-access states are higher than in traditionally-regulated states
- However, rates in the now-restructured states have already been higher prior to restructuring in the 1990s!

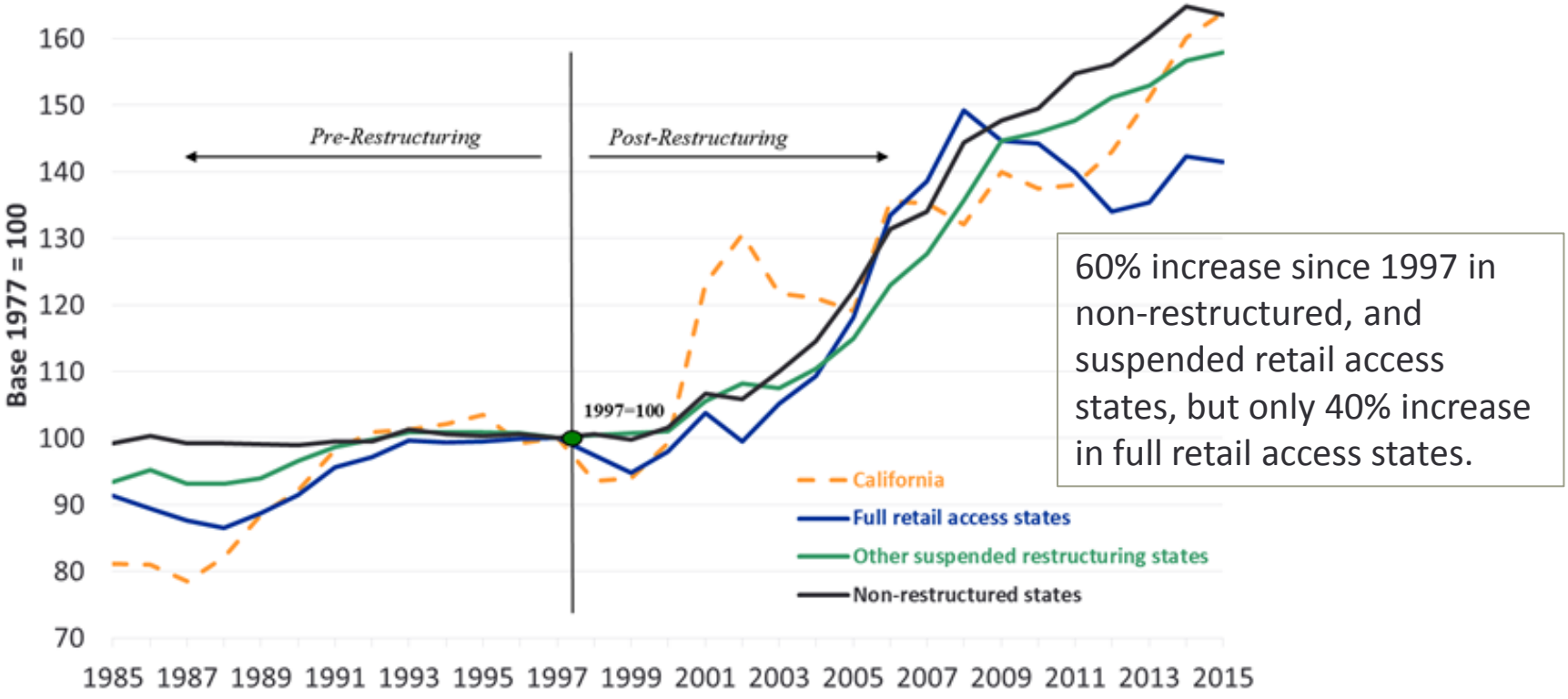


Source: The Brattle Group, based on EIA Data.

The Verdict: Trend of Average Retail Rates

- On a percentage basis, rates in now-restructured states have increased by less since restructuring compared to rates in traditionally-regulated states
- Considerable variation across both restructured and non-restructured states
- Fuel mix (reduced natural gas prices) explains some of the difference

Trends of Average Retail Rates Before and After Retail Restructuring



60% increase since 1997 in non-restructured, and suspended retail access states, but only 40% increase in full retail access states.

Source: The Brattle Group, based on EIA Data.

Electricity Market Restructuring: Where Are We Going?

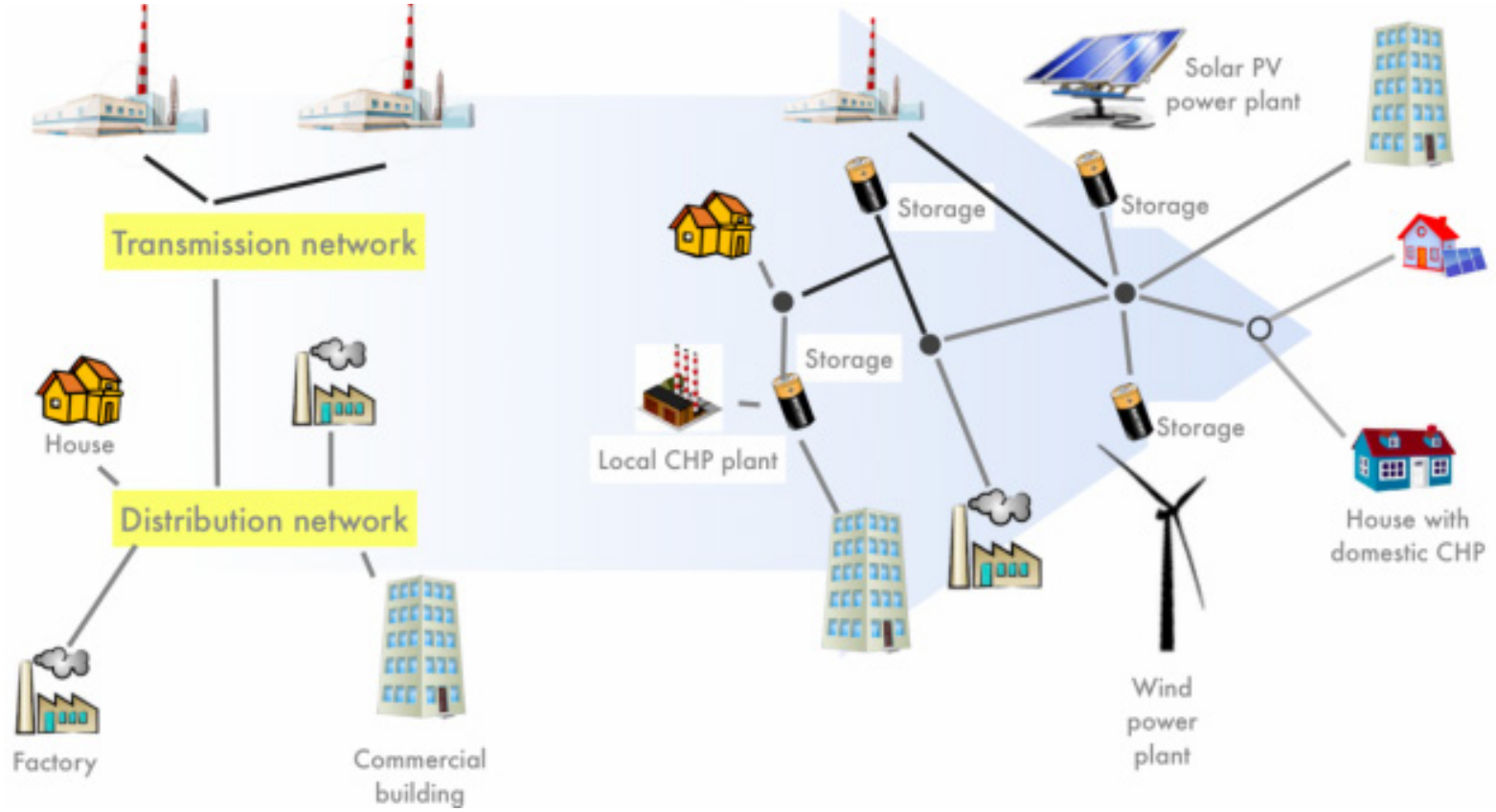
- Fundamental changes in technologies and consumer preferences will drive the need for continuous evolutions in wholesale and retain market designs

Yesterday

Centralized & Integrated

Tomorrow

More Renewable & Distributed



Example: New York Renewed Energy Vision (REV)

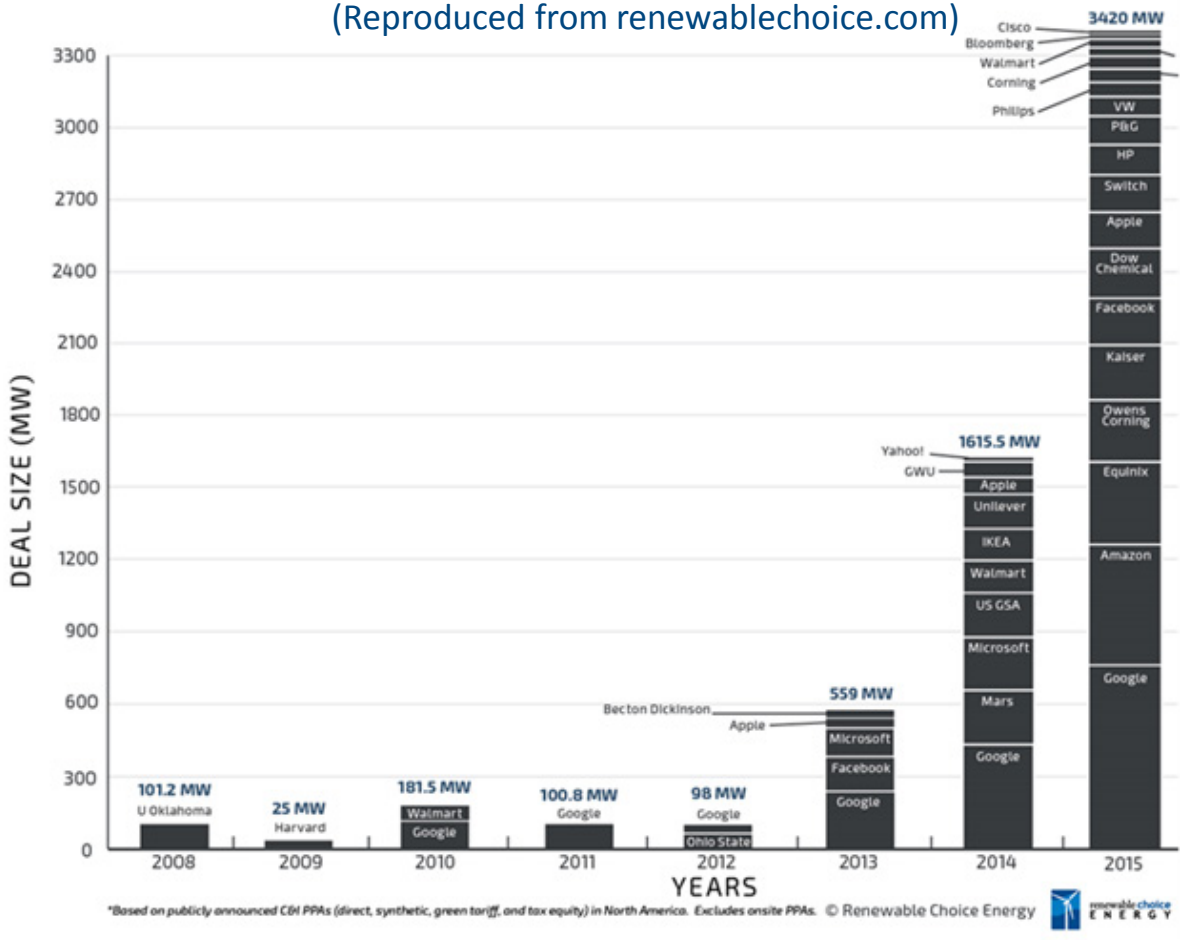
New York's Renewing the Energy Vision ("REV") redefines roles for the incumbent utilities with distribution functions

- Incumbent utilities will act as **Distributed System Platform Providers** ("DSPP"), with many new functions:
  - "The DSPP will modernize its distribution system to create a flexible platform for new energy products and services, to *improve overall system efficiency and to better serve customer needs*. The DSPP will *incorporate DER into planning and operations* to achieve the optimal means for meeting customer reliability needs…."
- Technical integration of **Distributed Energy Resources** ("DER") options into distribution system
- Setting the appropriate **distribution-level price** signals is a major challenge
  - Proposals to replace locational wholesale price with a Full Value Tariff ("FVT"), which would also include distribution service charges.
  - Distribution charge to include: time-variant and area-specific avoidable cost components, load changes, system capacity values, and energy losses.
- Design and development of the Platform and transaction framework remains a longer-term goal and work in progress

Growth in Renewable PPAs with C/I Customers

Aggregate PPA Deals with Commercial & Industrial Customers

(Reproduced from renewablechoice.com)



In 2015, 3,420 MW of low-cost wind resources were developed through PPAs with large C/I customers (up from 1,615 MW in 2014 and 559 MW in 2013)*

These C/I-based contracts are mostly in regional ISO-operated markets**

Renewable Energy Buyers Alliance (REBA), including more than 60 major companies, set a goal of procuring 60,000 MW of new U.S. renewable generation by 2025

* Reproduced from Powers, J. "The Rise of the Corporate Energy Buyer," Renewable Choice Energy (2016).

** For discussion see: http://www.renewablechoice.com/blog-corporate-energy-buyer
http://www.renewablechoice.com/blog-electricity-corporate-ppa-buyers

Lessons Learned from Recent Developments

Conditions driving innovation are applicable to most regions:

- Rapid changes in industry making traditional risk assessment tools obsolete
- Flat sales with increasing peak demand
- More customers wanting energy choices, including from renewable resources
- Aging utility infrastructure also creates opportunity to leap-frog grid modernization
  - Example: Southern California Edison's $2.3B "Distributed Resources" initiative

Transition to more distributed, renewables-based grid requires commitment from key policy makers and collaboration from all stakeholders on:

- Fundamental changes to the power system
- New business and regulatory model for utilities
- Evolution of wholesale power market design

Projects involving energy-efficiency retrofits, microgrids, storage, and new interconnection technologies for distributed resources are essential testing grounds for implementing future electricity market and regulatory reforms

Presenter Information

Johannes P. Pfeifenberger
Principal, Cambridge
Hannes.Pfeifenberger@brattle.com
617.864.7900 office
617.234.5624 direct

Johannes (Hannes) Pfeifenberger is an economist with a background in power engineering and over 20 years of experience in the areas of public utility economics and finance. He has published widely, assisted clients and stakeholder groups in the formulation of business and regulatory strategy, and submitted expert testimony to the U.S. Congress, courts, state and federal regulatory agencies, and in arbitration proceedings.

Hannes has extensive experience in the economic analyses of wholesale power markets and transmission systems. His recent experience includes the benefit of regional markets in the West, capacity markets and resource adequacy designs, testimony in contract disputes, and the analysis of transmission benefits, cost allocation, and rate design. He is advising a wide range of clients, including investor-owned utilities, independent system operators, transmission companies, regulatory agencies, public power companies, and generators across North America.

Hannes received an M.A. in Economics and Finance from Brandeis University and an M.S. in Power Engineering and Energy Economics from the University of Technology in Vienna, Austria.

About The Brattle Group

The Brattle Group provides consulting and expert testimony in economics, finance, and regulation to corporations, law firms, and governmental agencies worldwide.

We combine in-depth industry experience and rigorous analyses to help clients answer complex economic and financial questions in litigation and regulation, develop strategies for changing markets, and make critical business decisions.

Our services to the electric power industry include:

- Climate Change Policy and Planning
- Cost of Capital
- Demand Forecasting Methodology
- Demand Response and Energy Efficiency
- Electricity Market Modeling
- Energy Asset Valuation
- Energy Contract Litigation
- Environmental Compliance
- Fuel and Power Procurement
- Incentive Regulation
- Rate Design and Cost Allocation
- Regulatory Strategy and Litigation Support
- Renewables
- Resource Planning
- Retail Access and Restructuring
- Risk Management
- Market-Based Rates
- Market Design and Competitive Analysis
- Mergers and Acquisitions
- Transmission

Offices

CAMBRIDGE

NEW YORK

SAN FRANCISCO

WASHINGTON, DC

TORONTO

LONDON

MADRID

ROME

SYDNEY