

MACRUC 22nd Annual Education Conference

Ralph Izzo

*Chairman, President & CEO
PSEG*

**Wholesale Power Markets:
Are We at a Tipping Point?**

Wholesale Power Markets: Are We at a Tipping Point?

Ralph Izzo
Chairman, President and Chief Executive Officer
June 26, 2017



PSEG

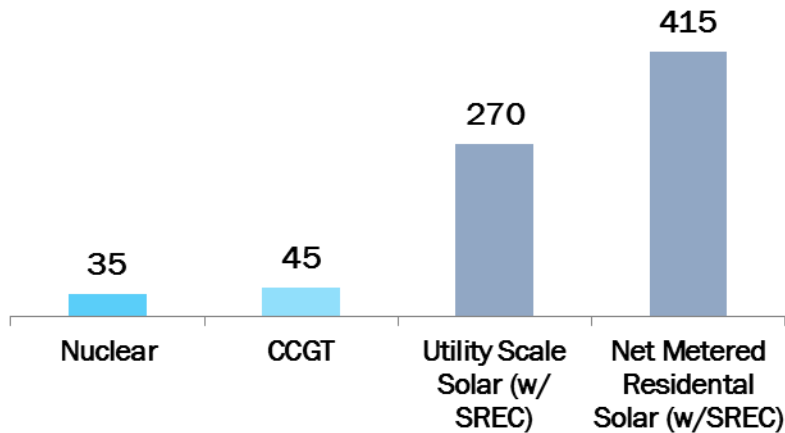
We make things work for you.

Markets may be at the tipping point as they grapple with integrating differing policy goals

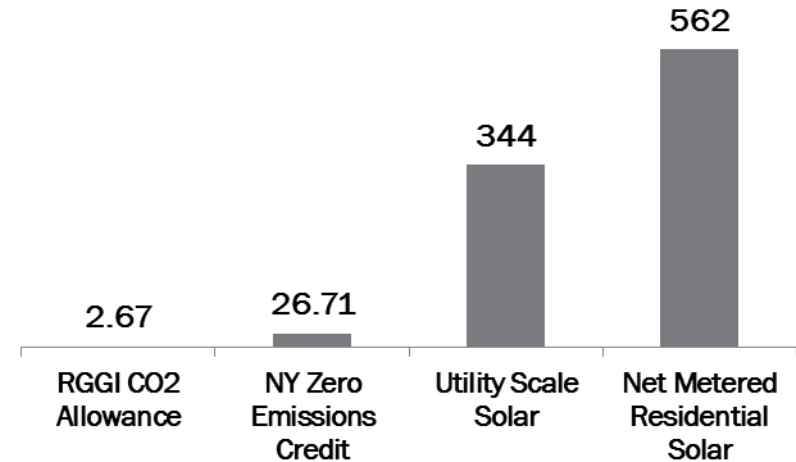
- Wholesale markets are not properly compensating generators resulting in a “missing money” problem:
 - Existing market designs fail to value generator attributes consistently.
 - Energy market rules and RTO software limitations prevent energy prices from reflecting the costs of all units needed to meet system demand.
 - Manual operator actions are opaque and appear to be biased against the recognition of scarcity conditions.
- The current state of affairs has been building up since deregulation began nearly two decades ago
- There are several viable options for moving ahead

There are wide disparities in prices and signals

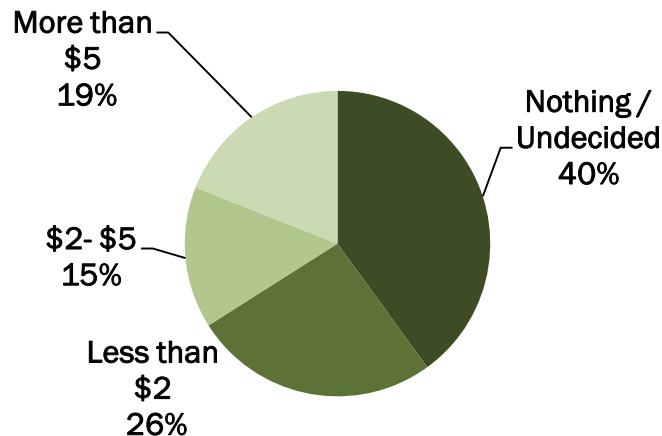
Revenues (\$/MWh)



Carbon Pricing (\$/ton)



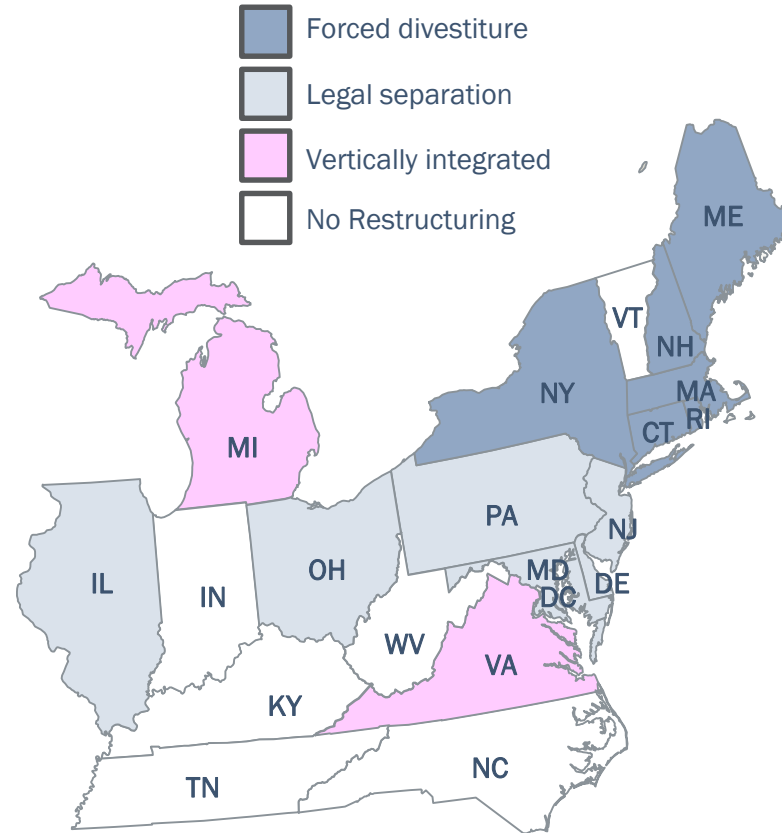
NJ Customer Willingness to Pay for Renewables (\$/Month)



Actual NJ Payment
\$4.57 / Month

States took different paths in deregulation and restructuring

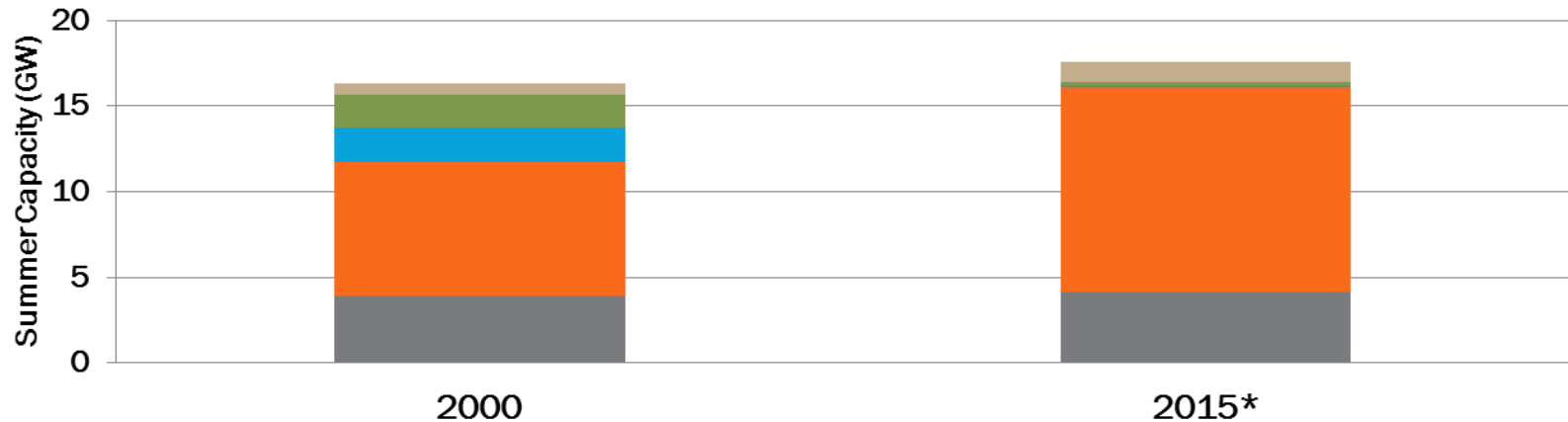
Restructured State Generation Ownership Policy



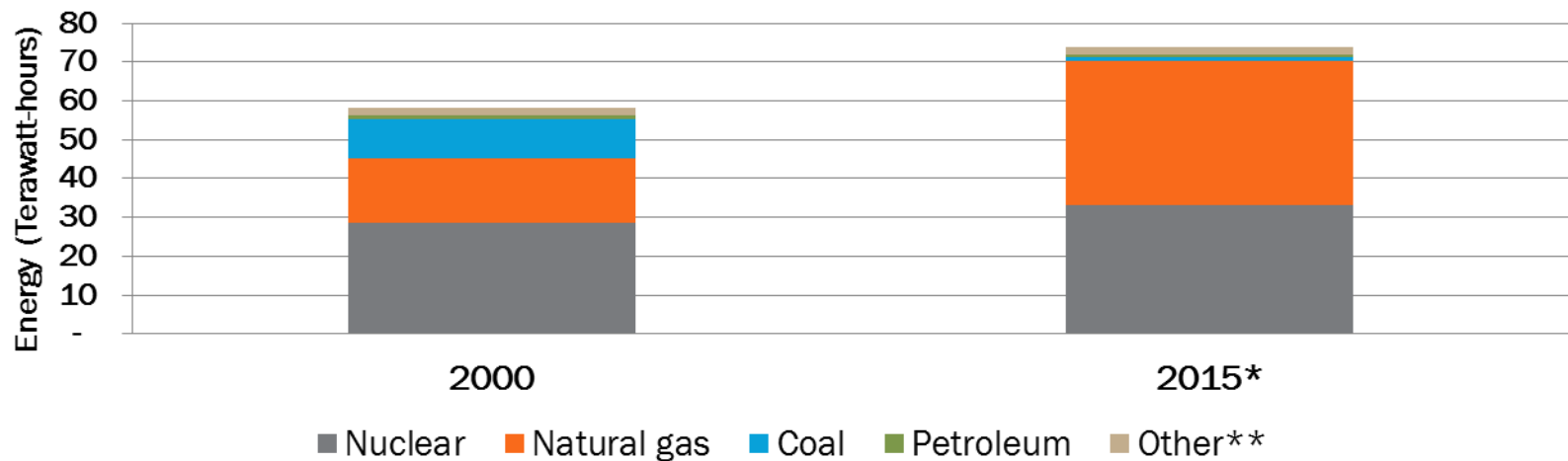
Note: For many years post restructuring, OH generation remained in rate base (except for FirstEnergy). FirstEnergy in NJ and PA (GPU fleet), Washington G&E (DC), Duquesne (PA) and Illinois utilities voluntarily divested generation.

Since deregulation, there has been a noticeable shift toward gas-fired generation and renewables in New Jersey

New Jersey Generation Mix - Capacity



New Jersey Generation Mix - Energy



Notes: * Adjusted to reflect closure of PSEG's Hudson and Mercer coal-fired stations on May 31, 2017

** "Other" includes hydro/pumped storage, solar, wind, biomass and other generation

Data Source: Energy Information Agency (www.eia.gov)

Policy goals are being integrated into the market in a disjointed fashion

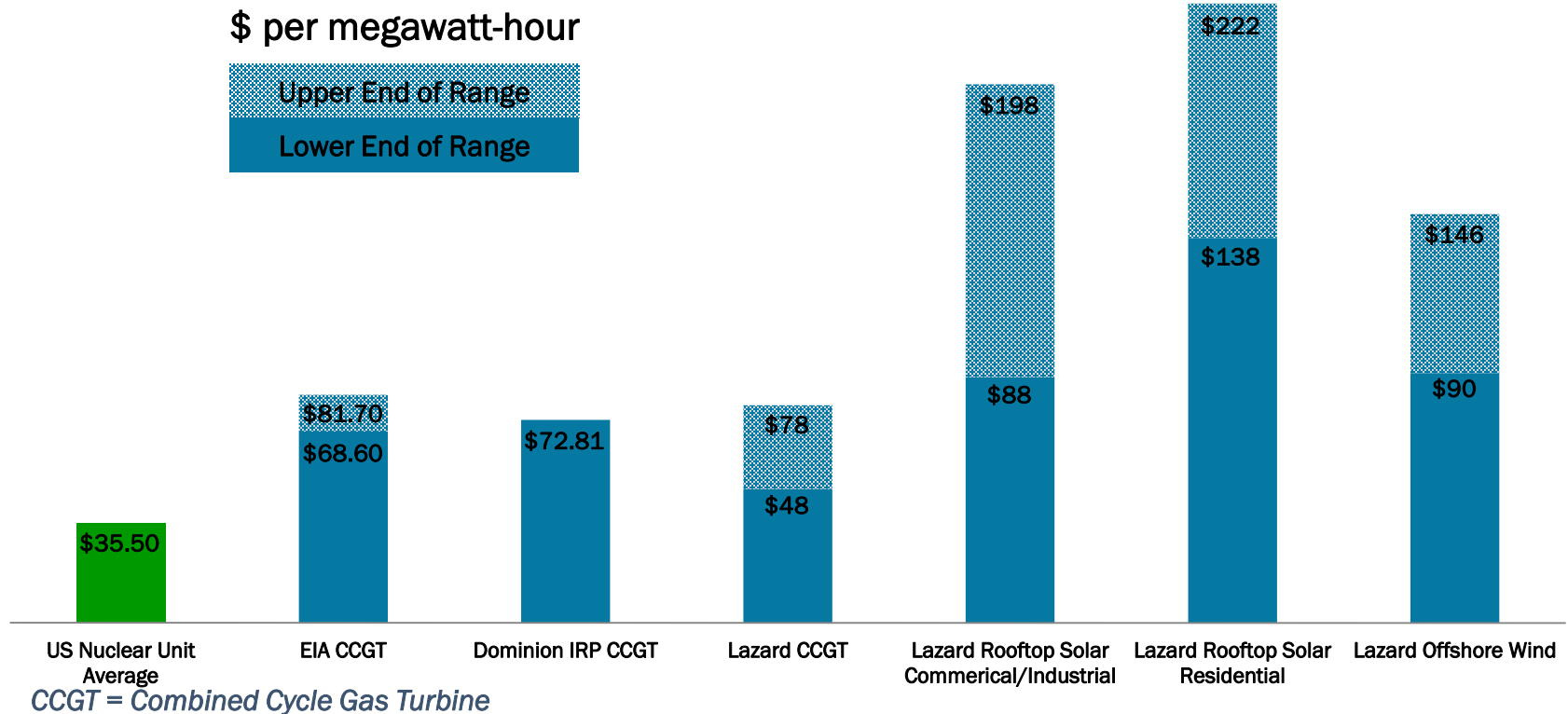
FERC/ISO have accommodated load/special interests

- FERC NOPR/Policy statement on storage – transmission and generation treatment
- FERC rulings:
 - No SCR for upstate NYISO demand curve
 - 200MW renewables exemption from MOPR in ISO-NE
 - MOPR exemptions in PJM
- Demand response performance and pricing rules

Policies favoring and/or subsidizing certain types of generation

- State
 - Renewable portfolio standards / renewable energy credits
 - Net metering, feed-in tariffs
 - Out-of-market payments, state-directed contracts
 - Tax abatements, economic development grants, tax-exempt financing
- Tax
 - Production tax credits / investment tax credits
 - 5-year MACRS federal tax depreciation for solar

Policy accommodations are driving toward a mix that is more expensive for consumers



Moving left to right on this chart, the sources of replacement power become more intermittent. In the case of solar, the above does not include the cost of storage which would be required as solar only produces when the sun shines

Sources: US Nuclear Unit Average from Nuclear Energy Institute April 2016 "Energy Costs In Context". Gas-fired combined cycle costs are levelized costs from (1) Energy Information Administration, Annual Energy Outlook 2015; (2) Dominion Virginia Power 2015 Integrated Resource Plan; (3) Lazard, Levelized Cost of Energy Analysis, 10.0, 2016. Rooftop solar and offshore wind costs are levelized costs from Lazard, Levelized Cost of Energy Analysis, 10.0, 2016

Significant market design changes are inevitable

1. Enhanced State Role

- States assume responsibility for “integrated resource plans” which incorporate the desired mix of conventional and renewable energy supply
- States develop their own “fixed resource requirement” for capacity
- PJM administers energy markets and daily system dispatch for economics and reliability

2. Enhanced PJM Role

- PJM acts as a true regional market by consolidating the states’ renewables/ resiliency requirements to set homogenized pricing for all attributes of generation
- PJM administers energy markets and daily system dispatch for economics and reliability

3. Accommodate State Public Policy Goals in Capacity Markets

- PJM administers energy markets and daily system dispatch for economics and reliability
- Capacity prices adjusted for generation receiving out-of-market payments
- State public policy goals for resiliency, fuel diversity and environmental attributes accommodated in capacity markets

In the absence of market-wide actions, we have no choice but to turn to the states

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