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National Association of Regulatory Utility Commissioners

Renewable Energy Auctions

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Overview

1. The United States' experience with administratively determined prices
2. The move toward competitive solicitations/auctions
3. Vertically Integrated States
4. Restructured States & Regional Transmission Organizations
5. Conclusion

Early Renewable Development

- Public Utility Regulatory Policies Act of 1978 (PURPA)
- Utilities “must purchase” the “energy and capacity” of “qualifying facilities” at “avoided cost”
- Although price is conceptually limited to “avoided cost,” PURPA essentially functions as a feed-in tariff for both renewable technologies, combined heat & power, and waste (e.g., petroleum coke).

Administratively Determined Pricing

- Regulators frequently mis-forecast “avoided cost,” leading to substantial out-of-market contracts
- Information asymmetry: rather than having moneyed interests vying against one another for business, they apply to a regulator for rents
- Regulatory arbitrage
- Not tied to customer needs

Competitive Selection

- Administratively determined pricing was the traditional way, but not the optimal way, to bring renewables online
- More and more utilities and states are moving toward renewable procurements conducted through competitive solicitations.
- How renewables are selected is significantly influenced by the market structure for electricity in various regions of the United States

The diverse States of the USA

- Restructured w/ Customer Choice: Northeast, Mid-Atlantic, + Texas
- Vertically Integrated: Everyone Else*

*Growing number of direct access arrangements in other states

Vertically Integrated Utilities

- More than half of States never ‘restructured’ their utilities.
  - In these places, owners of transmission & distribution also have a monopoly (or near-monopoly) on retail supply of electricity, and thus either own or contract for all generation
- In these jurisdictions, many State legislatures have imposed direct requirements on utilities to procure certain %s of renewable energy through Renewable Portfolio Standards, or through other mandatory carve-outs

Integrated Resource Planning

- Most vertically integrated utilities use ‘Integrated Resource Planning’ (IRP)
  - utility-conducted, government-overseen process
  - projected customers needs identified
  - expected production of existing resources forecast, and new resources specified
  - a planning model (e.g., EGEAS) is then run to make forecasts of supply/demand meet, identifying new resource build or retirements
  - this work is presented at Public Utility Commissions by vertically integrated utilities as evidence for cost recovery

So how does Renewable Procurement fit in?

- The IRP process solves for renewable mandates as a constraint, or deterministic output.
- Usually, these modeled outputs in the IRP process then become *inputs* to a Request for Proposals (RFP), or other type of competitive tender.
- Most States now require the use of competitive solicitations to procure renewables.

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Some recent results from Xcel (Colorado)'s Request for Proposals

RFP Responses by Technology

Generation Technology	# of Bids	Bid MW	# of Projects	Project MW	Median Bid Price or Equivalent	Pricing Units
Combustion Turbine/IC Engines	30	7,141	13	2,466	$ 4.80	$/kW-mo
Combustion Turbine with Battery Storage	7	804	3	476	6.20	$/kW-mo
Gas-Fired Combined Cycles	2	451	2	451	[redacted]	$/kW-mo
Stand-alone Battery Storage	28	2,143	21	1,614	11.30	$/kW-mo
Compressed Air Energy Storage	1	317	1	317	[redacted]	$/kW-mo
Wind	96	42,278	42	17,380	$ 18.10	$/MWh
Wind and Solar	5	2,612	4	2,162	19.90	$/MWh
Wind with Battery Storage	11	5,700	8	5,097	21.00	$/MWh
Solar (PV)	152	29,710	75	13,435	29.50	$/MWh
Wind and Solar and Battery Storage	7	4,048	7	4,048	30.60	$/MWh
Solar (PV) with Battery Storage	87	16,725	59	10,813	36.00	$/MWh
IC Engine with Solar	1	5	1	5	[redacted]	$/MWh
Waste Heat	2	21	1	11	[redacted]	$/MWh
Biomass	1	9	1	9	[redacted]	$/MWh
Total	430	111,963	238	58,283		

Issues to be decided in RFP Design

- Are RFPs subject to *ex ante* government approval, or are the results only judged after the fact?
- Will it be an 'all source' RFP, or will it target a specific technology?
- Where the renewable mandate has a cost cap, or something like it, how are results checked against conventional alternatives?
- How are transmission upgrades considered (is it the bidder's responsibility to factor in time/cost?)
- How are affiliate bids treated? (excluded? Independent evaluator?)

RFPs ≠ Auctions

- RFPs tend to be more informal. Auctions (at least in USA) are associated with a more formal process. Differences might include:
  - Specified quantity to be 'cleared' in auction, vs RFP where buyer may take more, or less, depending on results
  - For RFPs, typically a 'short list' which then results in further commercial negotiations around contract terms, as opposed to auction's obvious result
- RFPs for long-term arrangements intended to get around the 'lumpiness' of certain projects (e.g., online date, siting, or transmission access)

Customer Choice (1): 'Direct Access'

- Many large customers in 'vertically integrated' States desire to enter into separate Power Purchase Agreements, leaving vertically integrated utility's energy supply relationship with them.
- Community Choice Aggregators (CCAs) in California: Municipal governments that leave the load service obligations of traditional utilities, and instead sign PPAs with renewable developers.
- Large industrial customers in Montana, signing contracts directly with coal or hydro plants

Customer Choice (2): Green Tariffs

- Some vertically integrated utilities are moving to keep these customers with different product offerings
- ‘Green tariffs’ allow large customers with corporate-governance commitments to clean energy to procure a separately tariffed product that is more ‘green’ than the average supply, but the supply still comes from ‘the utility’.

Customer Choice (3): Some Problems

- Stranded costs: How to make sure departing customers pay for embedded costs of arrangements intended to supply them?
- Vertically integrated utilities are often co-opted by state governments for the least economic technology mandates, while direct access customers are able to obtain least-cost renewable PPAs
- If customer choice is good, why not ‘restructure’ the market?

Now Let's Talk about the Restructured Jurisdictions

- In the 1990s, many of the most populous states broke apart their vertically integrated utilities
- Generation: Wholesale Competition & Retail Choice

Electric Market Design

- Security Constrained Economic Dispatch (SCED): uses a bid-based auction, subject to locational congestion constrains on transmission grid, to result in *locational marginal prices* (LMPs) which load pays.
- The LMPs of a SCED are a real-time, or imbalance, energy price signal, which then informs the bidding behavior of other products, such as Day-Ahead Energy and Financial Transmission Rights (FTRs)
- Other products are also traded in RTOs wholesale markets (e.g., regulation, operating reserves, etc.)

Role of Market Design on Renewables

- One region (Mid-Atlantic/New England, a.k.a. RGGI) and one state (California) have a cap-and-trade program that causes there to be a price associated with emission of carbon-dioxide
- These costs are incorporated within the bids submitted within SCED
- All other things being equal, the higher price will inform competitive entry of renewables and other resources with low/no emissions factors
- In a perfect world, we'd let these markets be the 'renewable energy auctions'

Auctions ≠ Auctions

- SCED is typically not the auction we are talking about today.
- Some renewables do get built ‘on spec’: capital invested on speculation on wholesale prices. Example: Texas (here policy socialized the cost of transmission, which then led to extensive renewable development in Texas ‘panhandle’)
- However, restructured markets usually rely on longer-term competitive processes to bring renewables online, as opposed to market pricing (regardless of whether carbon is priced)

Vive la Difference?

- Restructured jurisdictions' renewables procurement end up looking similar to vertically integrated jurisdictions in important respects
- State legislatures use direct mandates (RPS) either on vertically integrated utilities, or – in restructured states – on either distribution company or load serving entity to specify a % renewable obligation, or similar mandate
- Those entities then acquire renewables in several ways

Paths to Renewables in Restructured Markets

- Example 1: State mandates distribution monopoly pay for renewable procurement resulting from RFP (cost becomes nonbypassable charge to all customers, regardless of 'customer choice')
- Example 2: State mandates renewable procurement for load-serving entities (LSEs).
  - LSEs buy Renewable Energy Credits (RECs), which adds to revenues earned by renewables in wholesale markets, or
  - LSEs enter into PPAs for renewables, both to satisfy renewable obligation & as price-hedge on wholesale energy market

Trouble Ahead?

- Nuclear generating stations are not profitable in several RTOs, due to cheap natural gas and growth in renewables. States (New York, Illinois, Connecticut) have stepped in to return these units to ‘cost of service’ regulation that exists in vertically integrated states.
- Rather than focusing on ‘least cost’ renewables, some States are focused on carve-outs for particular technologies (e.g., off-shore wind)
- RTOs are considering how to ‘mitigate’ or ‘accommodate’ renewable subsidies in their markets

Conclusion

- Most States, but not all, have competitive attributes to their procurement regime for renewables.
- No State (except Texas) relies on true auctions for renewable procurement, and carbon pricing is not sufficient to induce quantities of renewables satisfactory to policymakers elsewhere
- RFPs are not auctions, but they are widely used and a 2nd-best for least-cost procurement
- There is a significant diversity in approaches to generation procurement, which is largely a function of the diversity of States