

## Smart Rate Design for a Smart Future, Appendix C

# Restructured States, Retail Competition, and Market-Based Generation Rates

By Wilson Gonzalez

## Introduction

During the 1990s, several states restructured the generation portion of their electricity markets in an attempt to attain lower generation prices. They moved from a cost-based approach of generation pricing to a market-based approach to pricing. Restructuring required vertically integrated utilities to either divest or corporately separate their generation assets. The formerly vertically integrated utilities became “wires companies,” and they continued to provide “cost of service”-based distribution and transmission services. These electric distribution utilities (EDU) now served customers who purchased their electricity from non-utility providers, or else the EDU procured the electrons for their customers from generation in the competitive marketplace. Various structures and processes were developed in each state to purchase the electricity and make it available to electricity customers. This coincided with the development of regional wholesale electricity markets facilitated by federal legislation and regulation.

Customers in most restructured states have the ability to shop and purchase their own electricity from a retail electricity provider (REP) certified to provide electricity in the state.<sup>1</sup> Many states have set up web portals for customers to compare the terms and conditions of different competitive electricity offers.

Some restructured states have also allowed governmental and community aggregations to purchase electricity at a discount for their members.

The ability to market and sell directly to electricity customers has led to the development of new market players and technology companies pitching their energy goods and services to consumers.

## The Determination of Market-Based Generation Energy Rates

### Restructured States and Utility-Level Auctions

For states that have restructured, the determination of the generation cost portion of a customers’ bill differs markedly from states utilizing traditional cost of service regulation. The procurement of electricity from generation resources in restructured states is market based and firmly in place after 20 years of development following the restructuring movement in the United States.<sup>2</sup> Standard service offer<sup>3</sup> (SSO) electricity rates are usually determined by a wholesale auction or auctions, predominantly “declining clock,” that balance an EDU’s forecasted customer demand with generation resources.<sup>4</sup> For example, a recent wholesale generation auction in Ohio yielded the following results.

*“During the 21-round auction, held on Jan. 28, 2014, five competitive suppliers submitted winning bids for the one-year product opportunity to provide electricity to FirstEnergy customers. That auction resulted in a weighted average clearing price of \$55.83 per megawatt hour (MWh) [or 5.583*

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- 1 The term “CRES,” or competitive retail electric supplier, is also used.
  - 2 See Electric Restructuring by State at <http://www.eia.gov/electricity/policies/restructuring/>. Restructured states include CT, DE, IL, MA, MD, ME, MI, NH, NJ, NY, OH, PA, RI, TX, and DC.
  - 3 Sometimes referred to as “default service” or “POLR” (provider of last resort) service.
  - 4 In a “declining clock” or “Dutch” auction, the auctioneer starts very high and calls out progressively lower prices until the utility accepts the price that satisfies their resource requirements.

cents per kilowatt hour (kWh)] for the delivery period June 1, 2014 through May 31, 2015.”<sup>5</sup>

In other restructured states, there is a clearing price for different periods of the weekday; that is, a TOU is the default service.<sup>6</sup> Legislation and Public Utility Commission rules and regulations typically govern such auctions.<sup>7</sup> Rules usually include consumer protections to mitigate market power.<sup>8</sup> This supply-side auction process may supply the entire electricity service to retail customers; or, in states that allow retail choice<sup>9</sup> and customer shopping, a portion of the state’s electric service. Either the auction serves to provide the entire supply of power which is then resold by the utility to all its customers because only wholesale and not retail competition is permitted, or it provides power only to “default service customers” which are those customers who can shop for their own supplier but choose not to.

A looming issue before residential and small commercial customers is whether default service should be time-differentiated.<sup>10</sup> A variant also discussed is providing customers taking default service with the choice of both a fixed and time-differentiated SSO.<sup>11</sup> The potential benefits and concerns of this evolving issue are discussed later on in the section that reviews time-differentiated pricing.

## Consumer Protections in the Auction Process

In order to protect customers from the exercise of market power from generation suppliers during the auction process, a number of protections are usually established, such as:

- i. Bidding process should be conducted by an independent bid manager with regulatory oversight
- ii. Number of required bidders (for example, at least four bidders may constitute a fair auction)
- iii. What percentage can be awarded to the EDU’s unregulated affiliate, or to the largest bidder (load cap)
- iv. Whether a cost cap establishing an auction ceiling price will be established before the auction
- v. Prohibition of incumbent utility with regulated assets from bidding
- vi. No stand-by charges or provider of last resort charges
- vii. Other conditions as appropriate

## Treatment of Customer Price Volatility Risk Mitigation Strategies

Energy markets have historically had periods of volatility that can adversely impact customer electricity bills.<sup>12</sup> Therefore, SSO auctions many times incorporate portfolio risk management techniques such as the laddering of resources and the procurement of electricity products of different

5 “In the competitive bid process, the companies will seek to procure, on a slice of system basis, the aggregate wholesale ‘full requirements’ SSO supply, which includes energy and capacity, resource adequacy requirements, market-based transmission service, and market-based transmission ancillaries, to serve their retail SSO load.” See <http://dis.puc.state.oh.us/TiffToPDF/A1001001A12D13B71321J51359.pdf>, p. 7, and <http://www.puco.ohio.gov/puco/index.cfm/media-room/media-releases/puco-accepts-results-of-firstenergy-auction5/#sthash.tkbn6MFn.dpbs>.

6 Usually for non-residential customers.

7 For example, issues to address in legislation or regulation are usually:

- i. Competitive bid process bidding rules (including, but not limited to the type of auction (declining clock, English, Vickrey second-price bid, etc.)
- ii. Slice of system, full requirements SSO supply including energy, capacity, resource adequacy requirements, market-based transmission service, or a class-based procurement, or some other configuration
- iii. Development of bid process communications protocols
- iv. Necessary SSO Supply Agreement (see <http://dis.puc.state.oh.us/TiffToPDF/A1001001A12D13B71704F86878.pdf> for an example of a Supply Agreement)

8 Market power is the ability of a firm to profitably raise the market price of a good or service over marginal cost.

9 Retail choice refers to states where electricity customers can choose the company that will provide their generation.

10 Mandatory time-differentiated SSO rates for large commercial and industrial customers have been implemented in New Jersey where customers who want a fixed rate have to look to CRES offers.

11 See Borenstein, S. (2012). *Effective and Equitable Adoption of Opt-In Residential Dynamic Electricity Pricing*. NBER Working Paper No. 18037. Available at: <http://www.nber.org/papers/w18037>. Borenstein found that low-income households would, on average, see almost no change in their bills, while low-consumption households could see their bills decline somewhat and high-consumption households would see their bills rise. He further demonstrated that the opt-in approach is unlikely to increase the flat rate charged to other customers by more than a few percentage points.

12 Prior to the recent decreases in natural gas prices, auctions in restructure states such as Maryland and Illinois experienced double-digit electricity generation increases.

lengths. The laddering of resources (by purchasing products of different lengths and having multiple bid processes) is an established practice in several states and helps shield customers from market volatility. In the same FirstEnergy auction referenced above, “[f]or the two-year product, four competitive suppliers submitted winning bids resulting in an average clearing price of \$68.31 per megawatt hour (or 6.831 cents per kWh) for the delivery period June 1, 2014 through May 31, 2016. These results will be blended with previous auctions and two upcoming auctions to establish retail generation rates from June 1, 2014 through May 31, 2016.”<sup>13</sup>

## The Determination of Market-Based Capacity Costs

### The Evolution of the RTO/ISO

Until the Public Utility Regulatory Act (PURPA) in 1978, the private electrical power market resembled a collage of localized monopoly utilities responsible for generation, transmission, and distribution serving consumers at regulated prices.<sup>14</sup> The Federal Energy Regulatory Commission (FERC) instituted open access regulation of transmission in 1996 to help establish wholesale power markets.<sup>15</sup> Several years later, the FERC

required public utilities that owned or operated transmission facilities to participate in Regional Transmission Organizations (RTOs) and guarantee open access to all third-party providers. The opening of access to transmission by the Federal Energy Regulatory Commission (FERC) under order 2000 in December 1999 was a watershed in the development of the national market for wholesale electric power.<sup>16</sup> The FERC actions led to the development of Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) that manage transmission systems covering regional markets in more than two-thirds of the United States.

Table C-1

### Weighted Average Auction Price Example

An example of deriving a weighted average auction price and its blending with another auction’s results is as follows:

#### FE Ohio Auction Results

(wholesale prices — cost to Ohio utilities), October 20, 2010

#	Time Frame	Product # of Months	Tranches	\$/MWh	Total
A	B	C	D	E	F
1	6/1/11-5/31/12	12	17	\$54.55	\$927.35
2	6/1/11-5/31/13	24	17	\$54.10	\$919.70
3	6/1/11-5/31/14	36	16	\$56.58	\$905.28
4			50		\$2,752.33
5		Weighted Average (effective 6/1/11-5/31/12)		\$55.047	

Notes: (D)1=(B)1\*(C)1; (D)2=(B)2\*(C)2; (D)3=(B)3\*(C)3; (B)4 = Sum of (B)1:(B)3; (D)4=Sum of (D)1:(D)3; (E)5=(D)4/(B)4  
Source: (B)1:(B)3 Case No. 10-1284-EL-UNC

#### January 25, 2011, Auction Results

#	Time Frame	Product # of Months	Tranches	\$/MWh	Total
A	B	C	D	E	F
6	6/1/11-5/31/12	12	17	\$ 56.13	\$ 954.21
7	6/1/11-5/31/13	24	17	\$ 54.92	\$ 933.64
8	6/1/11-5/31/14	36	16	\$ 57.47	\$ 919.52
9			50		\$ 2,807.37
10		Weighted Average (effective 6/1/11-5/31/12)		\$ 56.147	

Notes: (D)6=(B)6\*(C)6; (D)7=(B)7\*(C)7; (D)8=(B)8\*(C)8; (B)9 = Sum of (B)6:(B)8; (D)9=Sum of (D)6:(D)8; (E)10=(D)9/(B)9  
Source: (B)6:(B)8 Case No. 10-1284-EL-UNC11.

**Average of Both Auctions:** \$ 55.597 per MWh, or 5.5597 cents per kWh.

Notes: (F)11=((E)5+(E)10)/2

13 Ibid.

14 Specifically, it created a market for power from non-utility power producers. It also required that electric utilities buy power from third-party cogeneration plants at the utility’s own avoided costs.

15 See <http://ferc.gov/industries/electric/indus-act/oatt-reform/history.asp>.

16 Ibid. The seven major RTOs/ISOs are the California ISO, the Southwest Power Pool, the Electric Reliability Council of Texas (ERCOT), PJM Interconnection, Midwest ISO (MISO), New York ISO (NYISO), and ISO New England (ISO-NE).

## Wholesale Energy and Capacity Markets

One of the responsibilities of RTO/ISO is to ensure the reliability of the transmission grid. They accomplish this by determining resource adequacy.<sup>17</sup> Resource adequacy is essentially the ability to supply electricity load with adequate generation resources.<sup>18</sup> Two market-based designs have evolved to ensure resource adequacy: an energy-only market and a centralized capacity market.<sup>19</sup>

Energy-only market designs are predicated on the concept of “scarcity pricing,” where prices are generally uncapped (or have higher caps) and therefore generators will be appropriately compensated with higher electricity prices during system peak events. This theoretically will lead to adequate generation investment levels through a combination of constrained demand and increased supply during very high-cost hours.

Table C-2

Scarcity Pricing and DR Integration						
	Res. Ad. Construct	Price Cap	Offer Cap	DR	Reserves Shortage Pricing	Other
<b>Alberta</b>	Energy-Only	\$1000/Mwh	\$999.99/MWh	DR bids	n/a	Permissive generator offer guidelines
<b>Australia</b>	Energy-Only	\$12,900/MWh (AUD) Adjusted Annually	Price cap (considering peak period restrictions on dominant generators)	DR bids	n/a	<ul style="list-style-type: none"> <li>• Administrative ex-post pricing corrects for interventions</li> <li>• Cumulative Price Threshold limits persistent high prices</li> </ul>
<b>ERCOT</b>	Energy-Only	None (but exceeding offer cap unlikely)	\$7,000/MWh (increasing to \$9,000/MWh in 2015)	DR bids in day-ahead	Dispatched at prices from \$120 to offer cap	Peaker Net Margin cap limits persistent high scarcity pricing
<b>CAISO</b>	Reliability Requirement and Regulated Planning	None (but exceeding \$2,000 unlikely)	\$1,000/MWh or lower w/ mitigation	DR bids in day-ahead and real-time	Additive \$100-\$700 penalty factors	n/a
<b>MISO</b>	Reliability Requirement and Regulated Planning	\$3,500/MWh (Based on Residential VOLL)	\$1,000/MWh or lower w/ mitigation	DR bids in day-ahead and real-time	Additive penalty factors and function of VOLL-LOLP	n/a
<b>ISO-NE</b>	Forward Capacity Marketing	\$2,000 to \$2,250/MWh by location	\$1,000/MWh or lower w/ mitigation	DR bids in day-ahead and real-time	Additive \$50-\$850 penalty factors by location and type	n/a
<b>PJM</b>	Forward Capacity Marketing	\$1,000/MWh in 2012, increasing to \$2,700/MWh by 2015	\$1,000/MWh or lower w/ mitigation	<ul style="list-style-type: none"> <li>• DR bids in DA and RT</li> <li>• Emergency DR can set price</li> </ul>	Additive \$850 penalty factors for spin and non-spin	Emergency imports can set price
<b>NYISO</b>	Prompt Capacity Marketing	\$1,850 to \$2,750/MWh by location	\$1,000/MWh or lower w/ mitigation	<ul style="list-style-type: none"> <li>• DR bids in DA</li> <li>• Emergency DR at \$500</li> </ul>	Additive \$25-\$500 demand curves	n/a

17 Given the rise in variable energy resources, the concept of “system quality,”—that is, a function of the types of resources that make up your generation mix—should be added to resource adequacy. See Hogan, M. (2012, August 14). *What Lies Beyond Capacity Markets? Delivering Least-Cost Reliability Under the New Resource Paradigm*. Montpelier, VT: The Regulatory Assistance Project.

18 Especially during peak load and generation outage conditions.

19 Pfeifenberger, J. P. (2014, July 2). *Resource Adequacy Requirements, Scarcity Pricing, and Electricity Market Design Implications*. The Brattle Group.

Centralized capacity markets stress maintaining physical resource adequacy standards where energy market prices are administratively capped, and generation investments are deemed insufficient. Currently, ISO-NE, PJM, and NYISO operate capacity markets to determine capacity prices in their regions. Table C-2 summarizes the various current market designs.<sup>20</sup>

Using PJM as an example, capacity prices are determined in a forward capacity market through PJM’s “Reliability Pricing Model” (RPM).

The RPM provides:<sup>21</sup>

- Procurement of capacity three years before it is needed through a competitive auction that includes both supply-side and demand-side resources such as demand response (DR) and energy efficiency (EE);
- Locational pricing for capacity that reflects limitations on the transmission system’s ability to deliver electricity into an area and to account for the differing need for capacity in various areas of PJM;
- A variable resource requirement to help set the price

for capacity; and

- A backstop mechanism to ensure that sufficient resources will be available to preserve system reliability.

The results of the 2017–2018 PJM capacity auction by locational delivery area<sup>22</sup> appear in Table C-3.

For FirstEnergy Ohio Companies that are in the ATSI zone, the cost for capacity from July 2017 through June 2018 will be \$120 per megawatt (MW) per day, according to the table.

### The Translation of Wholesale Rates to Retail Rates

Converting the PJM wholesale capacity cost of \$120 per MW day into a retail billable amount can take various forms for different customer classes. For residential customers not subject to demand charges, the auction clearing capacity price is usually converted into a cost per kWh (see Table C-4).

For commercial and industrial customers subject to

Table C-3

PJM Capacity Auction Results													
Auction Results	RTO	MAAC	SWMAAC	PEPCO	BGE	EMAAC	DPL-SOUTH	PSEG	PS-NORTH	AT SI	AT SI-CLEVELAND	PPL	COMED
Offered MW (UCAP)	178,838.50	72,351.30	12,645.00	6,133.70	4,107.00	33,706.00	1,684.10	6,833.10	4,039.00	12,172.60	2,561.00	10,727.60	26,701.30
Cleared MW (UCAP)	167,003.70	68,363.90	11,693.40	5,937.80	3,351.30	32,210.90	1,682.30	6,110.70	3,893.20	8,977.30	2,548.60	9,348.50	22,551.00
System Marginal Price	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00
Locational Price Adder*	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sub-Annual Resource Price Decrement**	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	(\$66.02)	\$0.00
Limited Price Decrement	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)	(\$13.98)
RCP for Limited Resources	\$106.02	\$106.02	\$106.02	\$106.02	\$106.02	\$106.02	\$106.02	\$201.02	\$201.02	\$106.02	\$106.02	\$40.00	\$106.02
RCP for Extended Summer Resources	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$215.00	\$215.00	\$120.00	\$120.00	\$53.98	\$120.00
RCP for Annual Resources	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$215.00	\$215.00	\$120.00	\$120.00	\$120.00	\$120.00

\*Locational Price Adder is with respect to the immediate parent LDA  
 \*\*Extended Summer and Limited DR receive the Sub-Annual Price Decrement

20 Pfeifenberger, p. 8. A “price cap” is the highest price allowed in the wholesale market and is a price mitigation tool. An “offer cap” is the highest price that a resource can offer to the wholesale market. “DR” means the demand response treatment in the market. “Reserves Shortage Pricing” refers to pricing and penalties in cases of reduced power reserves to ensure sufficient generation is available when needed.

21 See <http://www.pjm.com/markets-and-operations/rpm.aspx> for more detail.

22 There are currently 23 locational delivery areas in PJM. See [https://docs.askives.com/docs\\_file.php?v=RGVmaW5pbmcgTERB4oCZcyAtIFBKTSAtIEhvbWUKaHR0cDovL3d-3dy5wam0uY29tL34vbWVkaWEvY29tbWl0dGVlcy1nc-m91cHMvY29tbWl0dGVlcy9wYy8yMDA5MDYwOS8yM-DA5MDYwOS1pdGVtLTA5LWRLZmluaW5nLWxkYXMuYX-NoeAow](https://docs.askives.com/docs_file.php?v=RGVmaW5pbmcgTERB4oCZcyAtIFBKTSAtIEhvbWUKaHR0cDovL3d-3dy5wam0uY29tL34vbWVkaWEvY29tbWl0dGVlcy1nc-m91cHMvY29tbWl0dGVlcy9wYy8yMDA5MDYwOS8yM-DA5MDYwOS1pdGVtLTA5LWRLZmluaW5nLWxkYXMuYX-NoeAow).



Table C-4

PJM Sample Calculations (PJM capacity cost to FirstEnergy retail rate)		
Notes/Descriptions		
PJM Capacity Price (\$/MW-Day)(1)	\$120.00	capacity price PJM BRA
Average Load Factor (2)	0.6	60 percent assumed average load factor
Capacity Price (\$/MWh)(3)	\$8.33	line 1/24/line 2
Average Loss Factor (4)	0.04	4% assumed average loss factor
Retail Rate (\$/MWh) (5)	\$8.68	Line 3/(1-line 4)
Retail Rate (\$/kWh) (5)	\$0.0087	Line 7/1000

demand charges, the capacity costs are converted into \$3.65/kW/month (taking into account the difference in billed kW reflecting customer diversity), or they can be converted to a TOU rate.<sup>23</sup>

Once the energy and capacity cost of market-based generation is established, these costs are added to the regulated “costs of service” for transmission and distribution services.

**Bidding of Energy Efficiency and Demand Response Resources in Wholesale Capacity Markets**

PJM, ISO-NE, and NYISO all have wholesale capacity markets. These wholesale capacity markets accept utility and third-party EE and peak demand reduction capacity savings to be bid into their capacity markets.<sup>24</sup> The resources have to be demonstrated to be eligible by meeting the RTO/ISO’s monitoring and verification criteria.<sup>25</sup> Some distribution utilities whose corporate owners still own significant generation have balked at bidding in all their eligible EE and peak demand capacity savings, presumably

because it lowers the prices in capacity markets which impacts their unregulated subsidiary’s generation profits. The DR savings are significant, around \$400 per customer per year in the PJM 2013/2014 delivery year.<sup>26</sup>

Therefore, regulators should require their utilities to bid in all eligible EE and DR resources into the existing capacity markets to exert downward pressure on capacity prices. The payments made to the utility for the EE and DR resources clearing the market

should be credited back to customers who pay for the utility EE programs, generally through reductions in otherwise applicable system benefit charges.

**The Advent of Retail Competition**

Most restructured states allow for forms of retail competition.<sup>27</sup> This means that customers can either take their power from the utility SSO or voluntarily shop for a competitive retail electricity supplier (CRES).<sup>28</sup> With this choice, electricity customers ranging from large industrials to residential can shop for electricity supply from a diverse group of competitive suppliers usually certified by a state’s public utility commission. The offers made to customers are varied, but are generally only for the generation portion of the bill.

Retail competition is vibrant in some states. In Ohio, nearly 2 million electric customers are already participating either individually or with aggregation groups.<sup>29</sup> Ohio has 94 certified retail marketers.<sup>30</sup> In Illinois nearly 2.4 million ComEd residential electric customers and 677,700 Ameren

23 \$120/MW day multiplied by 365 days in the year = \$43,800. \$43,800/1,000 (kW/MW)/12 months = \$3.65/kW/month. For consistency, this demand charge should be based on coincident peak demand.

24 In light of the vacated FERC Order 745 by the US Court of Appeals, the inclusion of peak demand reduction programs assumes state level programs under state regulatory jurisdiction.

25 For example, the programs must comply with the Measurement & Verification (“M&V”) protocols in PJM Manual 18b for energy efficiency resources, and PJM Manual 18 Section 4.3, Load Management Products (and all PJM manuals referred therein) for load management resources (“LM”).

26 Keystone Energy Efficiency Alliance. (2012). Enernoc’s Healy, PJM’s OTT reflect on latest PJM auction. Available at: <http://energywisepa.org/node/1536>.

27 17 mostly restructured states and the District of Columbia allow retail competition.

28 As indicated on p. C-1, a CRES is also sometimes called a retail electricity provider (REP). See the Retail Energy Supply Association website at <http://www.resausa.org/>.

29 See <http://www.puco.ohio.gov/emplibrary/files/media/ECO/PUCO-ECO-SellSheet-web.pdf>

30 See <http://www.puco.ohio.gov/puco/index.cfm/docketing/regulating-company-list/?IndId=30#sthash.tYBIJHLD.dpbs>

residential electric customers totaling over 3.1 million residential customers have left utility supply service.<sup>31</sup> CRES providers in Illinois include:

- 54 certified suppliers (12 certified to only serve themselves)
- 22 certified to serve residential and small commercial customers (twice as many as last year), with two more pending at the Illinois Commerce Commission
- 18 registered with Ameren, 17 of which are actively selling
- 24 registered with ComEd and all are actively selling<sup>32</sup>

To date, Texas is the only state that has fully embraced retail competition and requires customers to choose a CRES for electric generation service with no back-stop default rate.

### Retail Competition Pricing Models

For retail suppliers, the pricing of the electricity is usually established by taking into account the customer's load profile, wholesale electricity prices, marketing costs, duration of the contract term, and whether the price offered is variable or fixed.

### Range of Electricity Rates Offered<sup>33</sup>

Retail suppliers offer a wide range of electricity rates to customers. Since they can target large customers or a group of customers, they can tailor the rates to that individual or customer group load profile. Pricing appears to be based strictly on short-term marginal costs.<sup>34</sup> The major terms of a contract with a CRES are:

- Rate: These are usually fixed, but can be variable or

time-differentiated (if the meter allows and billing can accommodate)<sup>35</sup> and it may also be an introductory price of limited duration

- Duration: Short-term or multi-year and whether the terms of the contract are renewable upon expiration
- Early termination fees, if any
- Any other monthly or other fee
- Any promotional offers or value-added products (EE products, energy management system)

The Texas wholesale market is characterized by a large supply of wind power that often results in wholesale prices below \$.02/kWh at night – and even negative prices at times. TXU Energy is a CRES, a sister company to the distribution utility serving the Dallas/Fort Worth area (Oncor). TXU Energy sponsored a ‘free nights’ program in May of 2012, and added a ‘free weekends’ option in May of 2013. In only 15 months, the programs attracted almost 100,000 participants, or a 3% market share. Competitor Direct Energy responded with a similar program, offering free electricity on Saturdays. It has since introduced the offering in other states in which it operates. And Reliant Energy offers a plan with deeply discounted rates for electricity used on both evenings and weekends.”<sup>36</sup> This takes advantage of historic cellular marketing (free nights and weekends), but is functionally the equivalent of a TOU rate design.

### “Apples to Apples” Rate and Bill Comparisons

To assist customers shopping for electricity, a state will offer a comparison of rate options per utility service territory. These comparison charts are very helpful in evaluating the different offers. The following are examples of retail rate comparison for residential customers in Dallas and Dayton (Ohio) Power and Light's service territory.<sup>37</sup>

31 See <http://www.illinoiscompetitiveenergy.com/>

32 See [http://www.illinoiscompetitiveenergy.com/Illinois\\_Retail\\_Electric\\_Market\\_Highlights-2011\\_ORMD\\_Report.pdf](http://www.illinoiscompetitiveenergy.com/Illinois_Retail_Electric_Market_Highlights-2011_ORMD_Report.pdf)

33 See <http://www.energychoice.ohio.gov/ApplesToApples-Comparison.aspx?Category=Electric&TerritoryId=2&RateCode=1> for the retail choices available in Ohio.

34 A cursory review of the Texas offerings revealed a proliferation of declining block rate energy structures.

35 TOU rates have been available in Texas, although other states that allow retail competition with large AMI deployments are working on the necessary data management portals to allow this.

36 Alvarez, P. (2014, January 3). *Free Nights & Weekends and the Battle to Increase Voluntary Adoption of Time-Varying Rates*. The Wired Group. Available at: <http://newsletters.wiredgroup.net/?m=201401>. “This is exactly the type of market innovation the Texas legislature hoped for when authorizing retail electric competition in 1999 and by directing the Texas Public Utilities Commission to approve smart meter investments by investor-owned distribution utilities in 2005.”

37 See <http://energychoice.ohio.gov/ApplesToApplesComparison.aspx?Category=Electric&TerritoryId=9&RateCode=1> And <https://www.texaselectricrates.com/compare-offers.php?ZipCode=75206>. This represents the first four of 36 plans available in the 75206 zip code.

Figure C-1

### Dallas Retail Rate Comparison

We found 36 plans available in Dallas. Need help choosing the best one for you?  
Call 1-877-903-0887 or [Chat with us!](#)

Electricity Rates for 75206 Edit

Type: **Electric** Show: **All** Green No Contract Sort by: **Our Picks** **Lowest Rate** Company Term

Company	Product	Term	Rate(kwh)	How to order
TXU energy Company Info	<b>Smart Deal 12</b> A great low rate with guaranteed price protection for 1 full year. Exclusive online offer available to new customers. <a href="#">Product Details</a>	12 Months	7.9¢	Call 1-877-833-9654 or <a href="#">Order Online</a>
just energy Company Info	<b>Power Max 12</b> Phone only special! Take advantage of our LOWEST intro rate and enjoy guaranteed rate protection for the remainder of your term. <a href="#">Product Details</a>	12 Months	8.2¢	Call 1-877-833-9654
bounce energy Company Info	<b>Thrifty Saver Promotional</b> Earn an additional \$50 in bill credits or \$50 Gift Card, 3% off with Platinum Status, free month of electricity and more. <a href="#">Product Details</a>	Month to Month	8.2¢	Call 1-877-552-5065
First Choice Power Company Info	<b>Texas Choice Savings 12</b> <a href="#">Product Details</a>	12 Months	8.3¢	Call 1-877-833-9654 or <a href="#">Order Online</a>

Figure C-2

### Dayton Power and Light Retail Rate Comparison

**Search**  
65 RECORDS FOUND

Dayton Power & Light

My Current Rate (Optional)

Price per kWh:  
From \$  to \$

Term Length (months):  
From  to

Early Termination Fee:  
From \$  to \$

Monthly Fee  
From \$  to \$

Renewable Content

Rate Type

Electric Supplier Listing

[FILTER RESULTS](#)

<a href="#">Click to Compare</a>	Supplier	S/KWh	Rate Type	Renew. Content	Intro. Price	Term. Length	Early Term. Fee	Monthly Fee	Promo. Offers
<input type="checkbox"/>	Titan Gas And Power 3355 W. Alabama Houston, TX 77098 (713) 355-6200 <a href="#">Company Url</a> <a href="#">Offer Details</a> Terms of Service <a href="#">Sign Up</a>	0.0720	Fixed	5%	No	3 mo.	\$10 <a href="#">details</a>	\$0	No
<input type="checkbox"/>	Star Energy Partners LLC 3340 W. Market Street, Suite 100 Akron, OH 44333 (855) 427-7827 <a href="#">Company Url</a> <a href="#">Offer Details</a> Terms of Service <a href="#">Sign Up</a>	0.0769	Fixed	25%	No	12 mo.	\$80	\$0	No
<input type="checkbox"/>	North American Power And Gas LLC 20 Glover Avenue Nowalk, CT 06851 (888) 313-9086 <a href="#">Company Url</a> <a href="#">Offer Details</a> Terms of Service <a href="#">Sign Up</a>	0.0699	Fixed	25%	No	12 mo.	\$10 <a href="#">details</a>	\$0	No
<input type="checkbox"/>	Direct Energy Services LLC PO Box 180 Tulsa, OK 74101 (877) 698-7551 <a href="#">Company Url</a> <a href="#">Offer Details</a> Terms of Service	0.0655	Fixed	0%	No	18 mo.	\$99	\$0	No



## Who Regulates Competitive Retail Electricity Suppliers?

In states sanctioning retail competition, all energy marketers and suppliers (and sometimes community aggregation suppliers) are required to be certified through the state's Public Utilities Commission. To be certified, companies are usually required to meet the regulators' strict financial, managerial, and structural guidelines. There are also codes of conduct with which the CRES suppliers must comply,<sup>38</sup> and complaints and complaint resolutions are usually handled by the commission or another state consumer protection agency. While the commissioners no longer regulate prices, they do regulate and oversee the conduct of the market to ensure fairness at all levels.

Since the public utility commissions many times do not have jurisdiction over what types of rates marketers choose to offer, caveat emptor —“let the buyer beware”— should be heeded by consumers. In the UK, this has been addressed by requiring every retail electric supplier to offer at least two “standardized” products — varying monthly and fixed for one year — which consumers can readily compare.

## Should SSO Service Be Eliminated In Favor of Full Retail Competition?

A debate is raging between customers, distribution utilities, and CRES in restructured states that have an SSO and allow for retail competition. In those states, the CRES providers are trying to severely limit or terminate the electric distribution company SSO.<sup>39</sup> They argue that they are best positioned to offer time-differentiated and dynamic rates in states that have deployed smart meters.<sup>40</sup> Some consumer advocates do not agree and argue that eliminating the SSO would eliminate a vital

consumer choice and remove the discipline that the SSO exerts on CRES pricing.<sup>41</sup> Many are concerned that lower-income consumers will not have competitive options as a result of burdensome terms of service. To support their position, they point to evidence “demonstrating that Texas retail electricity customers residing in service territories with no default service pay higher prices than similarly situated customers residing in territories served by municipal utilities that have not unbundled generation and distribution functions.”<sup>42</sup>

## Aggregators and Intermediaries

Some restructured states also allow for other entities to supply customers with electricity. These aggregators and intermediaries help retain simplicity for customers facing complicated price schedules while enabling more economic transactions for customers. They can assist in bridging wholesale and retail electric markets. One such option is for the customer to become part of a group that buys electricity for its members.

## Aggregation and Municipal Aggregation

An aggregator is a person or organization that brings a group of customers together. A large buying group may be able to get a better price for the group members than you could get on your own. An aggregator may also have a better understanding of market volatility and incorporate risk-mitigating strategies. The electricity is usually procured from a supplier or suppliers through a competitive Request for Proposal. This “buying power” may also allow aggregators to negotiate for additional benefits for the group's members such as consolidated billing, energy management services, and energy use analysis.<sup>43</sup>

38 Competitive Retail Electric Service Providers, Chapter 4901:1-21. Available at: <http://codes.ohio.gov/oac/4901%3A1-21>.

39 See Direct Energy Comment in: <http://dis.puc.state.oh.us/TiffToPdf/A1001001A14B06B50600C93822.pdf>. Also, Retail Energy Supply Association (RESA) Initial Comments in same docket, pp. 4, 16-19 (2013, March 1).

40 See Reply Comments of the RESA in PUCO Case No. 12-3150-EL-COI, page 18.

41 The Office of the Ohio Consumers' Counsel (OCC). Comments on PUCO Staff's Market Development Work Plan, pp. 2-4. Available at: <http://dis.puc.state.oh.us/TiffToPdf/A1001001A14B06B64817J32560.pdf>. Also see:

Comments of Ohio Partners for Affordable Energy, AARP, the Ohio Poverty Law Center, Edgemont Neighborhood Coalition, ProSeniors, Inc., Southeastern Ohio Legal Services, Legal Aid Society of Columbus, Legal Aid Society of Cleveland, Communities United for Action, and the Citizens Coalition on the Staff's Market Development Work Plan. Available at: <http://dis.puc.state.oh.us/TiffToPdf/A1001001A14B06B40710H49542.pdf>.

42 OCC, p. 4.

43 See <http://www.puco.ohio.gov/puco/index.cfm/consumer-information/consumer-topics/governmental-energy-aggregation-local-community-buying-power/#sthash.THblBRPP.dpbs>

Aggregated groups can often get a better price because the marketer saves money from having to market to customers on an individual basis and can pass some of those savings on to the aggregated customers.

Buying groups may be formed by existing organizations, or new groups may be formed solely for the purpose of buying electricity for their members. Some state legislation also allows for local government aggregation by cities, townships, or counties, with “opt-in” or “opt-out” provisions for their consumers. In an “opt-in” aggregation the customer must affirmatively sign up to the aggregation, whereas in an “opt-out” aggregation a customer is considered to be part of the aggregation unless they affirmatively chose not to participate. Aggregators usually must be certified by the Public Utility Commission of the state to make sure they are qualified to provide electricity services. A major government aggregator in Northeast Ohio is NOPEC, which serves 500,000 electric consumers and 300,000 natural gas consumers receiving distribution service from 134 members in 174 communities.<sup>44</sup>

### Electricity Attribute Aggregators: Demand Response and Curtailable Service Providers

The evolution of wholesale capacity markets has led to the development or expansion of non-utility third-party companies, called curtailable service providers (CSPs), whose main business is to aggregate the electricity attributes of customers and then market them to utilities or to wholesale energy and capacity markets. Two such attributes are electricity energy and capacity as represented by DR.<sup>45</sup> DR “refers to deliberate load reductions during times of system need, such as periods of peak demand or high market prices. Because reduced consumption and increased generation can both restore a

system’s supply and demand to equilibrium, DR can be a resource that offsets or defers the need for new generation, transmission, and/or distribution infrastructure.”<sup>46</sup>

Historically, vertically integrated utilities offered “interruptible tariffs” to their large customers. Some utilities also offered EE programs to their customers. With the advent of the Internet and improvements in metering and control equipment, DR capabilities extend beyond industrial customers and the companies now aggregate industrial, commercial, and residential customers and manage their usage to maintain grid reliability or to allow wholesale markets to operate more efficiently.<sup>47</sup>

These companies use sophisticated energy management systems and other types of communication interfaces to reduce customer loads as contractually agreed upon. DR resources are paid in the same way supply-side generators are paid — by receiving capacity and energy payments.<sup>48</sup>

The DR impacts in the wholesale energy and capacity markets are significant. A study of the benefits of DR and EE in the PJM market by the Brattle Group indicated that a 3% reduction of demand during peak periods translates to wholesale price reductions of 5% to 8% on average, with reductions even greater in some regions within PJM.<sup>49</sup> Similarly, the PJM independent market monitor has issued a report stating that utility customers would have been charged \$11.8 billion more in the 2013–2014 delivery year without the DR that cleared in that capacity auction.<sup>50</sup>

More recently, DR has developed into a more dynamic resource that can also provide price mitigation and ancillary services to utilities and grid operators. In the former case, DR helps keep wholesale prices lower during times of high demand, and in the latter it can provide near instantaneous response to grid dispatch signals and

44 See <http://www.nopecinfo.org/>

45 See the Association for Demand Response and Smart Grid for reports and research. Available at: <http://demandresponsesmartgrid.org/>.

46 Enernoc. Demand Response: A Multi-Purpose Resource for Utilities and Grid Operations [white paper]. Available at: <http://www.enernoc.com/our-resources/white-papers/demand-response-a-multi-purpose-resource-for-utilities-and-grid-operators>

47 See <http://www.peakload.org/?page=MemberDirectory> for a list of demand response providers.

48 Enernoc, p. 3. Capacity (measured in kilowatts or megawatts

(1 MW = 1,000 kW)) measures the maximum amount of energy that can be produced (or reduced) at a given moment in time. Capacity payments are in the form of \$/kW per unit of time (i.e., \$/kW-month or \$/kW-year). Energy (measured in the form of capacity multiplied by period, i.e., kilowatt-hour (kWh) or megawatt-hour (MWh)) is an amount of capacity supplied over a given amount of time, typically an hour. Energy payments are in the form of \$/kWh or \$/MWh.

49 The Brattle Group (2007, January 29). *Quantifying Demand Response Benefits in PJM*. Prepared for PJM Interconnection, LLC and the Mid-Atlantic Distributed Resources Initiative (MADRI).

50 Keystone Energy Efficiency Alliance, 2012.

provide spinning reserves and regulation service.<sup>51</sup>

### **Community Choice Aggregation: Does the Customer Have to Directly Experience Grid Value?**

Given the increasing choice and complexity of rates and rate designs that consumers will face in the future, one of the potential benefits of the aggregated service environment is that customers do not need to see value-based prices. Rather, it is enough for service providers to experience the prices and market them to customers while managing market risk as customers choose. The issue here is how important is it for customers to experience grid value compared with having an aggregator experience it and manage it. The latter may be in a better position to manage the pricing value proposition for some customers.

This scenario is currently playing out in New York, where the state Public Service Commission approved the state's first community choice aggregation (CCA) program.<sup>52</sup> The commission granted approval for Sustainable Westchester to pilot a CCA program for Westchester County, which would allow the non-profit to procure power on behalf of customers, "and support energy efficiency and control retrofits, distributed generation, enhanced renewable generation, and other permissible measures that Sustainable Westchester reasonably deems appropriate."<sup>53</sup>

As stated in the commission press release, "[t]he potential benefits of CCA programs include price stability for a fixed contract term, the potential for lower prices and more favorable terms, and the ability to design a program

that reflects local preferences and needs, including a preference for cleaner power sources. CCA programs also have the potential to enable Energy Service Companies to secure a large number of customers at relatively low marketing costs."<sup>54</sup>

### **The Role of Technology Companies**

New and existing technology companies have developed products and services to serve the more dynamic electricity market. The deployment of more sophisticated meters in utility service territories has escalated this trend.

For example, GE has marketed the Energenius appliance control system as well as developed and started marketing the Brillion line of appliances that gave customers the ability to control over 60 percent of their home's energy usage.<sup>55</sup> The GE system uses the Nucleus, a device used to gather energy use data from your home's existing smart network (smart meter and smart appliances). The Nucleus collects interval energy consumption data and operates with local TOU and dynamic utility pricing structures to wirelessly control your appliances depending on customer pre-set price commands. A utility is therefore able to communicate directly with the customer with an energy display on their computer, tablet, or smart phone, sending messages and information about pricing changes or critical utility peaks.<sup>56</sup>

In summary, electricity generation pricing in restructured states is competitively sourced, can take many forms, and can be administered by the distribution utility or provided by non-utility marketers or governmental/community aggregators or other third-party vendors.

51 In PJM Interconnection, DR resources can bid into both the Synchronized Reserves and Regulation Markets. Similarly, the Electric Reliability Council of Texas (ERCOT) has in excess of one gigawatt (1,000 MW) of DR participating as Responsive Reserve Service. With the successful participation of DR in these programs, other regions, as well as regulated utilities, are also exploring the capabilities of DR as an ancillary service. A recent Federal Energy Regulatory Commission Order has also recommended that ISOs/Regional Transmission Organizations (RTOs) "accept bids from demand response resources in their markets for certain ancillary services, comparable to any other resources."

52 New York PSC Order in Case 14-M-0564 Granting Petition in Part of Sustainable Westchester for Expedited Approval for the Implementation of a Pilot Community Choice Aggregation Program within the County of Westchester, February 26, 2015.

53 Ibid, p. 3.

54 New York Public Service Commission. (2015, February 26). PSC OK's State's First Community Choice Aggregation Pilot Program. [Press release].

55 Heimbuch, J. (2012, October 23). *GE's Brillion Home Energy Systems Now Available at Sears*. <http://www.treehugger.com/clean-technology/ges-brillion-home-energy-systems-now-available-sears.html>. Smart meter deployment has not been as fast as GE expected, so they have developed technology to allow the customer to control his GE appliances without the need of a smart meter.

56 Ecomagination, GE Annual Report. (2015). *GE Smart Grid Technologies Help Martha's Vineyard Achieve Greater Energy Independence*. Available at: <http://www.ecomagination.com/ar2010/innovation/grid/nucleus-energy-manager/>.



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