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DER Aggregation: Lessons Learned from Other States

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Lessons Learned to Date: Market Participation and Impacts



Aggregation Comes in Different Forms

Examples

	Utility*	Third-Party
Utility adjusts load forecast	<ul style="list-style-type: none">• Many utility DR/load control programs	<ul style="list-style-type: none">• <i>Not applicable</i>
Aggregated DERs are bid into RTO/ISO markets as a resource	<ul style="list-style-type: none">• Ameren Missouri's C&I DR program• BGE's Smart Energy Rewards• Green Mountain Power's Powerwall program	<ul style="list-style-type: none">• Voltus DR contracts with customers in restructured states

*Or third-party under contract to utility – e.g., Ameren Missouri partners with Enel X

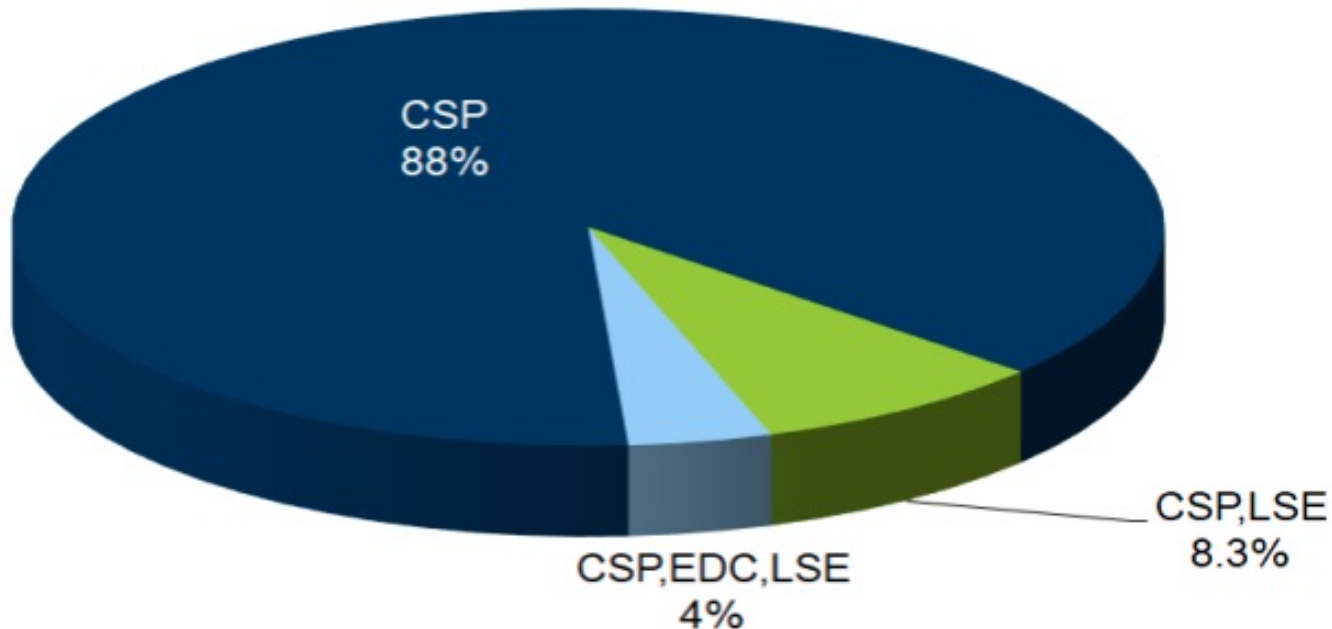
Utilities Do Participate as Aggregators: Maryland Example

Capacity Market Auction Year	MW Cleared in Capacity Auction			Capacity Market Revenues (Million \$)
	DLC DR	EE	Dynamic Pricing	
2014/2015	772	179	267	54.4
2015/2016	625	175	426	69.5
2016/2017	554	226	461	53.6
2017/2018	536	243	387	51.3
2018/2019	522	172	378	31.6
2019/2020	230	184	225	10.6
2020/2021	265	199	425	28.1

Source: EmPOWER Maryland Energy Efficiency Act Report of 2021

But Third-Party Aggregators Have Dominated the Markets

Figure 4: DY 21/22 Confirmed Load Management DR Registrations Owner/Company Type



Source: PJM, *2021 Demand Response Operations Markets Activity Report*

Aggregation Lowers Wholesale Power Costs for All Customers!

Table 1 Summary of sensitivity results: 2017/2018 RPM Base Residual Auction

Scenario	Scenario Description	RPM Revenue (\$ per Delivery Year)	Difference from Actual Results	
			RPM Revenue (\$ per Delivery Year)	Percentage
0	Actual Results	\$7,512,229,630	NA	NA
1	Annual Resources Only	\$9,738,222,922	\$2,225,993,292	29.6%
2	No Offers for DR or EE (Generation Resources Only)	\$16,859,658,203	\$9,347,428,573	124.4%
3	No Short-Term Resource Procurement Target Reduction	\$9,947,329,539	\$2,435,099,909	32.4%
4	No Short-Term Resource Procurement Target Reduction and Annual Resources Only	\$10,932,522,889	\$3,420,293,259	45.5%
5	No Short-Term Resource Procurement Target Reduction and No Offers for DR or EE (Generation Resources Only)	\$23,870,404,571	\$16,358,174,941	217.8%

Source: Independent Market Monitor for PJM, *The 2017/2018 RPM Base Residual Auction: Sensitivity Analyses*

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Lessons Learned to Date: State Regulation of Utilities and Aggregators



For Utility Aggregation, Most Regulatory Issues Were Familiar

- Would new utility DER programs be cost-effective?
- Would new programs serve the public interest?
- How could the Commission ensure fair competition between utilities (or their affiliates) and third-party aggregators?
- How would utility costs be allocated and recovered?
- Were utility expenditures prudent?

For Third-Party Aggregation, New Issues Had to Be Resolved

- Registration/licensing of aggregators
- Consumer protections & dispute resolution process
- Changes to utility programs or tariffs to avoid double compensation
- Cost allocation & cost recovery

Order 2222 May Generate Unique Issues for State Regulators

- Revise interconnection standards, rules and processes
- Revise data access and privacy policies
- Allow DR aggregation? (optional under Order 719)
- Allow DER aggregation for customers served by smaller utilities? (optional under Order 2222)
- Revise utility planning practices (e.g., IRP)?

Note that many regulatory issues around aggregation fall under FERC jurisdiction, not state PUC jurisdiction

About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org



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Extra Slides for Use if Relevant Questions Arise

FERC Order 2222 Definition of DER

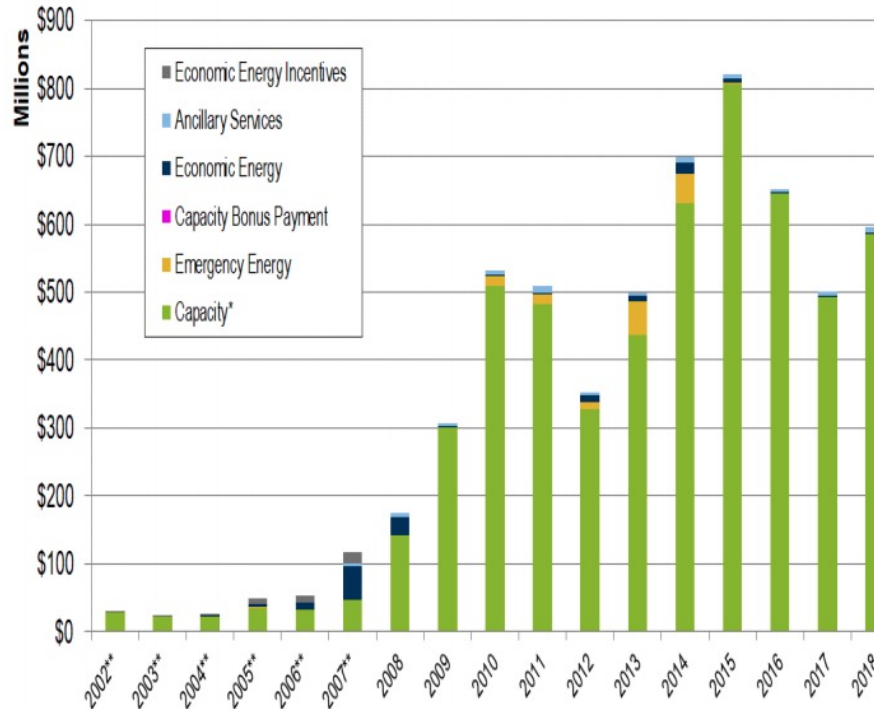
- DER includes ANY resource connected to the distribution system, in front of the retail meter or behind the meter, including:
 - Energy storage – electric and thermal
 - Distributed generation (DG)
 - Demand response (DR)
 - Energy efficiency (EE)
 - Electric vehicles and their supply equipment

DER Aggregations (other than EE and DR) to Date

- 7 DER aggregators registered in CAISO, including 1 IOU
- 1 Vermont utility (Green Mountain Power) bidding aggregated energy storage into ISO-NE ancillary services market
- 1 third-party aggregator of residential PV + storage (SunRun) has cleared ISO-NE capacity market
- Probably other examples, but not many

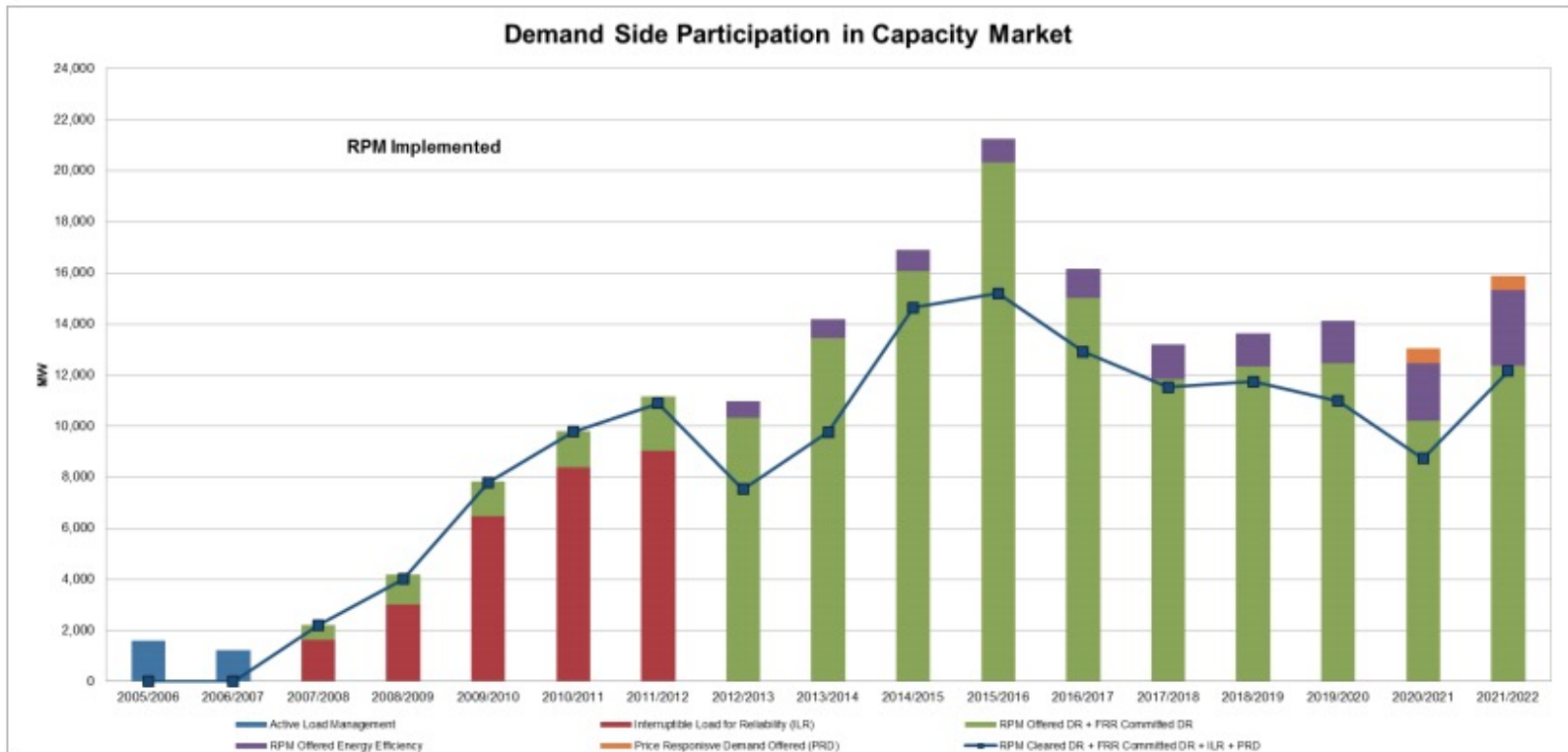
Significant Revenues in Capacity Markets; Less in Energy & Ancillary

Figure 14: PJM Estimated Revenue for Economic and Load Management DR Markets



Source: PJM, 2019 Demand Response Operations Markets Activity Report

Market Participation Rules Can Erect Barriers to Aggregation



Source: PJM, 2021/2022 RPM Base Residual Auction Results