



2023 OMS DER Survey Results

Public Webinar
September 25, 2023



Executive Summary



This is the sixth year of OMS DER Survey

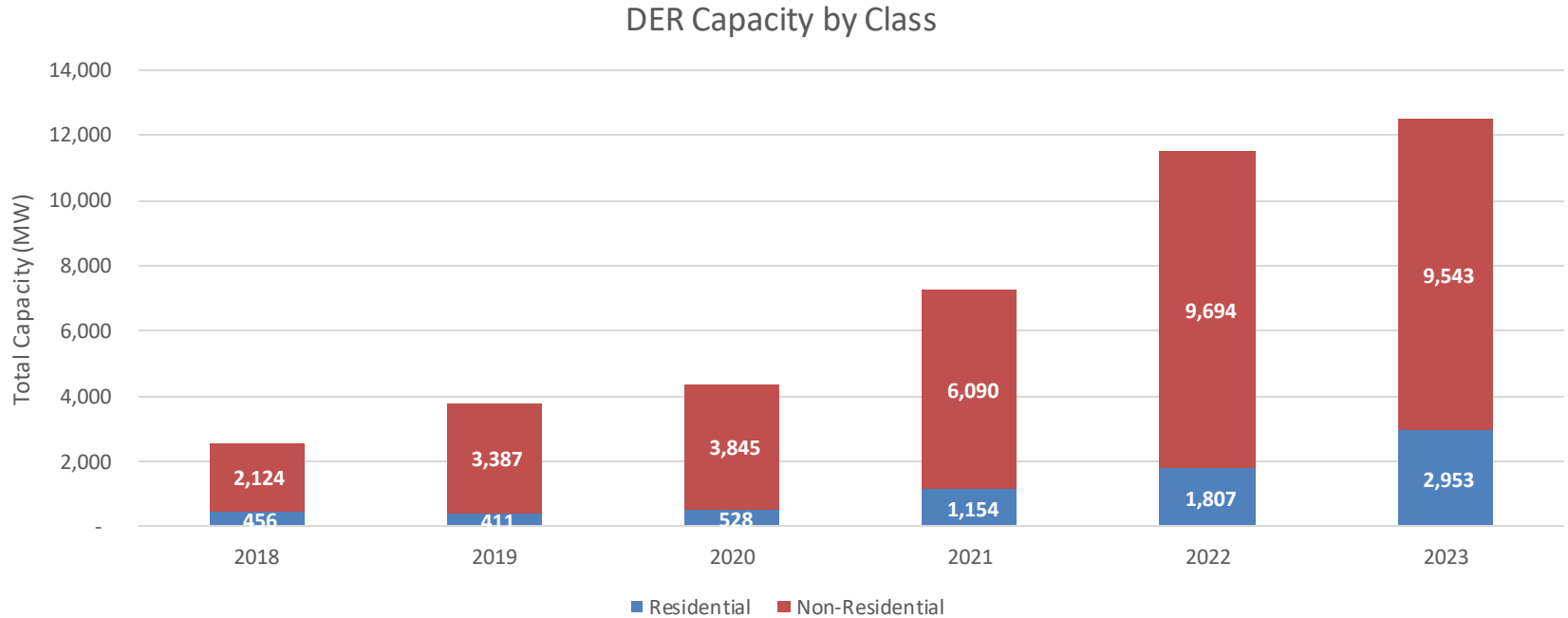


This was the second year we requested information on DER that was Registered with MISO (RM)

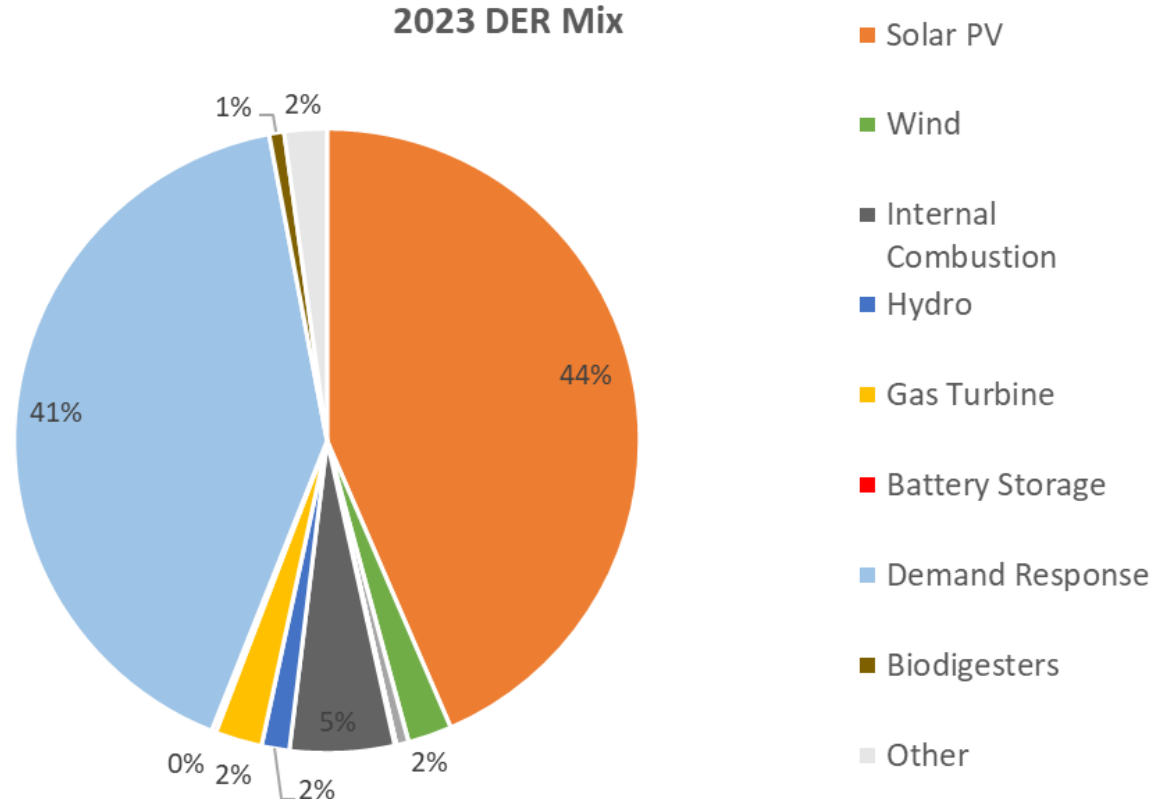


DER growth continues with significant increase in residential customer class

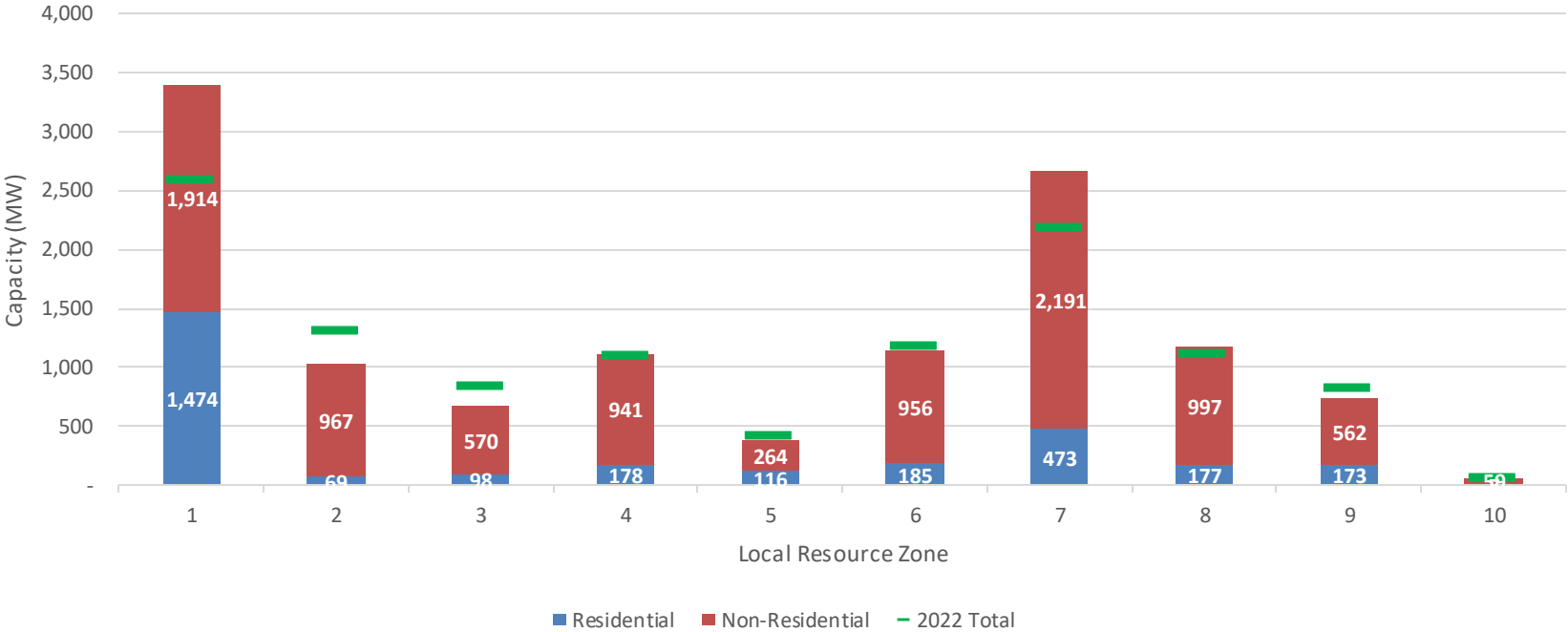
The steady trend of DER growth continues in MISO



12.5 GW of DER by Resource Type

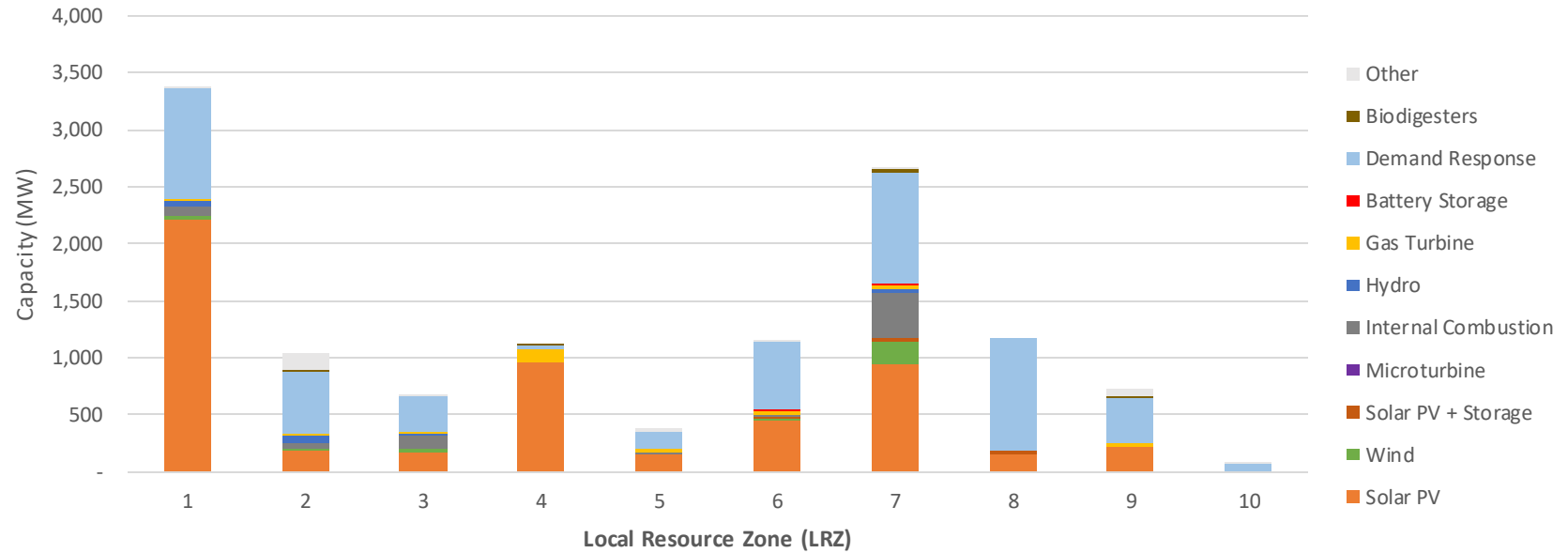


Several zones saw large increases this year



Solar and DR are most common in all zones

DER by Resource Type and LRZ

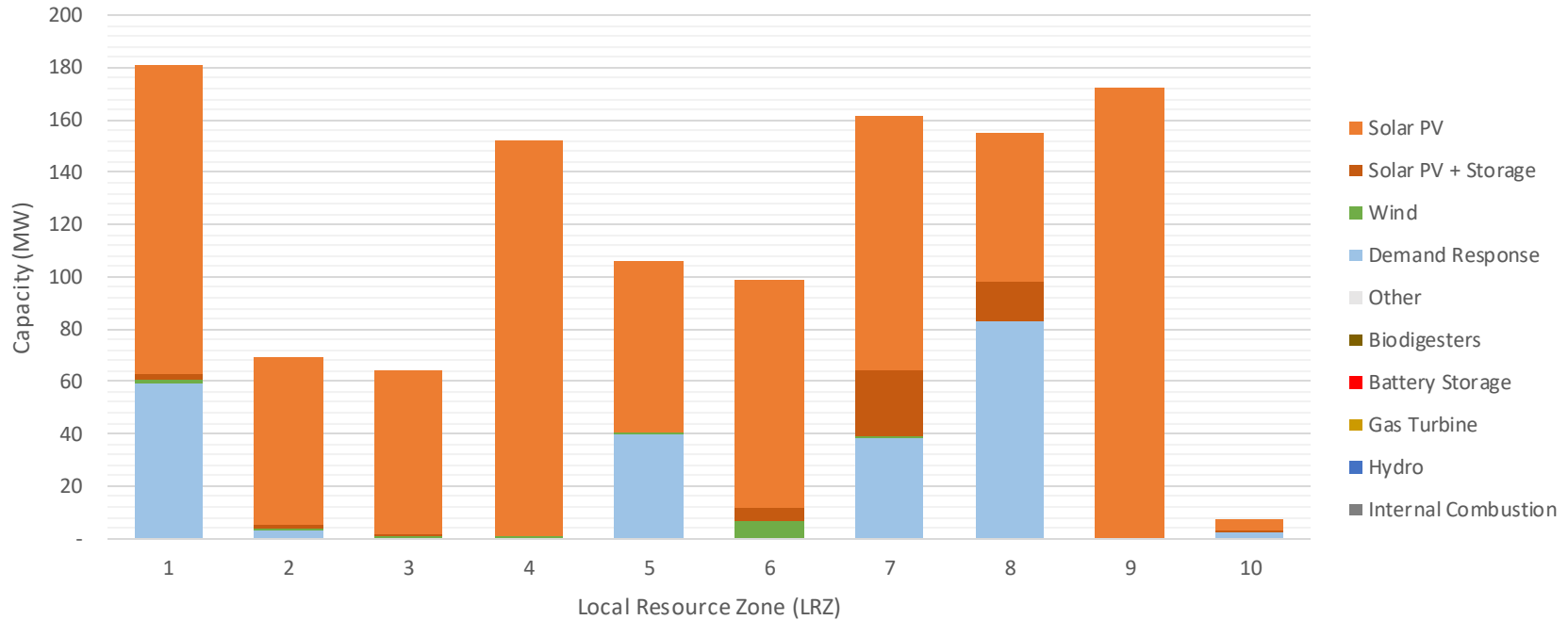


NON-MISO REGISTERED DER DATA

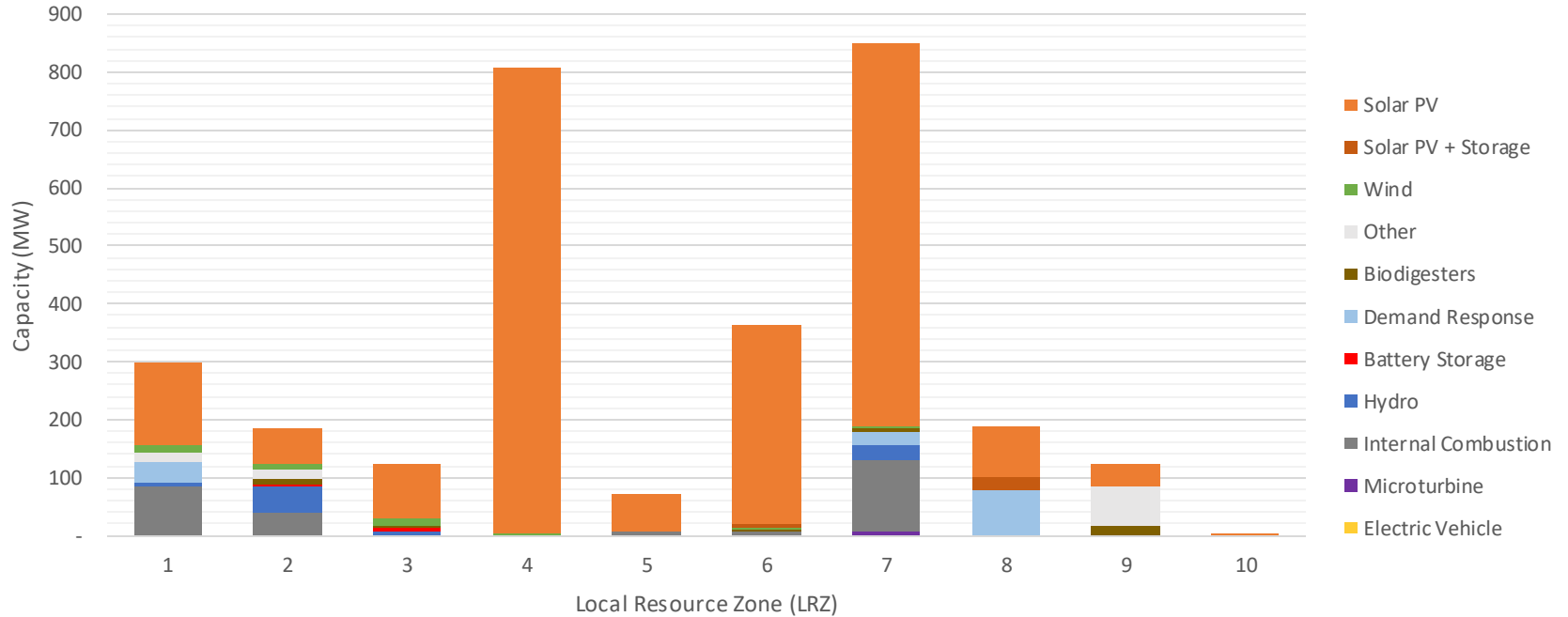


Organization of MISO States

Non-MISO Registered DER: Residential



Non-MISO Registered DER: Non-Residential

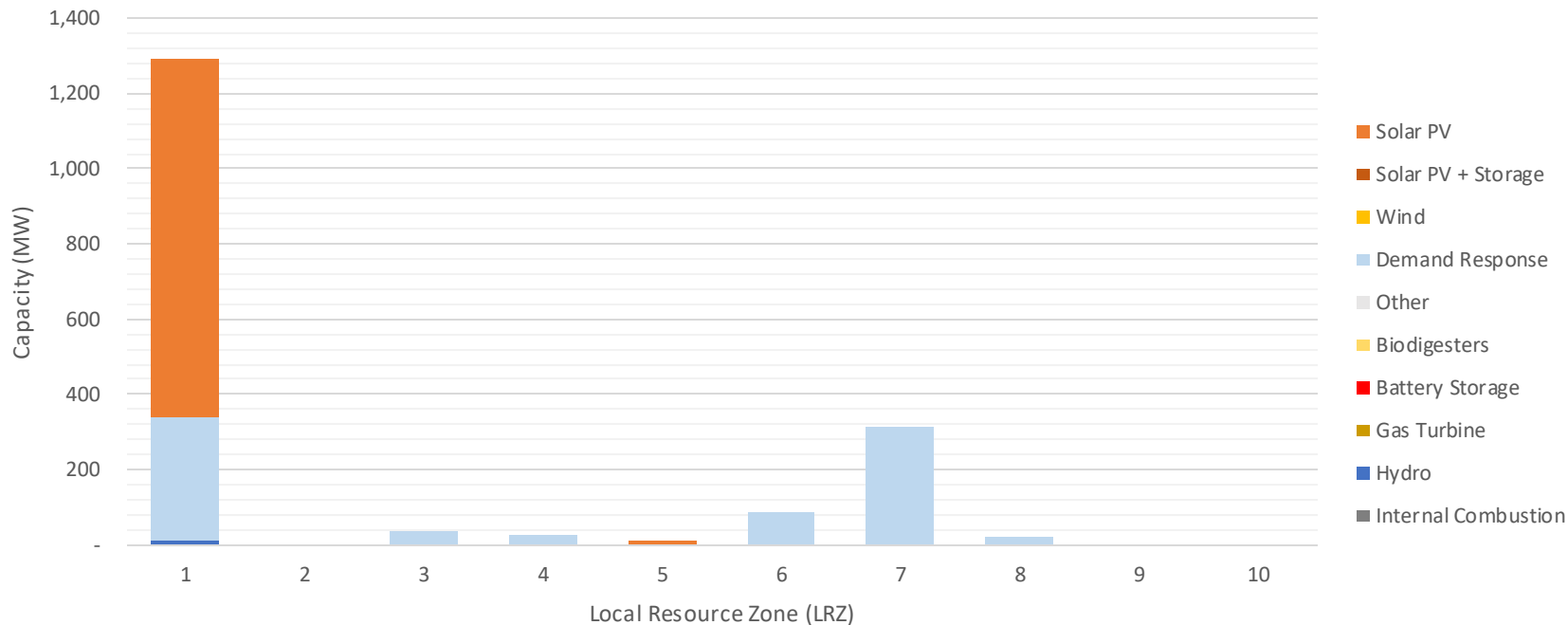


REGISTERED WITH MISO

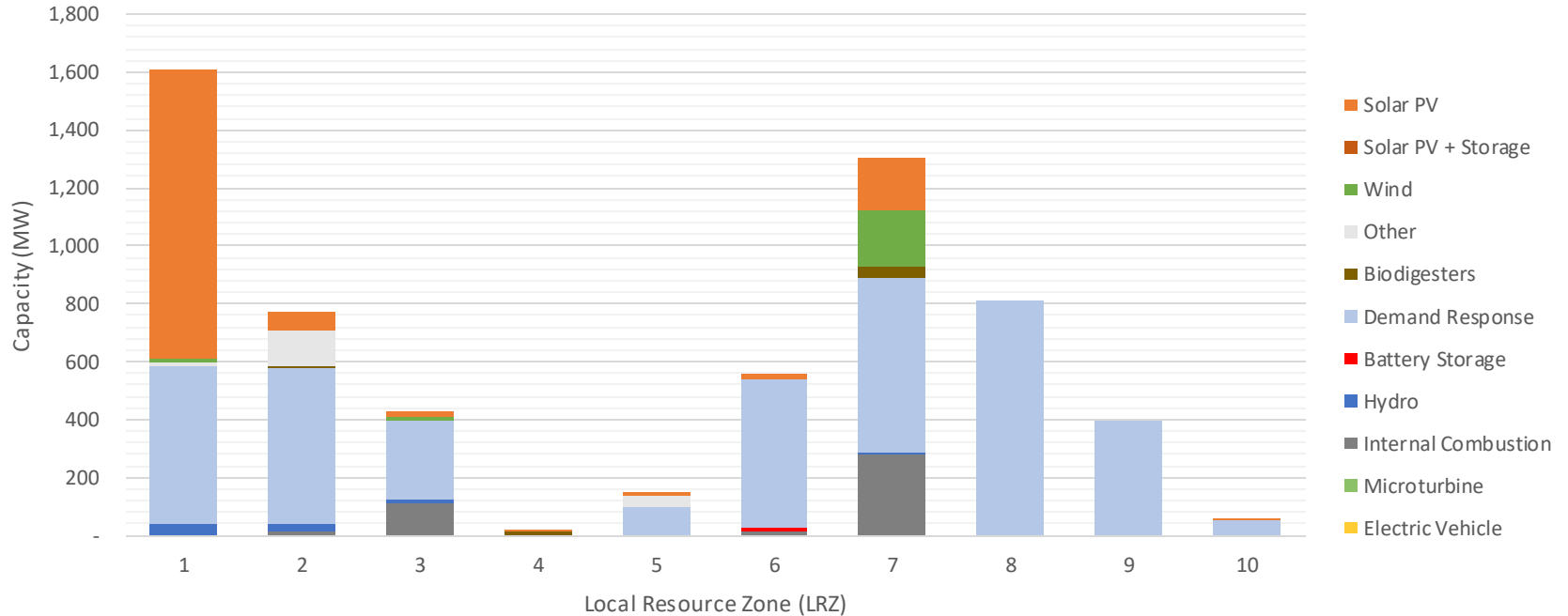


Organization of MISO States

Registered with MISO DER: Residential



Registered with MISO DER: Non-Residential

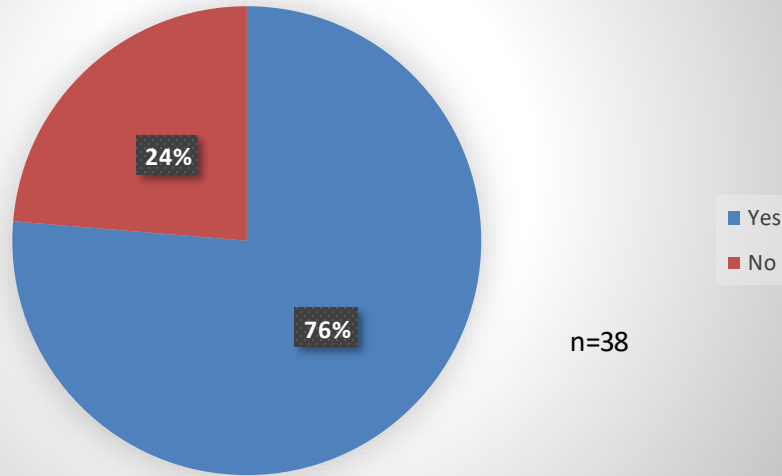


WRITTEN RESPONSE ANALYSIS



Organization of MISO States

Q2: Investments to achieve awareness/visibility



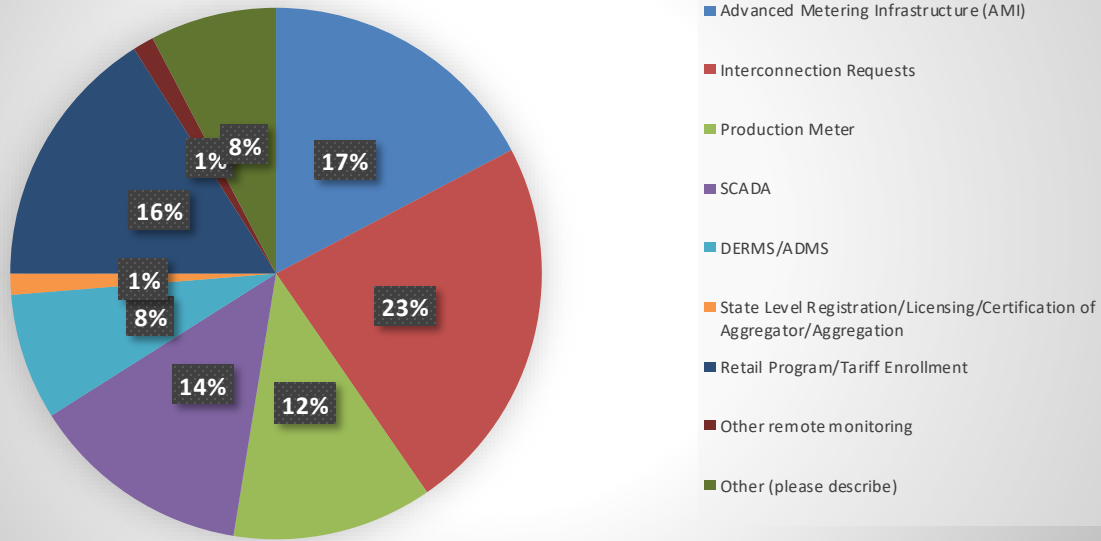
Yes- up 7%

- Need for safety and reliability
- Developing pilot programs with expectation that DERs will increase
- Investments in AMI, DERMs, ADMS
- High speed data communications, circuit visibility

No

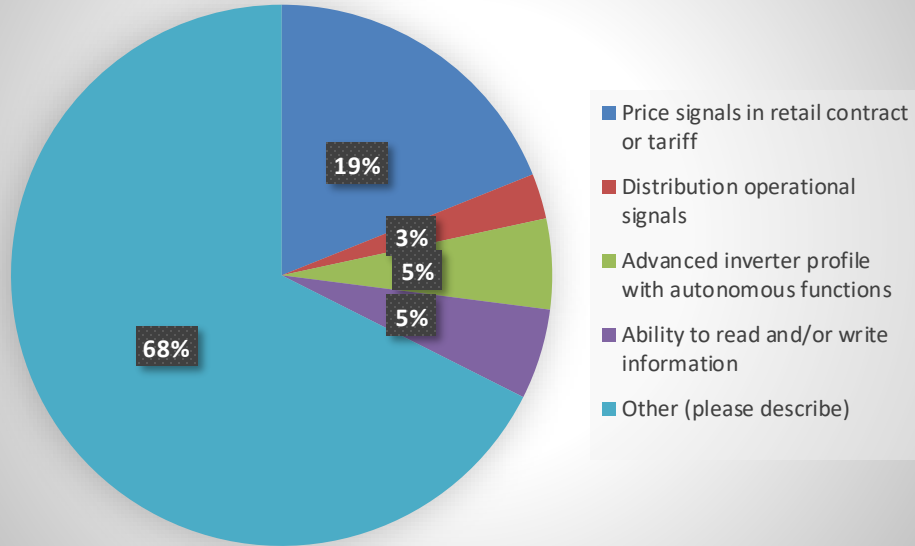
- Most are behind the meter, export/import monitored on monthly basis
- Low DER penetration
- Need AMI rollout first

Q3: Process to obtain awareness of DERs



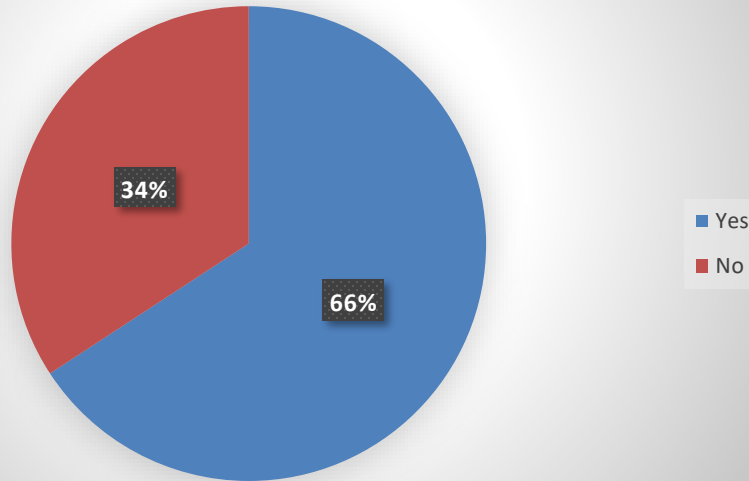
- Interval of data varies broadly from seconds to monthly read depending on what type of meter is used
- Other: mapping system, outage management, site visits
- Note: 2 responses noted a state level licensing process
 - Possibly conflating with MISO level registration process

Q4: Interoperability with DERs



- 'Other' category
 - Remotely start/stop SCADA DERs that are on interruptible rates
 - 1-way communication from DERs to SCADA
 - Advanced inverters for all new DERs
 - DERMS pilot testing aggregation and controllability
- Most did not estimate the % of DERs in their territory that had these selections

Q5: Update Interconnection Standards?



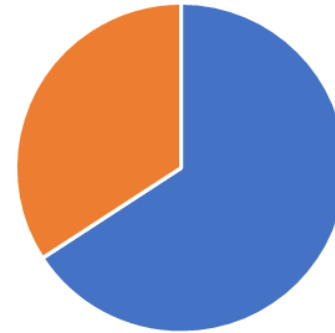
- 10% drop from last year, updates already complete or are underway
- ‘Many see a need to update ahead of Order 2222 implementation
 - Possible meter configuration changes
 - How to handle costs associated with aggregations
 - Updates to retail tariffs and policies

Future DER Growth

Factors driving DER growth (Q6):

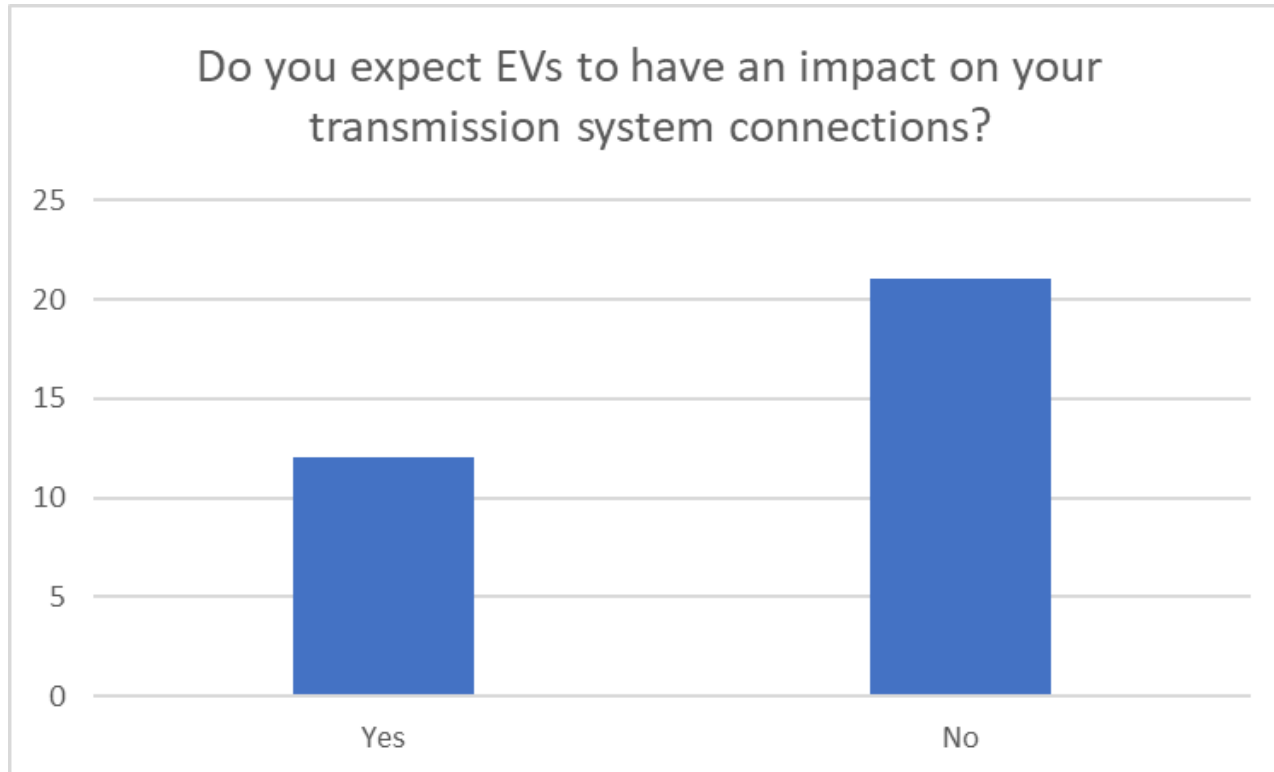
- Environmental concerns
- Tax incentives
- Lower costs
- Back up for weather events (hurricanes)
- Participation in wholesale market

Does your company explicitly project DER growth on your system? (Q8)



■ Yes ■ No

EVs and Transmission (Q7)

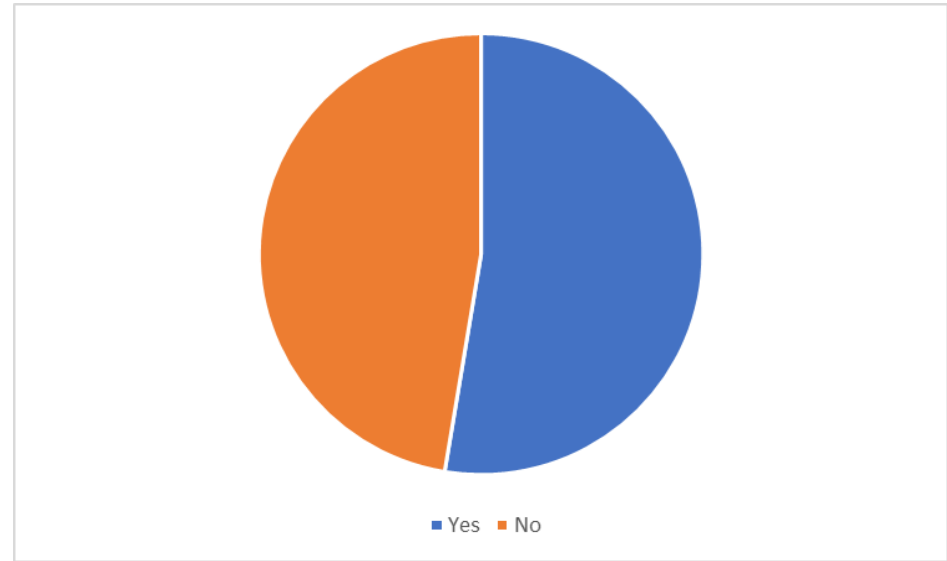


DER and Transmission Planning

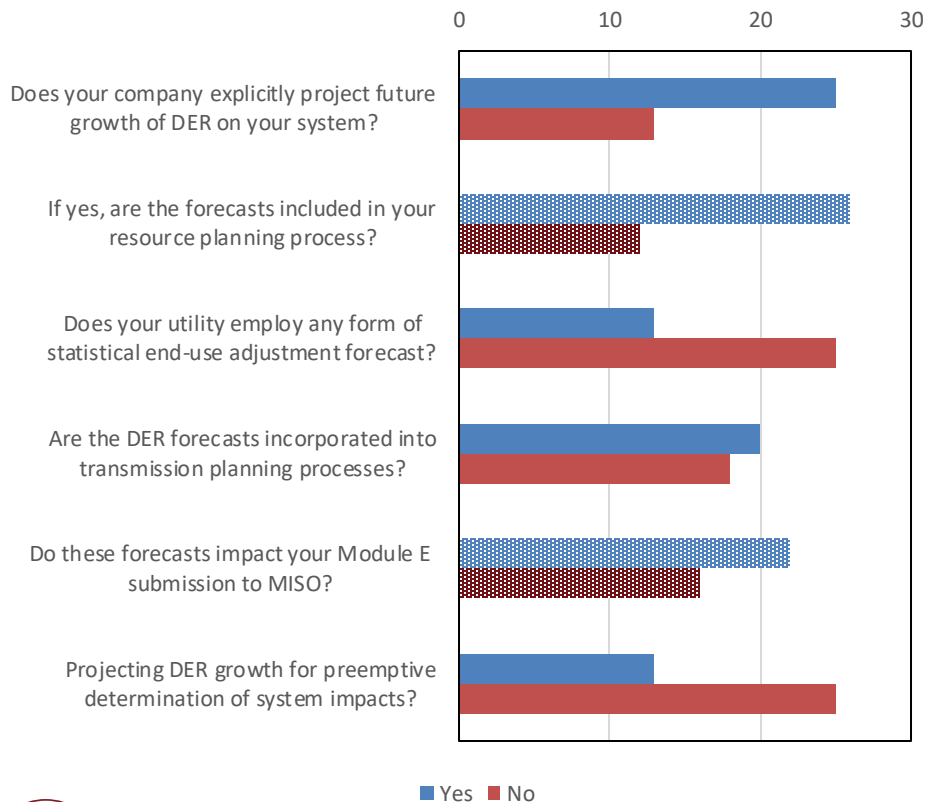
Root Cause of DER Impact (Q7)

- Size and location were the most common answer
- In many cases, DER impact is still negligible
- Backfeed/powerflow were both mentioned as becoming more common
- Many utilities are beginning to plan for larger DER connections in the future, looking at better interconnection processes, improved variance prediction, and design guides
- Two responders indicated a need for better coordination/communication between distribution and transmission operator

Are DER incorporated into transmission planning (Q8)?



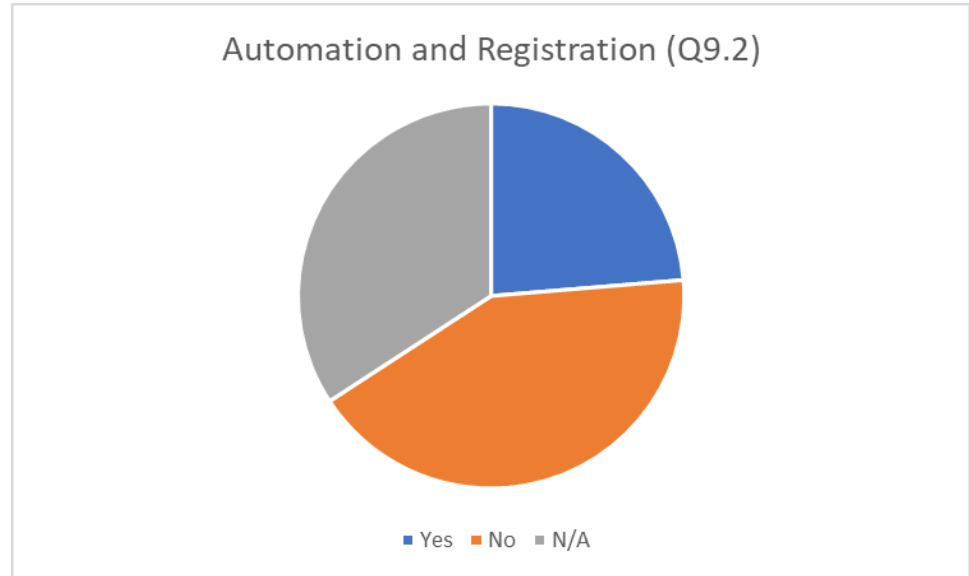
Q8: Forecasting DER



- Yes, but not all DERs are explicitly forecast. Only those with sufficient visibility
 - Ex: EE, DR/LMRs
- DERs that are not registered capacity resources are captured as part of historical demand data and netted from the base load forecast (thereby impacting Module E submission)
 - Ex: net metering, EVs
- Some reported using statistical end-use forecasting via a vendor or internal models

Planning for Future DER Implementation (Q9)

- The most common response was a need to bring MISO, state, and FERC requirement into alignment. This includes both policy and technological upgrades.
- A number of issues were raised: billing, metering, and rates.
- Commentors are still waiting on the final MISO market process before moving forward. It was noted that this could still be years away.
- Other issues raised were:
 - Evaluating load management options
 - Exploring a DERMs pilot



APPENDIX



Organization of MISO States

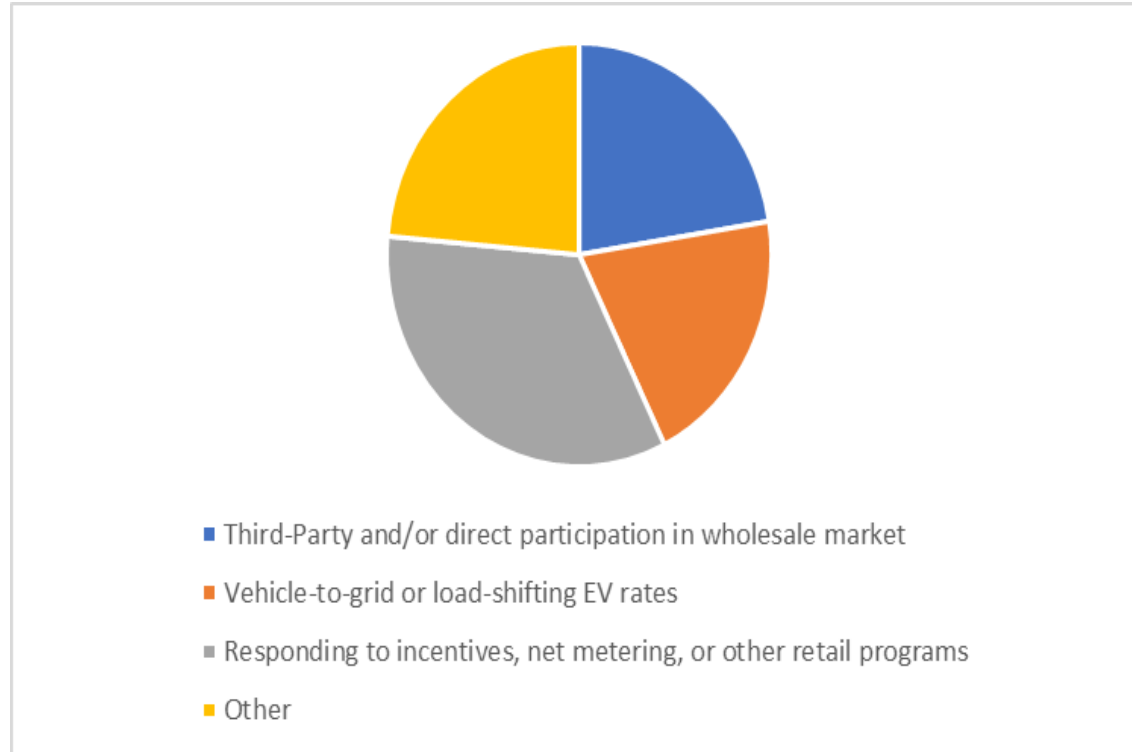
DER and Communication (Q9)

- There was an expressed willingness to improve utility and aggregator communication when necessary
- Respondents mentioned the need to build communication systems, such as DERMS
 - How to pay for these systems and who is responsible was raised as will (notably when a utility covers the cost vs when an aggregator should be responsible)
- Utilities are planning to work with aggregators

Incorporating 3rd Party DER into State Planning (Q9)

- State will need to determine status of aggregators
- Transmission will need to start considering DERs.
 - Aggregator may be a “cost causer”
- DERs will shape load forecasting
- May need a new interconnection rule
- Automating registration may be considered in the future

Factors driving customer interest in DERs (Q6)



APPENDIX



Organization of MISO States

Year-to-Year Comparisons

Customer Class	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Residential MW	456	411	528	1,154	1,807	2,953
Non-Res MW	2,124	3,387	3,845	6,090	9,694	9,543
Total MW	2,581	3,797	4,373	7,244	11,501	12,496

DER Data Tables

DER Type	Capacity (MW)		
	Residential	Non-Res	Total
Solar PV	1,843	3,596	5,439
Wind	11	273	284
Solar PV + Storage	50	31	81
Wind + Storage	0	-	0
Electric Vehicle	-	0	0
Microturbine	-	8	8
Fuel Cell CHP	-	1	1
Fuel Cell Electric	-	-	-
Internal Combustion	-	676	676
Hydro	13	167	180
Gas Turbine	-	303	303
Battery Storage	0	29	29
Demand Response	1,035	4,089	5,124
Biodigesters	-	97	97
Other	0	274	275
Totals	2,953	9,543	12,496

DER by Type and LRZ

	1	2	3	4	5	6	7	8	9	10
Solar PV	2,207.5	185.4	173.9	955.8	156.7	451.7	941.9	144.8	210.9	8.5
Wind	28.3	12.3	27.4	4.8	0.0	11.3	199.7	0.0	0.0	0.0
Solar PV + Storage	2.4	2.8	3.8	-	0.0	9.4	25.2	37.0	-	0.4
Wind + Storage	0.0	-	-	-	-	-	-	-	-	-
Electric Vehicle	-	-	-	-	-	0.2	-	-	-	-
Microturbine	-	-	-	-	-	0.1	8.0	-	-	-
Fuel Cell CHP	-	-	-	-	-	-	0.9	-	-	-
Fuel Cell Electric	-	-	-	-	-	-	-	-	-	-
Internal Combustion	85.0	51.3	110.6	-	6.0	23.3	400.0	-	-	-
Hydro	59.4	69.2	18.3	-	-	-	32.9	-	-	-
Gas Turbine	7.3	10.4	14.7	120.0	41.0	35.2	34.0	-	40.1	-
Battery Storage	0.3	5.0	5.7	-	-	15.0	2.4	-	0.5	-
Demand Response	967.0	545.5	307.2	26.7	140.5	593.9	972.5	992.0	398.0	57.8
Biodigesters	1.9	15.3	4.8	11.7	-	0.8	45.3	-	17.1	-
Other	28.0	139.5	1.8	-	35.3	0.2	1.5	-	68.2	0.0
Total	3,387	1,037	668	1,119	380	1,141	2,664	1,174	735	67