



2019 OMS DER Survey Results



BACKGROUND



Organization of MISO States

DER Survey Successfully Conducted a Second Time

- DER survey first conducted in 2018
- Feedback from stakeholders and OMS members used to make improvements to 2019 survey
 - More useful responses
- End of Year 2018 data requested
- Robust participation throughout entire footprint

Two components to survey are used to collect data

Data Table Examples

Residential				
Wabash Valley Power			LRZ:	
Type	Size Category	# of Installations	Total MW	
Solar PV	2	33	2	
Solar PV	1	57	0.7	

Non-Residential (C&I)				
Utility Name:			LRZ:	
Type	Size Category	# of Installations	Total MW	
Solar PV	3	4	1.2	
Solar PV	4	2	3.6	
Biodigesters	4	4	4.7	
Wind	3	1	0.9	

Questions

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DER Survey Questions
April 2019

- Visibility into DER and how it is achieved:
 - Is your utility considering future investments that will increase visibility into DER operations? If yes, please describe future investments under consideration:
 - Yes
 - No
 - Check all current processes used to obtain DER visibility:
 - AMI
 - Interconnection Requests
 - Production Meter
 - SCADA
 - DERMS/ADMS
 - Other
- What are the drivers behind DER growth in your territory? Please explain drivers and where possible, connect this response to your data submission. **[Complete the survey data tables as part of this question].**



Over 85% of MISO Load Responded

- 48 LSEs responded to the survey
- Respondents represent 86% of MISO load
- Increased participation from 2018 survey

2019 SURVEY RESULTS

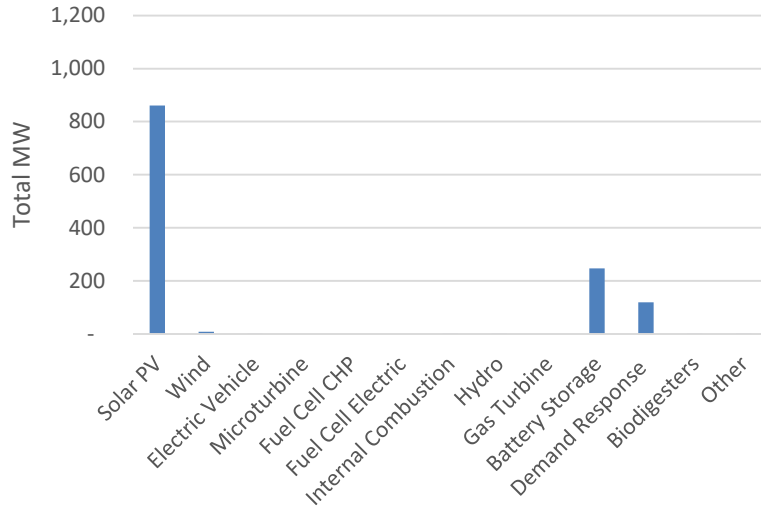


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Over 4.5 GW of DER in Footprint

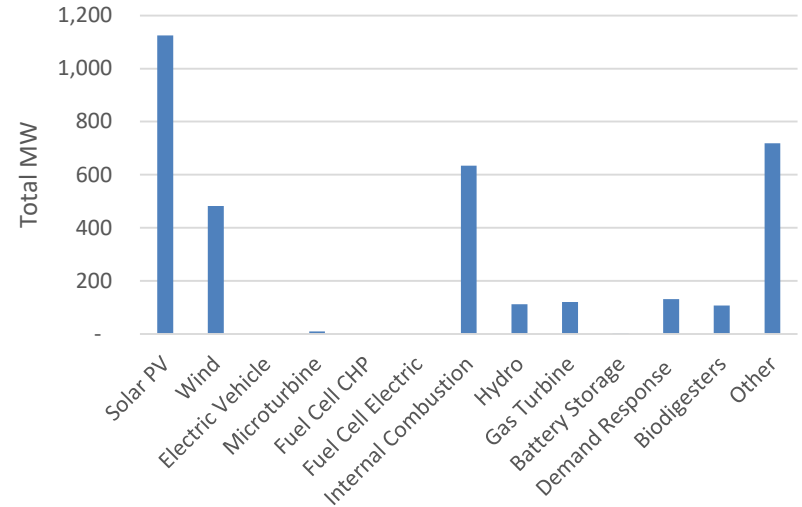
~1.2 GW of Residential

Residential Capacity

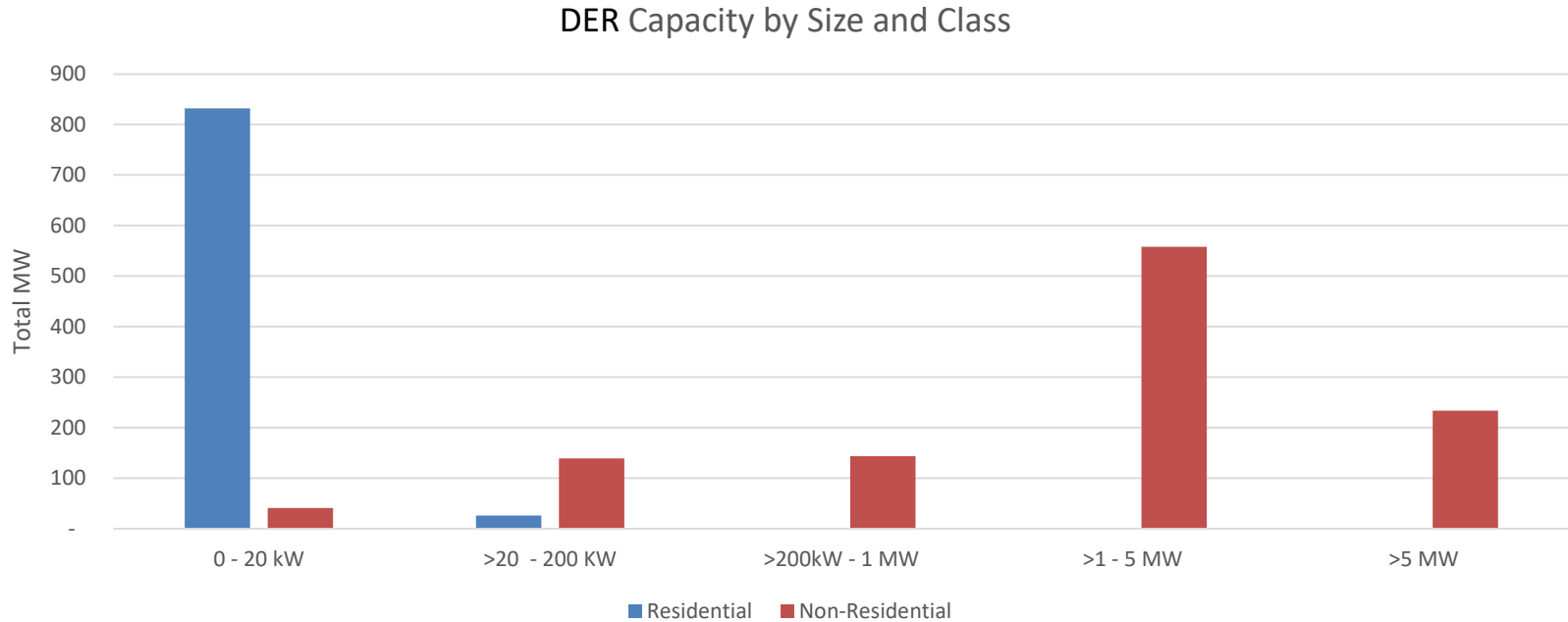


~3.4 GW of Non-Residential

Non-Residential Capacity



Residential installations tend to be smaller

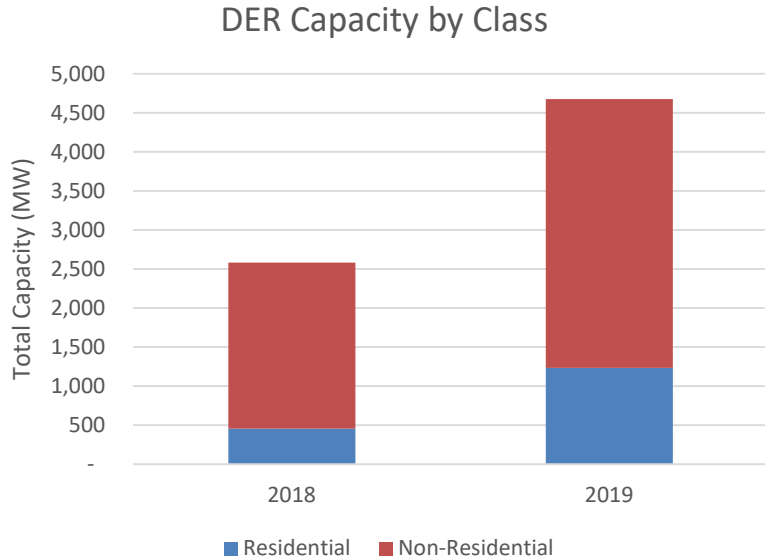


COMPARISON TO 2018



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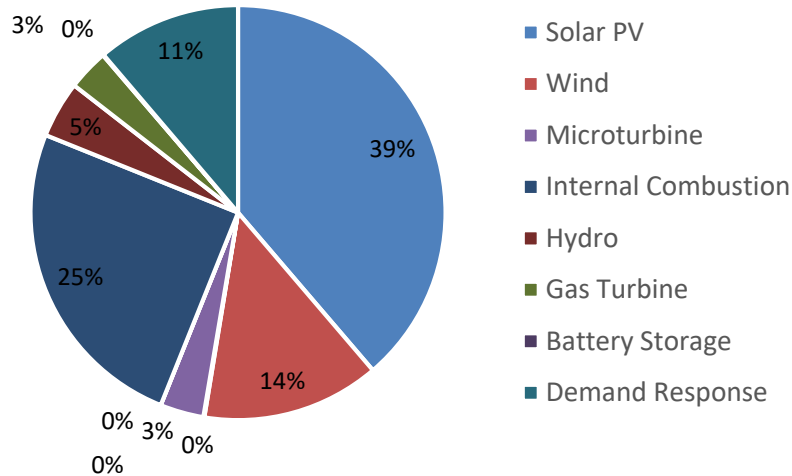
DER Increased while trends remained same



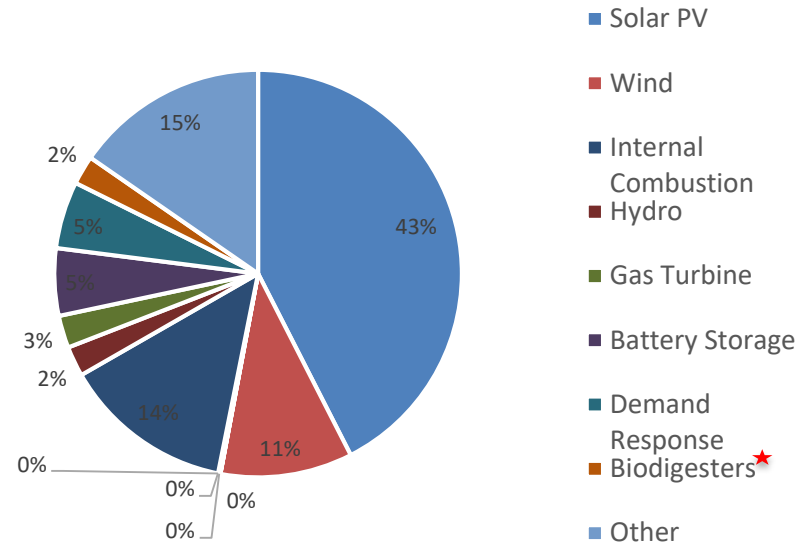
- Residential capacity increased by 170%
- Non-residential increased by 62%
- Non-residential is still the dominant class of DER within MISO

The variety of DERs remained similar

2018 DER Mix



2019 DER Mix



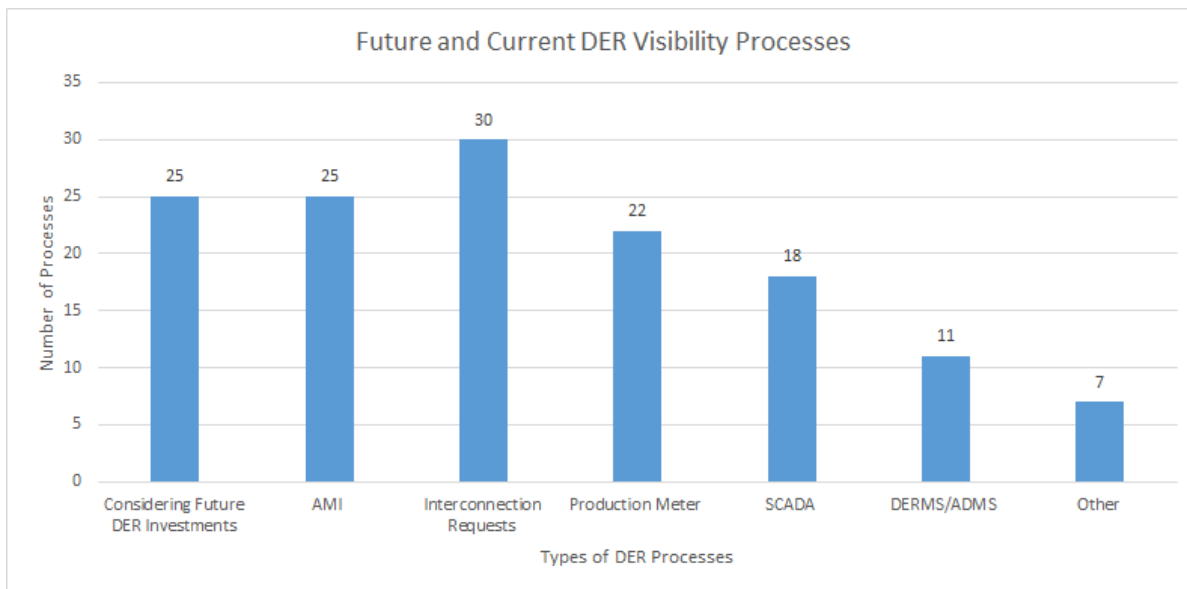
* Biodigesters were included within the microturbine category in the 2018 survey.

WRITTEN RESPONSE ANALYSIS



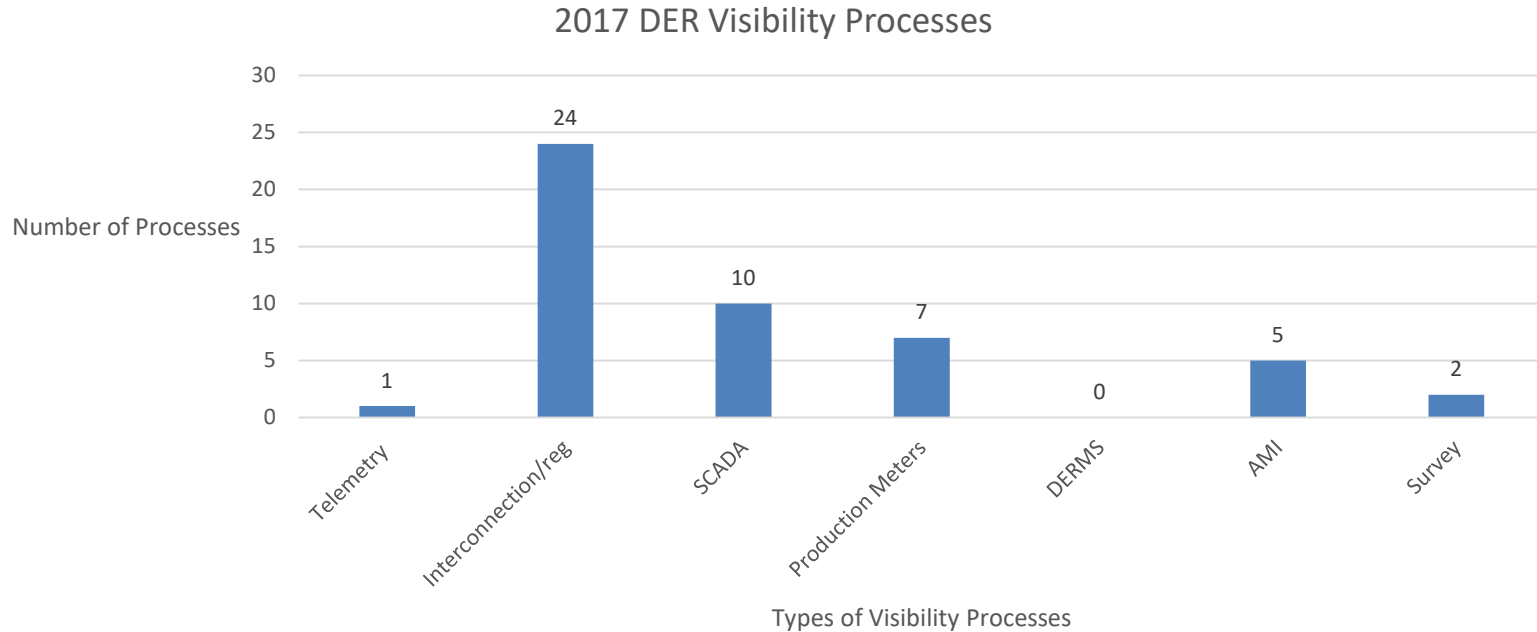
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Q1: Visibility into DER and how it's achieved



- Over half (25) of the total respondents are considering future investments into DER visibility
- Interconnection requests remain primary source of utility information on DERs
- Three respondents use all options
- Eleven respondents considering investment into some form of Distributed Energy Resource Management System (DERMS)

Q1: 2018 Survey DER Visibility Processes



Q2: Drivers behind DER growth

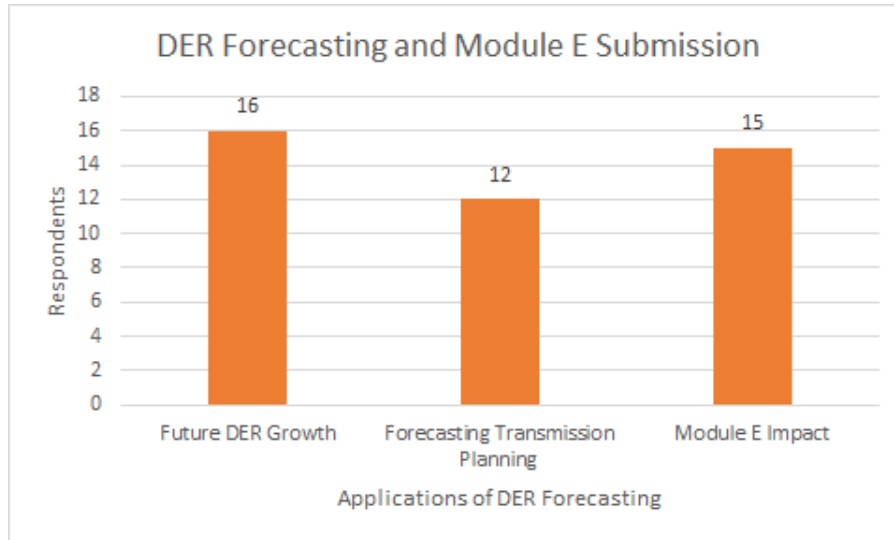
# of Respondents	Driver
12	Customer preferences
9	Rate design
8	Declining DER cost
7	State Policy
7	Federal Tax Credits
6	Environmental concerns
5	Limited/no growth

- State laws continue to be a big driver
- Last year only 4 utilities listed customer preferences as a driver, versus 12 utilities this time
- Low natural gas prices may be discouraging some DER, and encouraging others (customer-owned CHP)

Q3: DER's impact on transmission system

- Most respondents have not experienced transmission-level impacts
 - 40 respondents have seen no impact
 - 3 have (same # as 2018 survey)*
- Many respondents are investigating potential future impacts, some making proactive modifications
- 8 respondents do not foresee near-term issues
- 5 respondents are actively monitoring for expected issues
 - Reviewing interconnection and T-D coordination

Q4: Forecasting DER Growth & DER impact on other forecasts

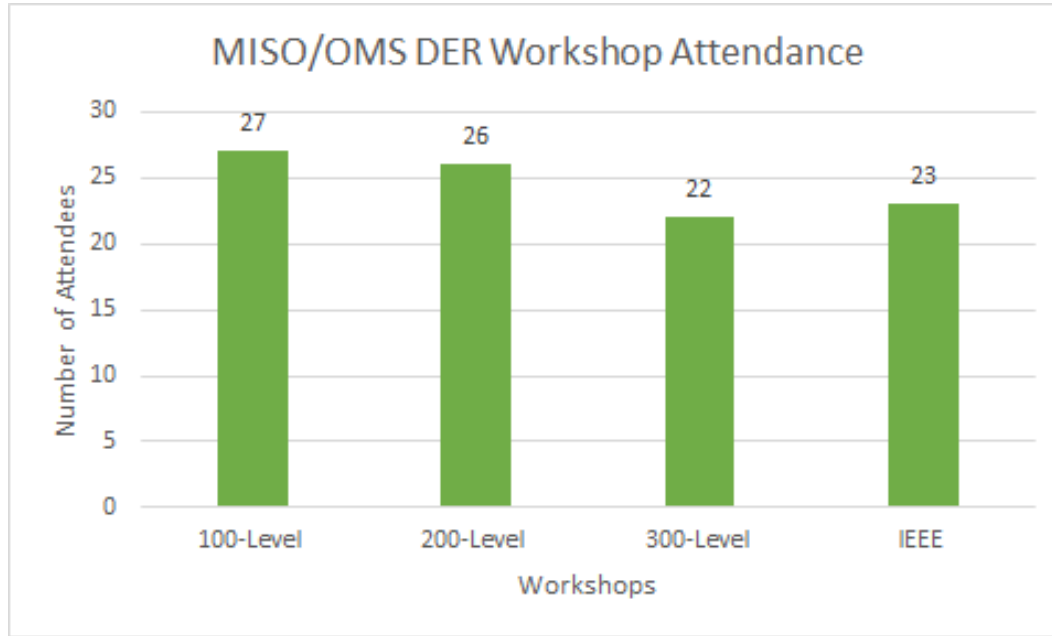


- Part A: Twenty-seven do not explicitly project DER growth; 16 do
- Part B: Of the respondents that answered this question, 15 stated DER impacts their Module E submission to MISO, while 8 stated it did not
 - Six count DER as load reduction
 - Twelve utilities incorporate information into transmission planning

Q6: Currently approved DER pilots

TYPE OF PILOT	TOTAL NUMBER
BATTERY STORAGE	6
SOLAR + BATTERY	6
SOLAR PV OR ROOFTOP SOLAR	5
COMMUNITY OR SHARED SOLAR	4
DEMAND RESPONSE	2
SMART THERMOSTAT	2
MICROGRID	2
VIRTUAL METERING	2
ELECTRIC VEHICLES	1
NATURAL GAS GENERATOR	1

Q7: MISO DER Workshop Attendance



- Over 50% of respondents were able to attend 1 workshop
- 19 attended every workshop
- 13 attended no workshops