Growth of Renewable Energy in Duke Energy Indiana Service Area

Nancy Connelly, November 10, 2017

Growth of Renewable Energy Duke Energy Indiana Service Area

Topics to be covered in this presentation

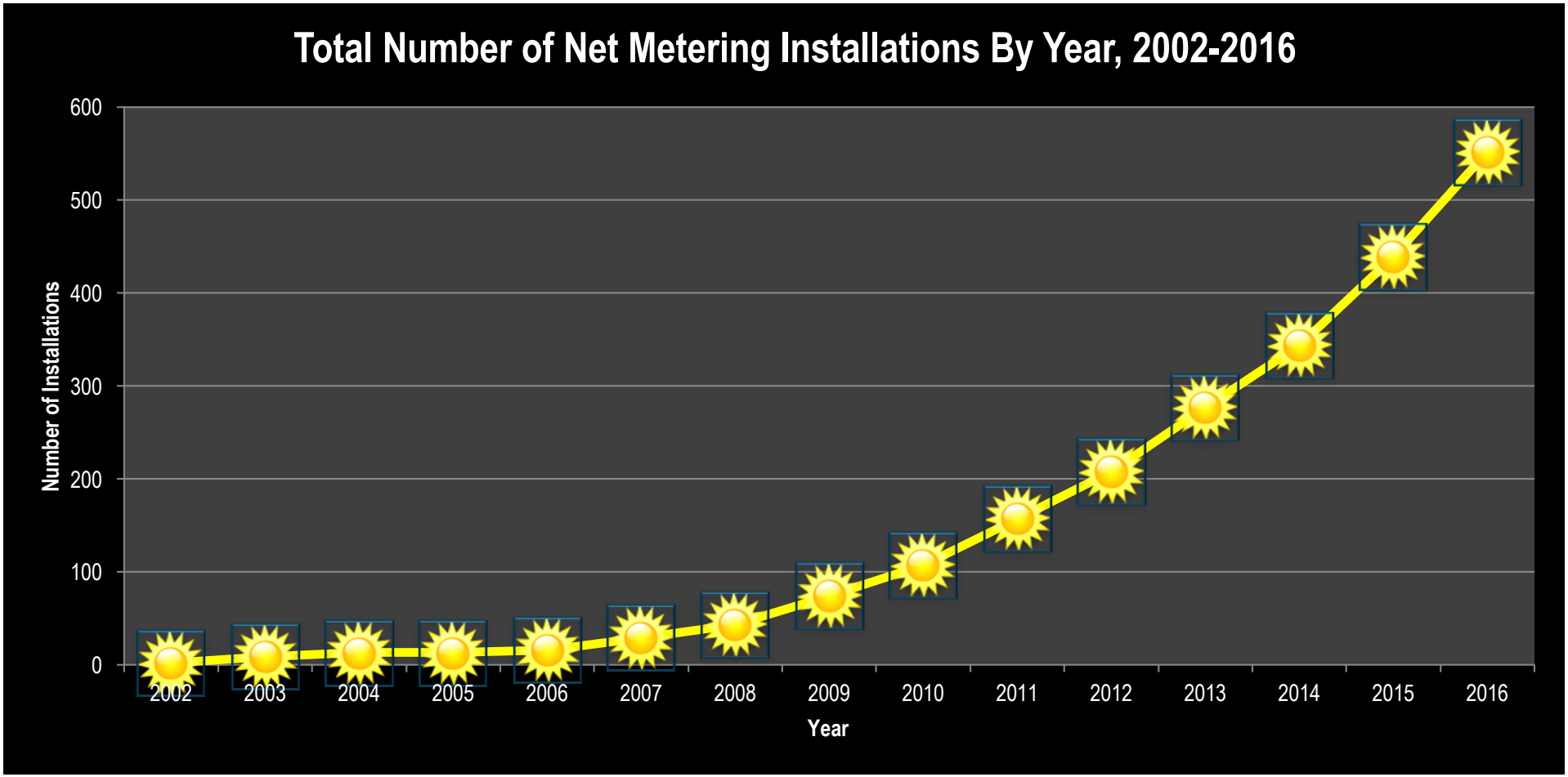
- Growth of net metering in DEI service area
  - Number of installations
  - Capacity of installations
- Growth of net metering in Bloomington/Monroe County
- Utility-scale standalone generation
  - Customer-owned
  - Duke Energy owned

Net Metered Installations

Duke Energy Service Area	Number of Installations	Capacity (MW)
Residential	825 (802 PV, 23 wind)	5.53 (5.46 PV, 0.07 wind)
Nonresidential	226 (213 PV, 13 wind)	28.34 (26.19 PV, 2.15 wind)

Monroe County	Number of Installations	Capacity (MW)
Residential	391	2.21
Nonresidential	60	4.13

Growth in Number of Installations, Duke Energy Indiana Service Area



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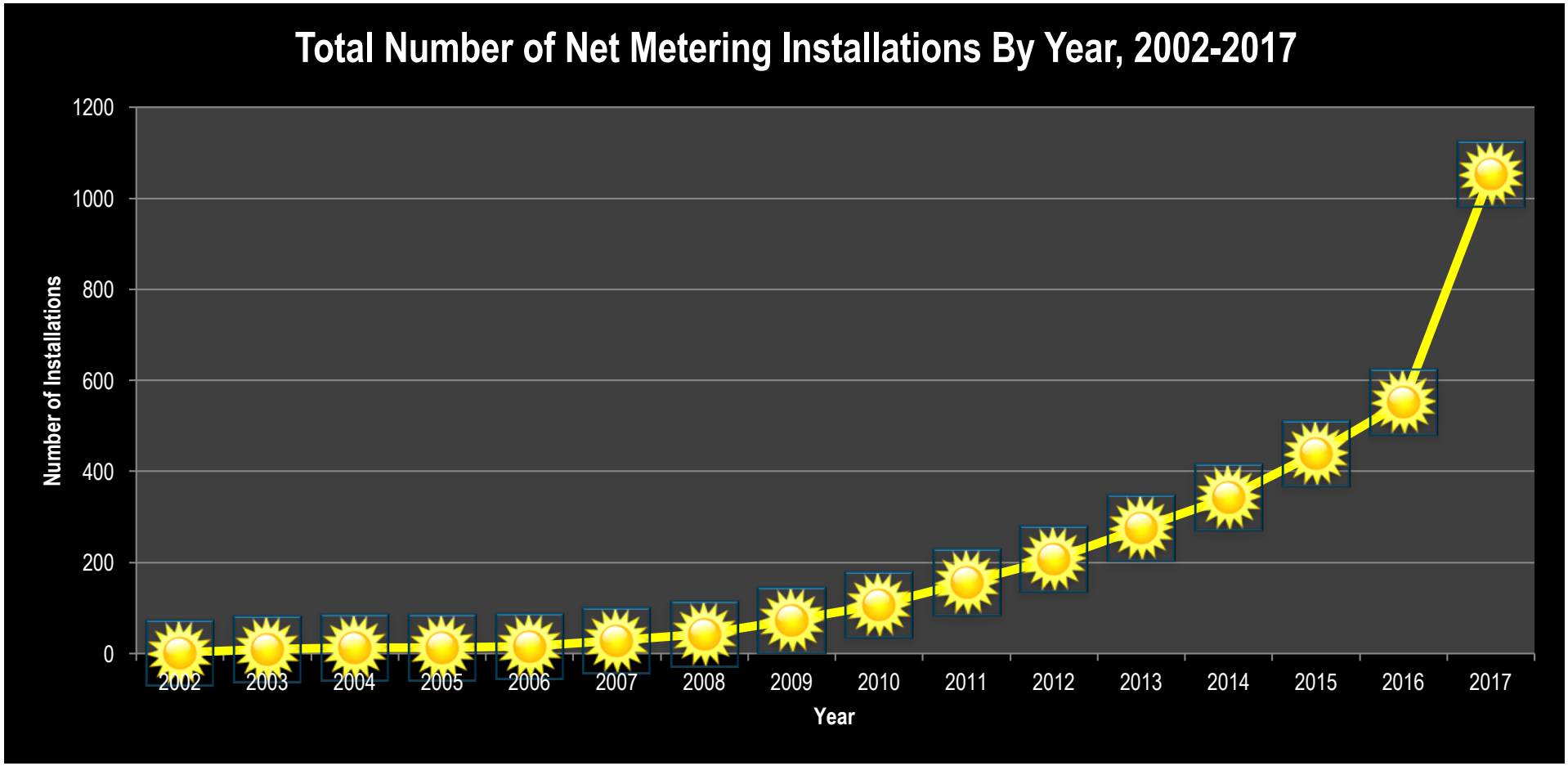
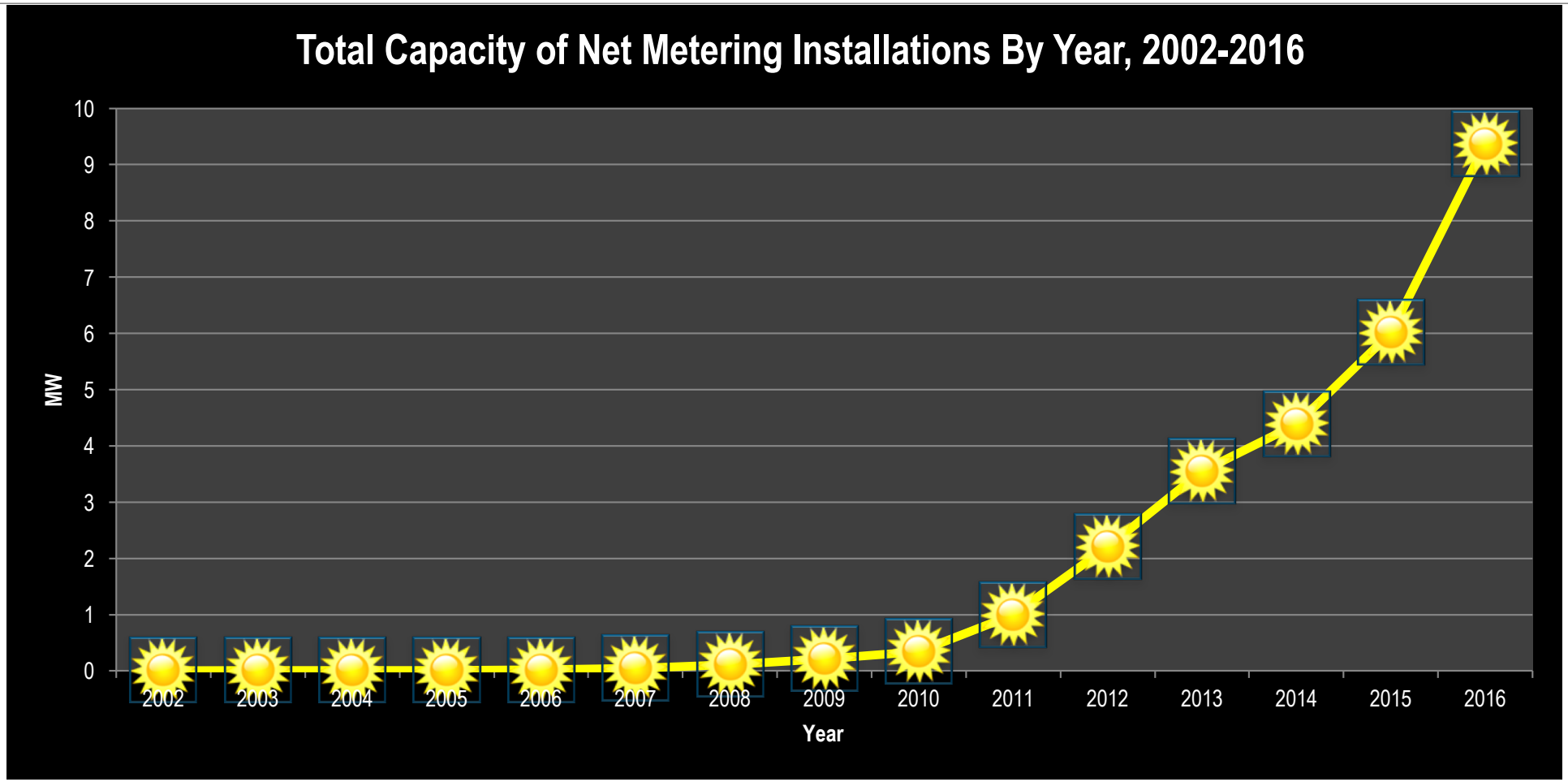


Net Metering Capacity Growth, Duke Energy Indiana Service Area



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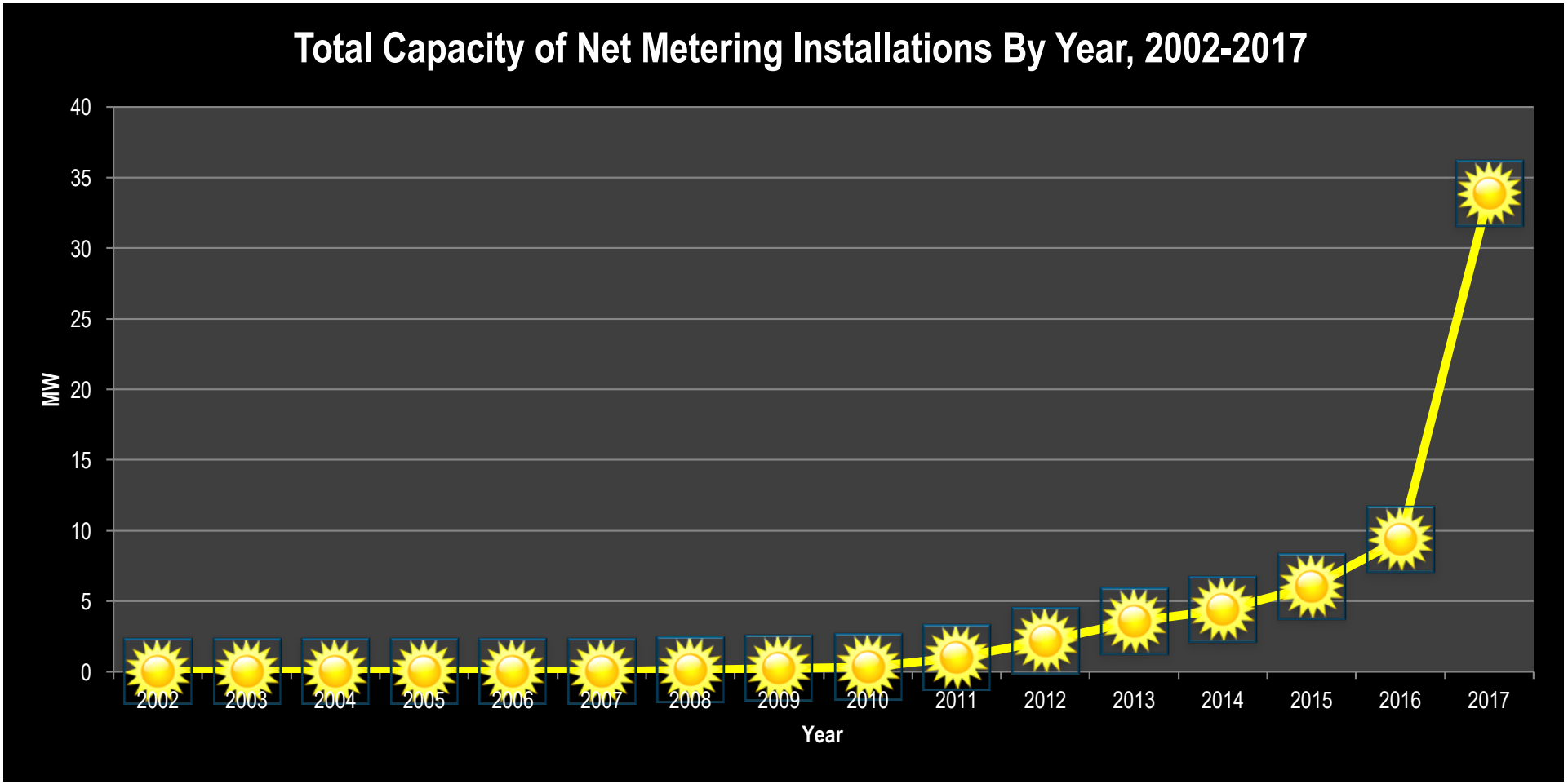
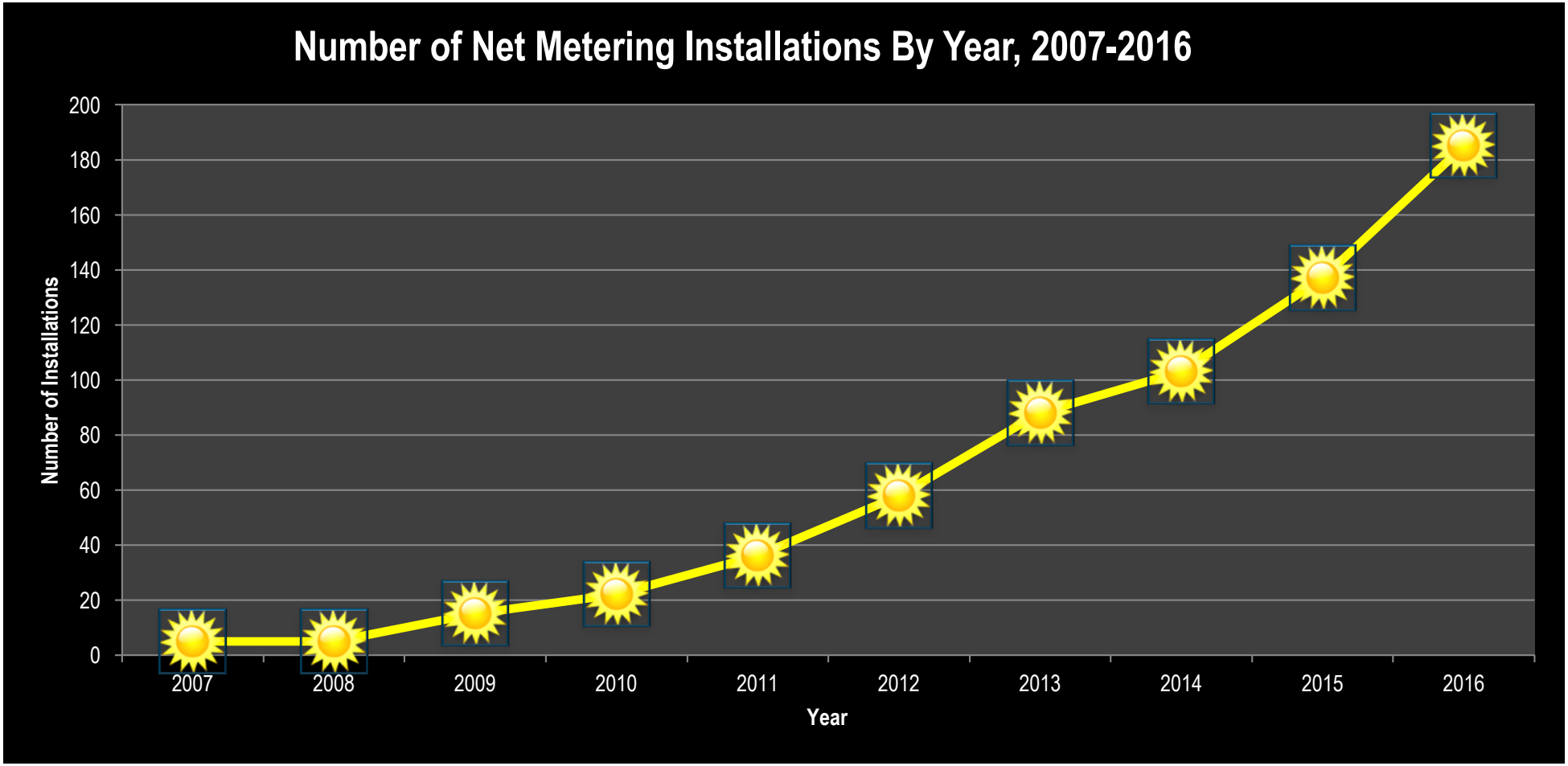


Growth in Number of Installations, Monroe County



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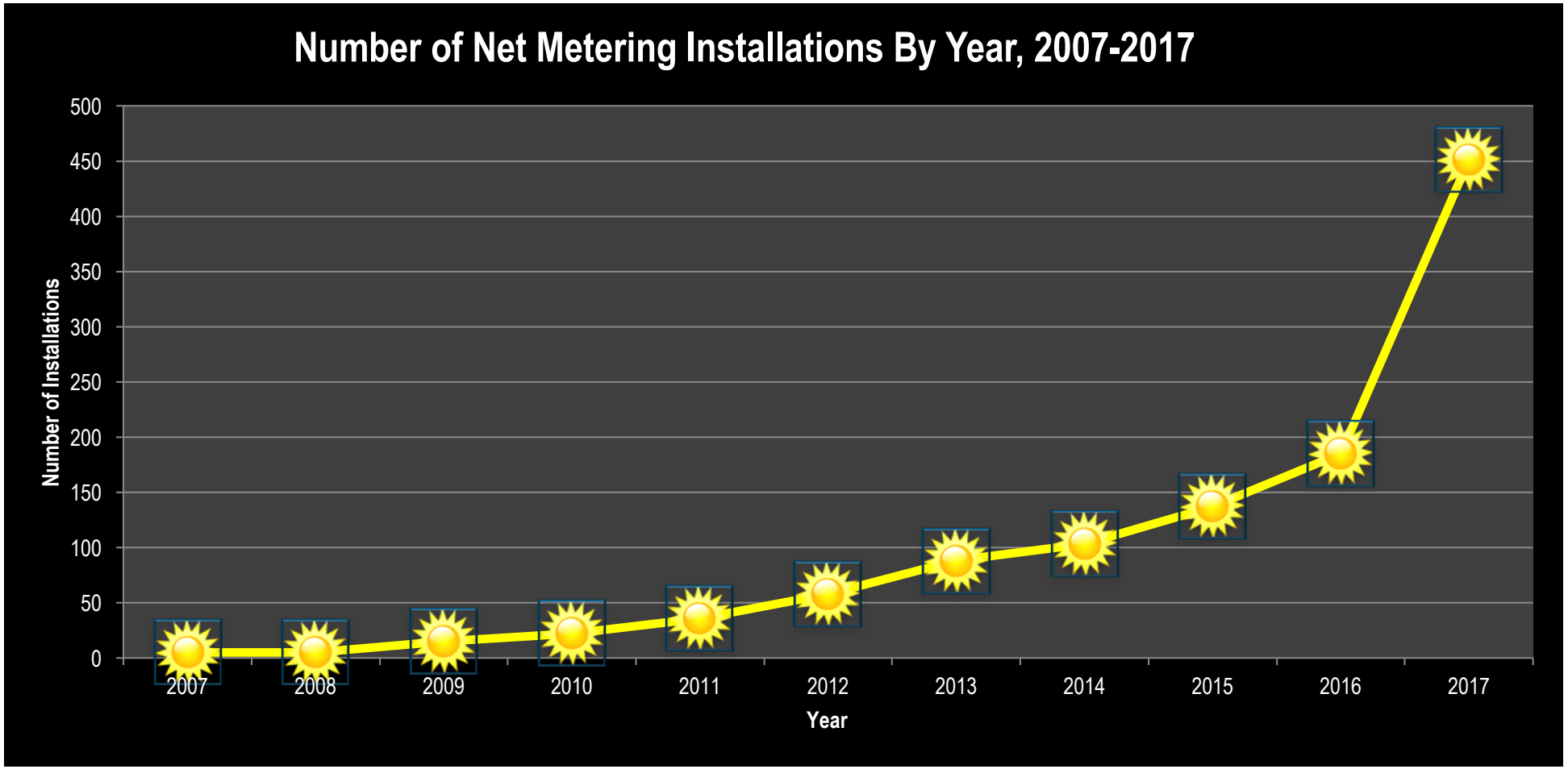
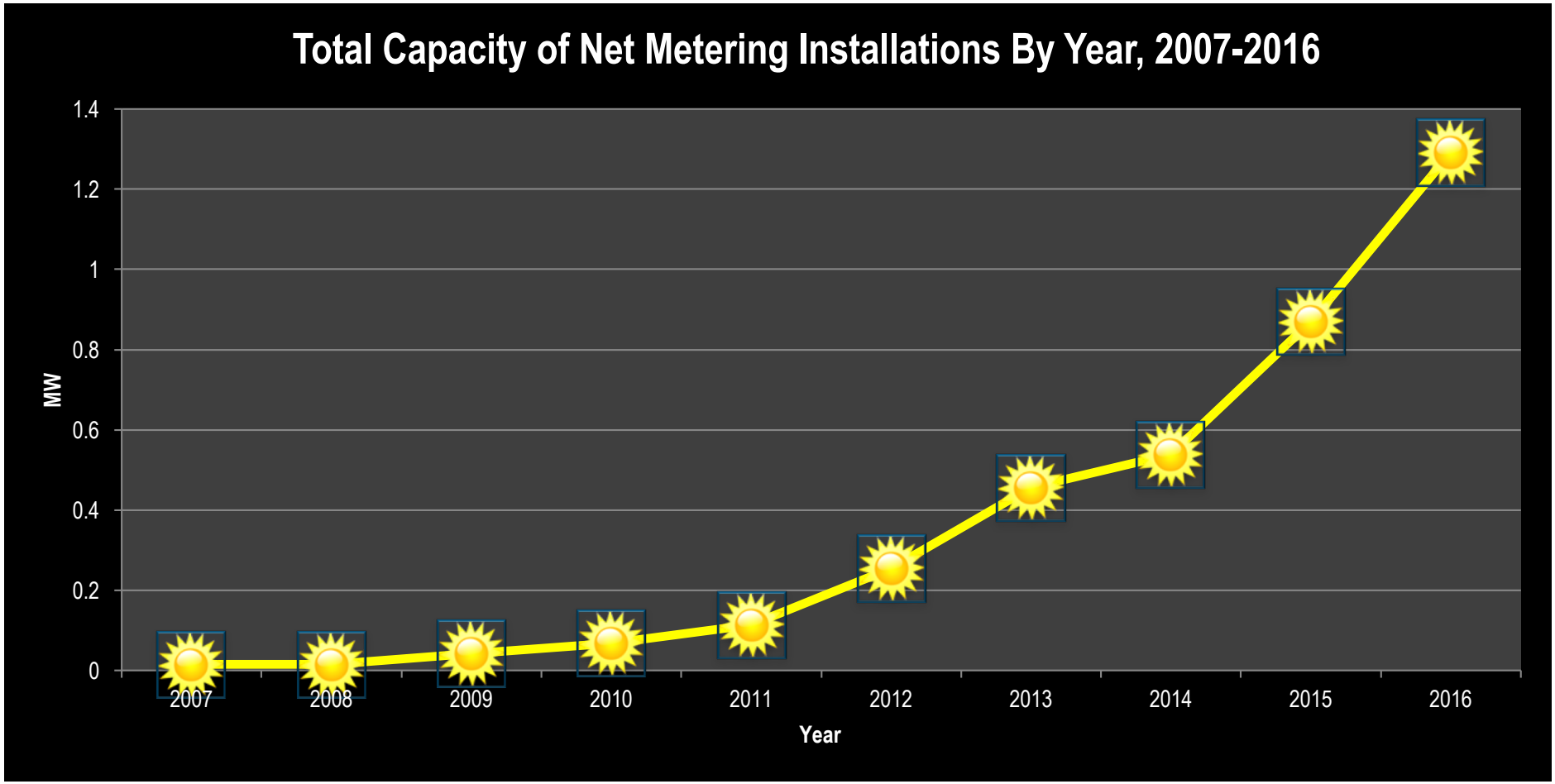


Net Metering Capacity Growth in Monroe County



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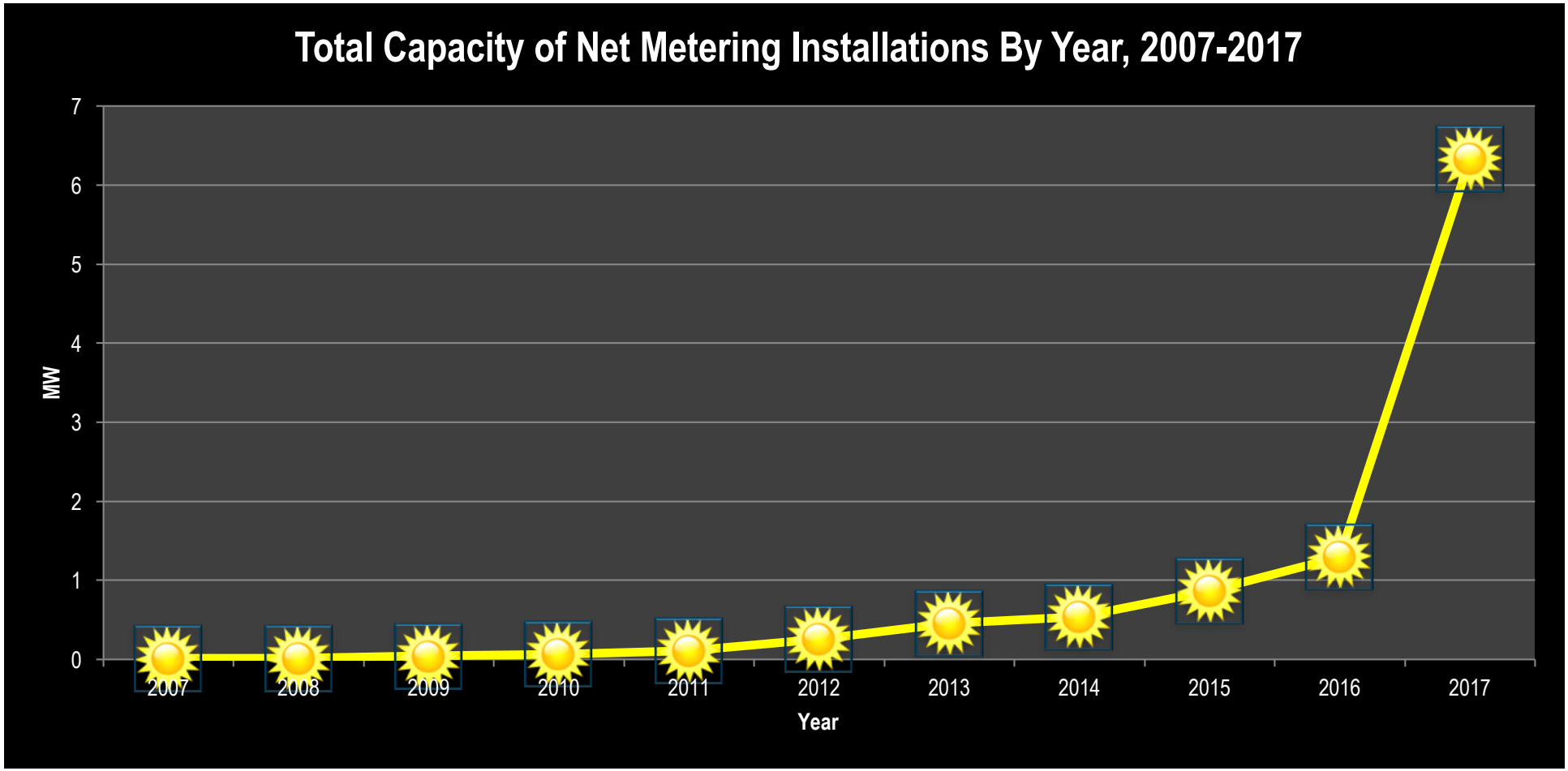

Top Five Counties, Number of Net Metered Installations, 2016 and 2017

County	2016 number of NM installations
Monroe	198
Hamilton	43
Vigo	40
Howard	32
Vermillion	27

County	2017 number of NM installations
Monroe	451
Hamilton	87
Howard	48
Vigo	43
Bartholomew	32

Top Five Counties, Increase in Number of Installations, 2016-2017

County	2016 number of NM installations	2017 number of NM installations	increase in number	percent increase in number
Monroe	198	451	253	127.78%
Hamilton	43	87	44	102.33%
Jennings	1	21	20	2000.00%
Howard	32	48	16	50.00%
Bartholomew	18	32	14	77.78%

Top Five Counties, Capacity of Net Metered Installations, 2016 and 2017

County	2016 kW
Hamilton	1985
Monroe	1414
Howard	1078
Putnam	1049
Henry	924

County	2017 kW
Hamilton	8543
Monroe	6333
Howard	2235
Washington	1704
Decatur	1470

Top Five Counties, Increase in Capacity of Installations, 2016-2017

County	2016 kW	2017 kW	increase in kW	percent increase in kW
Hamilton	1985.115	8543.255	6558.14	330.37%
Monroe	1413.72	6333.227	4919.507	347.98%
Washington	12.28	1704.28	1692	13778.50%
Decatur	0	1470.229	1470.229	---
Carroll	0	1362	1362	---

Is this rapid growth causing issues on the distribution system?

Many 2017 projects are not connected yet, but we model them to study the impacts.

Interconnection study looks at impacts from both a single interconnection and cumulative interconnections on a circuit, transformer or substation.

A large number of small interconnections may cause voltage and balance issues, or may exceed equipment ratings, on a single circuit or a section of a circuit.

Cost burden for mitigation is on the customer whose interconnection was the “tipping point” from no negative impact to causing an impact.

Net Metering Caps – How close are we to reaching them?

- Cap is 1.5 % of a utility's most recent summer peak
  - 40% carve-out for residential customers
  - 15% carve-out for biomass (may be residential or nonresidential)

- Duke Energy's 2017 summer peak: 5217 MW
  - 1.5% of this is 78.255 MW
  - 40% of the cap is 31.302 MW. Residential connections are at 5.53 MW, so we are not near this cap for residential.
  - 60% of the cap is 46.953 MW. Nonresidential connections are at 28.34 MW. It is likely we will reach the cap within a few years.

Non-Net Metered Renewable Projects

Privately-owned projects:

- Four 5 MW solar farms with a total of 20 MW AC presently connected
- One 4 MW solar farm in project development
- Nine previously studied projects on hold
- Inquiries and requests for pre-application data for several sites

Non-Net Metered Renewable Projects

Duke Energy-owned projects:

- Crane Solar 17 MW facility presently connected

- Planned future projects:
  - 1.696 kW solar farm
  - Microgrid with 2 MW PV and 5 MW, 5 MWh battery storage
  - 5 MW, 5 MWh battery storage project
  - 20-25 MW combined heat and power generator project
  - Additional 15-20 MW of PV divided among multiple sites

Crane Solar

Duke Energy Indiana-owned asset at Naval Support Activity Crane (NSA Crane)

17 MW facility

Approx. 76,000 panels on 145 acres

Expectations for the Future

- Continued steady growth in residential solar
- High growth in nonresidential solar
- Microgrids
- Renewables combined with energy storage

Questions?


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