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Indiana's Potential for the Next Top Midwestern State Solar Market

Could **INDIANA** Be the Next Top Midwestern Solar Market?



INDIANA—The Bad



- No mandatory RPS (weak voluntary RPS)
- No clear authority for third party PPAs
- No state financial incentives
- Phase-out of IOU net metering no later than 2022 to average locational marginal price X 125%
 - Could be sooner if caps are met
- Republican control of all statewide offices
- No state siting authority

INDIANA—The Good



WE HAVE POTENTIAL!

- Strong pro-business climate
- State taxes
- Pro-solar mayors & cities (Bloomington, North Vernon, Goshen, South Bend & Carmel)
- **Lots of potential with many aging coal power plants**
- “Let competition and flexibility rule our electricity system.”
 - NYT: “A Market-Driven New Deal? We’d Be Unstoppable” by Amory B. Lovins and Rushad R. Nanavatty.

INDIANA Coal-Fired Power Plants

Top 10 Coal Power States

Indiana generated more electricity from coal-fired power plants in 2018 than any other state except for Texas. Nationwide, 28% of electricity came from coal-fired generation that year.

STATES THAT GENERATE THE MOST ELECTRICITY FROM COAL

Ranked by gigawatt-hours, 2018

	Gigawatt-hours of electricity from coal	% of state's total electricity generation
1 Texas	111,475	26%
2 Indiana	77,463	72%
3 West Virginia	61,975	94%
4 Missouri	59,924	73%
5 Kentucky	59,168	75%
6 Ohio	58,788	47%
7 Illinois	57,862	31%
8 Pennsylvania	43,969	21%
9 Michigan	42,826	38%
10 Wyoming	39,196	87%

SOURCE: EIA

PAUL HORN / InsideClimate News

Indiana's Coal-Fired Power Plants

Indiana still relies heavily on coal to produce electricity and has a fleet of large coal-fired power plants, most of them in the southern part of the state near coal mines. The largest, Duke's Gibson Station, has a listed nameplate capacity of 3,340 megawatts.

MAJOR COAL PLANTS

Name, owner and nameplate capacity in megawatts (100 MW or more)



SOURCE: EIA Form 860M, December 2018

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INDIANA Projected Retirements

Projected Coal, Natural Gas, and Oil Fueled Generating Unit Retirements

Generating Unit (Year In-Service)	Owner	Summer Rating (MW)	Fuel	Retire Date	Age at Retire Date
Connersville Units 1 and 2 (1972)	Duke	86.0	Oil	2018	46
Miami-Wabash Units 1-3, 5, 6 (1968)	Duke	80.0	Oil	2018	50
Gallagher Unit 4 (1961)	Duke	140.0	Coal	2022	61
Gallagher Unit 2 (1958)	Duke	140.0	Coal	2022	64
Bailly Unit 10 (1968)	NIPSCO	31.0	Nat. Gas	2023	55
RM Schahfer 17 (1983)	NIPSCO	361.0	Coal	2023	40
RM Schahfer 18 (1986)	NIPSCO	361.0	Coal	2023	37
Broadway Unit 2 (1981)	Vectren South	115.0	Nat. Gas	2024	43
Northeast Units 1 and 2 (1963, 1964)	Vectren South	20.0	Nat. Gas	2024	61
Warrick Unit 4 (1970, Note 1)	Vectren South	150.0	Coal	2024	54
FB Culley Unit 2 (1966)	Vectren South	150.0	Coal	2024	58
AB Brown Unit 1 (1979)	Vectren South	245.0	Coal	2024	45
AB Brown Unit 2 (1986)	Vectren South	245.0	Coal	2024	38
Note 1: 150 MW = SIGECO 50% share of Unit 4					

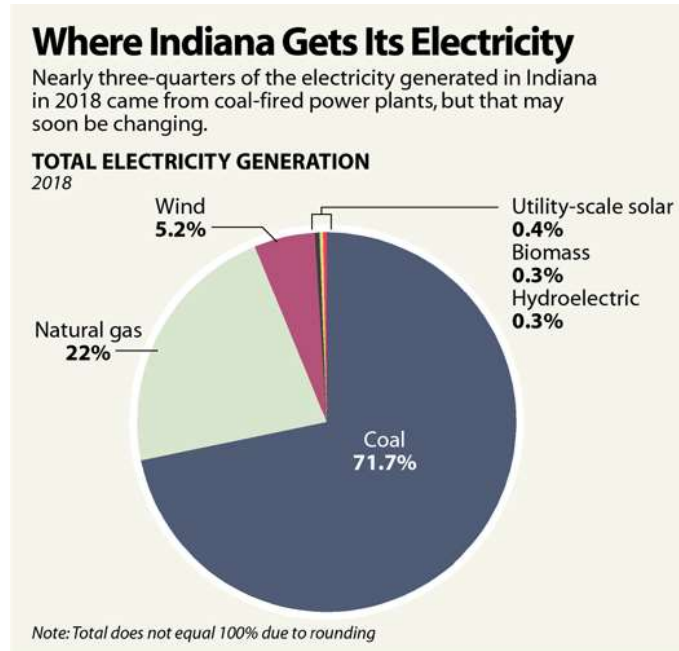
INDIANA

Coal vs. Gas... vs. Renewables?



COAL

- In 2017, about 70% of Indiana's MWH was generated by coal
- 8 of Indiana's 10 largest power plants are still coal-fired



SOURCE: EIA

PAUL HORN / InsideClimate News

GAS...AND RENEWABLES!

- In 2017, net generation from gas more than doubled from 2014 to about 20%.
- Indiana's new 200 MW of generation capacity in 2017:
 - **60% renewable energy sources**
 - **40% natural gas**

INDIANA Developments

NIPSCO RFP for 2018 IRP



Overall Summary and Pricing Received

	Technology	# of Bids	Bid MW (ICAP)	# of Projects	Project MW	Average Bid Price	Pricing Units	Comments
Asset Sale or Option	Combine Cycle Gas (CCGT)	7	4,846	4	3,055	\$959.61	\$/kW	
	Combustion Turbine (CT)	1						
	Solar	9	1,374	5	669	\$1,151.01	\$/kW	
	Wind	8	1,807	7	1,607	\$1,457.07	\$/kW	
	Solar + Storage	4	705	3	465	\$1,182.79	\$/kW	
	Wind + Solar + Storage	1						
	Storage	1						
Purchase Power Agreement	Combine Cycle Gas (CCGT)	8	2,715	6	2,415	\$7.86	\$/kW-Mo	+ fuel and variable O&M
	Solar + Storage	7	1,055	5	755	\$5.90	\$/kW-Mo	+ \$35/MWh (Average)
	Storage	8	1,055	5	925	\$11.24	\$/kW-Mo	
	Solar	26	3,591	16	1,911	\$35.67	\$/MWh	
	Wind	6	788	4	603	\$26.97	\$/MWh	
	Fossil	3	1,494	2	772	N/A		Structure not amenable to price comparison
	Demand Response	1						
Total		90	20,585	59	13,247			

INDIANA Developments NIPSCO RFP for 2018 IRP



2018 IRP UPDATE - PREFERRED PLAN

- Retire remaining coal (rest of Schahfer coal plant by 2023, MI City 12 coal unit by 2028)
- By 2023, replace with:
 - ▪ 1,150 MW of solar, solar + storage
 - 160 MW of wind
 - 125 MW of DSM
 - 50 MW of market purchases
- By 2028, likely add:
 - ▪ Additional 300 MW of solar
 - Additional 114 MW of DSM

2018 IRP UPDATE – SHORT-TERM ACTION PLAN (2019-2022)

- Procure new wind resources in 2020
- ▪ Conduct a subsequent All-Source RFP to identify preferred resources to fill remainder of 2023 capacity need (likely renewables and storage)

INDIANA Developments 2019 Legislative Session



Indiana Chamber of Commerce + Utilities + Consumers + Enviros vs. Pruitt/Coal

Energy Task Force

- To examine state's policies concerning electric generation portfolios;
- To develop recommendations concerning any identified challenges; and
- To issue a report and recommendations not later than 12/1/20

IURC Study

Requires IURC to conduct a comprehensive study by 7/1/20 of impacts on:

1. Transitions in the fuel sources and other resources used to generate electricity by electric utilities; and
 2. New and emerging technologies for the generation of electricity;
- on electric generation capacity, system reliability, system resilience, and the cost of electric utility service.

INDIANA Developments

IURC Rejects 850 MW CCGT



“The proposed large scale single resource investment for a utility of Vectren South’s size does not present an outcome which reasonably **minimizes the potential risk** that customers could sometime in the future be saddled with an uneconomic investment or serve to **foster utility and customer flexibility in an environment of rapid technological innovation.**”

“IURC determined that **new electricity generation technology is emerging so quickly** that it makes no sense to saddle ratepayers with a new 850-megawatt natural gas power plant for the next 30 years.”

INDIANA POTENTIAL

Business Climate Rankings-2018



1. Georgia
2. North Carolina
3. Texas
4. Ohio
5. Tennessee
6. South Carolina
7. Virginia
- 8. INDIANA**
9. Alabama
10. Kentucky
11. Louisiana

Site Selection Magazine

INDIANA POTENTIAL

2019 Business Tax Climate Index

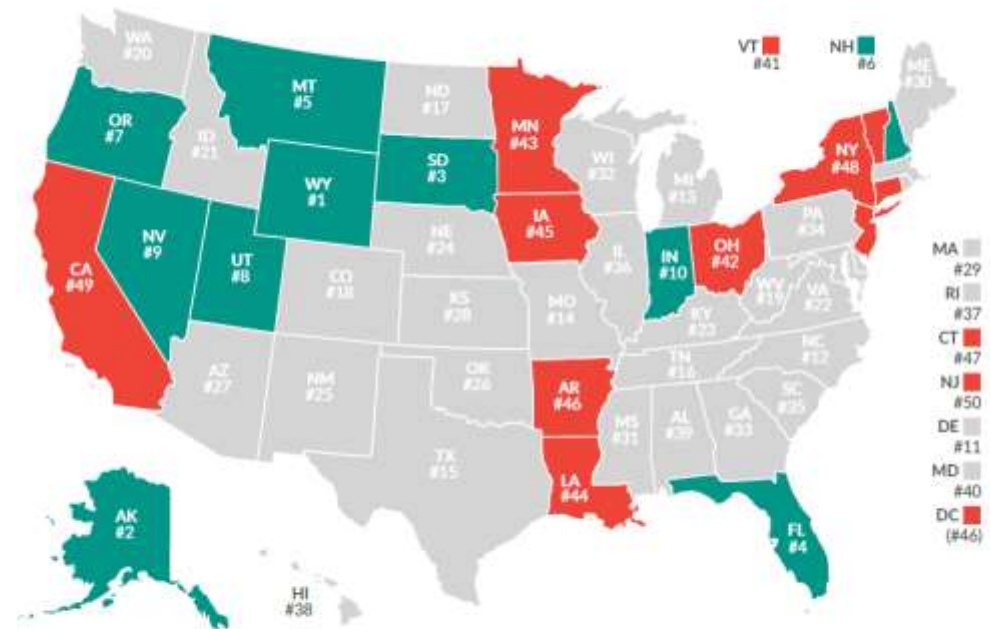


1. Wyoming
2. Alaska
3. South Dakota
4. Florida
5. Montana
6. New Hampshire
7. Oregon
8. Utah
9. Nevada

10. INDIANA

Inside Indiana Business

2019 State Business Tax Climate Index



Note: A rank of 1 is best, 50 is worst. Rankings do not average to the total. States without a tax rank equally as 1. D.C.'s score and rank do not affect other states. The report shows tax systems as of July 1, 2016 (the beginning of Fiscal Year 2019).

Source: Tax Foundation.

10 Best Business Tax Climates
10 Worst Business Tax Climates

INDIANA POTENTIAL

Solar Status



Indiana's Installed Solar Capacity

state	MW of installed solar capacity, Q4 2018
Minnesota	1,094
Indiana	331
Ohio	202
Missouri	202
Michigan	152
Illinois	108
Iowa	96
Wisconsin	67
Nebraska	43
Kansas	29
South Dakota	2
North Dakota	0
	2326



Indianapolis as a "Solar Star" City

Table ES-1. The "Solar Stars" (Cities with 50 or More Watts of Solar PV per Person, End of 2018)

Per Capita Rank	City	State	Per Capita Solar PV Installed (Watts-DC/person) ¹	Change in Per Capita Rank 2017 to 2018	Total Solar PV Installed (MW-DC)	Total Solar PV Rank
1	Honolulu	HI	646.4	0	226.5	4
2	San Diego	CA	247.5	0	351.4	2
3	San Jose	CA	194.9	0	201.7	5
4	Burlington	VT	187.3	+1	79	37
5	Las Vegas	NV	162.2	+1	104.1	9
6	Phoenix	AZ	145.3	+1	236.2	3
7	Indianapolis	IN	143.5	-3	123.8	8
8	Riverside	CA	138.3	+1	45.3	16
9	Denver	CO	129.6	-1	91.4	10
10	Albuquerque	NM	128.9	+2	72.0	11
11	Salt Lake City	UT	126.9	-1	25.5	21
12	San Antonio	TX	123.6	-1	186.9	7
13	New Orleans	LA	107.3	0	42.2	18



INDIANA POTENTIAL

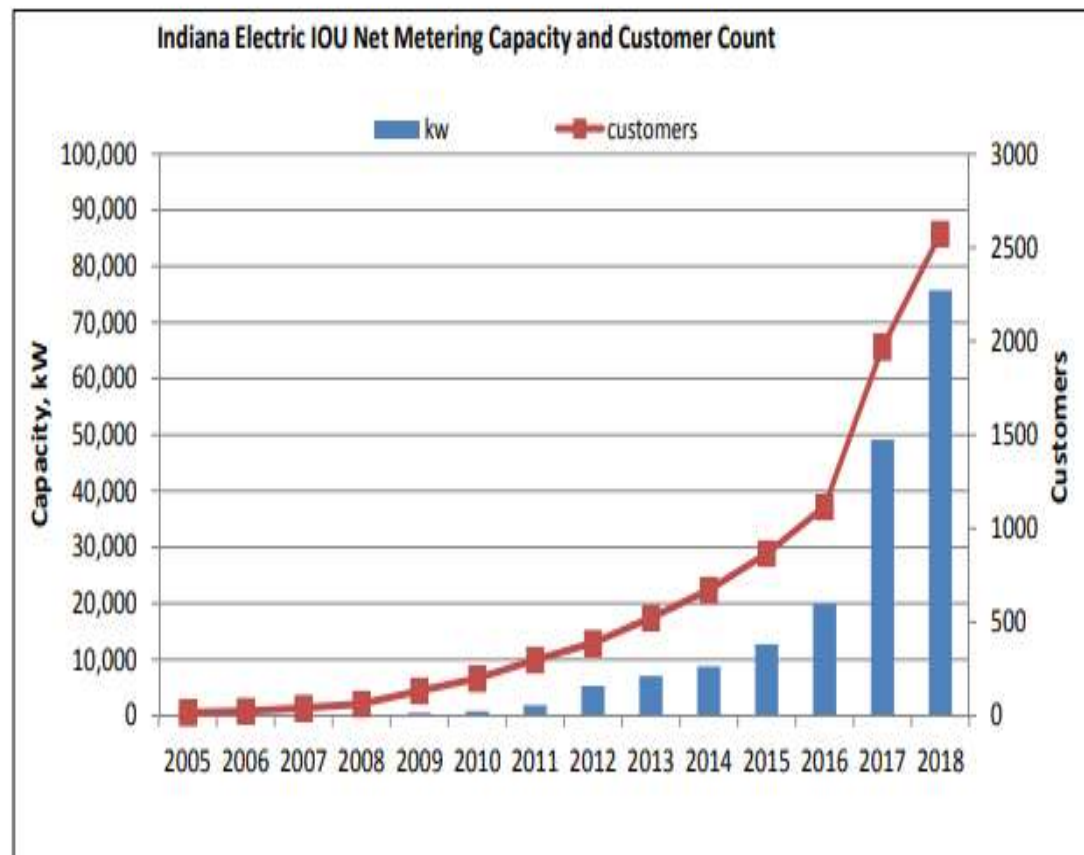
Solar Status—Net Metering



Table 7. Solar Nameplate Capacity growth year over year

	Capacity (kW)	% change from previous year	Absolute change from previous year (kW)
2008	167	38%	46
2009	307	84%	140
2010	529	72%	221
2011	1,119	112%	591
2012	1,789	60%	670
2013	2,657	49%	868
2014	4,346	64%	1,689
2015	8,123	87%	3,777
2016	15,476	91%	7,353
2017	44,310	186%	28,834
2018	71,018	60%	26,708

Figure 1. Number of customers and total capacity by year



INDIANA POTENTIAL State Solar PV Rankings



STATE	2016	2017	2018
INDIANA	23	24	28
MICHIGAN	32	23	30
WISCONSIN	40	33	38

INDIANA POTENTIAL

MISO & PJM Solar Interconnection Queue



STATE	MISO	PJM	TOTAL
INDIANA	3129	3536.5	6665.5
MICHIGAN	3088.3	N/A	3088.3
WISCONSIN	4611.64	N/A	4611.64

INDIANA POTENTIAL

PURPA 2019 "Avoided Cost" Rates



Utility	30 day filing ID	Time Period	Energy rate (\$/kWh)	Capacity rate (\$/kW/month)
Duke Energy	50252	Peak Period - Summer	\$0.031961	\$4.38
		Peak Period Other mos.	\$0.031961	\$4.38
IPL	50255	Peak Period	\$0.0279	\$6.00
		Off Peak Period	\$0.0247	\$6.00
SIGECO	50256	Annual On-Peak	\$0.03545	\$5.90
		Annual Off-Peak	\$0.02670	\$5.90
I&M	50254	Standard	\$0.0295	\$6.58
	TOD	On-Peak	\$0.0351	\$6.58
		Off-Peak	\$0.0255	\$6.58

(see 170 Ind. Admin. Code 4-4.1-10)

INDIANA POTENTIAL

PURPA 2019 "Avoided Cost" Rates (2)



Utility	30 day filing ID	Time Period	Energy rate (\$/kWh)	Capacity rate (\$/kW/month)	
NIPSCO	50253	Summer (May-Sept)			
		TOU	On-Peak	\$0.03709	\$8.70
		Off-Peak	\$0.02460	\$8.70	
		Winter (Oct-Apr)			
		On-Peak	\$0.03692	\$8.70	
		Off-Peak	\$0.02942	\$8.70	
		STD	Summer Period	\$0.03113	\$8.70
			Winter Period	\$0.03271	\$8.70

(see 170 Ind. Admin. Code 4-4.1-10)

INDIANA

Here's to a bright and sunny future!



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