Financial Arrangements Behind New Generating Capacity

2018-2019 Update

AMERICAN PUBLIC POWER ASSOCIATION
80 Years of Powering Strong Communities

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The American Public Power Association is the voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide. We represent public power before the federal government to protect the interests of the more than 49 million people that public power utilities serve, and the 93,000 people they employ. We advocate and ad¬vise on electricity policy, technology, trends, training, and operations.

Introduction

This paper examines the types of financial arrangements behind new electric generation capacity that completed construction and came online in 2018 and 2019. These data show the revenue sources supporting the development of new resources, including payments from long-term bilateral contracts, direct ownership, or from the wholesale electricity markets.

Understanding the patterns of real-world resource investment decisions is an important factor to consider when evaluating different types of market designs. In the regional transmission organizations (RTOs) and independent system operators (ISOs), market rules are often justified by the RTOs/ISOs, Federal Energy Regulatory Commission (FERC or the Commission) and certain stakeholders as needed to provide incentives or price signals for investments in new generating resources. For example, in the December 2019 order greatly expanding the Minimum Offer Price Rule in the PJM Interconnection (PJM) capacity construct, the Commission opined that this administratively determined offer floor would "enable PJM's capacity market to send price signals on which investors and consumers can rely to guide the orderly entry and exit of economically efficient capacity resources."[1] In the energy markets, the Commission issued a series of rulemakings and orders on price formation for which a primary justification was to "improve price signals to support efficient investments in facilities and equipment."[2]

Such justifications for market rule designs, however, appear to overstate the extent to which these markets are drivers of resource investments. The data presented here show that markets often are not the primary source of revenue and therefore might not play a key role in resource decision-making. Instead, there are a variety of drivers of new generation investment, with the greatest sources of revenue for new capacity continuing to come from long-term contracts or ownership. Moreover, these data show that resource diversity, technology innovation, and emissions reductions can be best achieved by financial arrangements that consider utility, consumer and state policy goals rather than projects constructed to maximize earnings from wholesale markets.

Primary Findings

The primary findings of this analysis are:

- 38% of the new capacity that began service in 2018 (11,800 megawatts (MW)) and 16% that began service in 2019 (3,700 MW) receive revenue solely from wholesale markets (known as "merchant plants").
- New merchant capacity is composed almost entirely of natural gas fired generation (92% in 2018 and 99% in 2019).
- Although electricity consumption in 2019 was at the same level as five years earlier, new capacity exceeded retirements in 2018 and 2019 by 12,500 MW and 3,900 MW respectively.
- Utility projects (bilateral contracts and ownership) accounted for about half of the new capacity in each year and were characterized by a greater diversity of resources than merchant generation. In 2018, about half of the utility-sponsored new capacity was natural gas, one-fourth was solar, and one-fifth was wind; and in 2019, those three technologies each accounted for about one-third of utility capacity additions.
- Storage accounted for about 1% of utility, customer, and merchant projects, with the greatest share of new storage attributable to utility projects. Small amounts of hydropower, geothermal, biomass or biogas, and fuel cells were among the utility projects, but not the merchant projects.
- Bilateral contracts for renewable resources and storage with large end-use customers accounted for 6% and 15% of the total new capacity in 2018 and 2019 respectively, compared to 12% and 11% in 2016 and 2017.

[1] *Calpine Corp., et al. v. PJM Interconnection, L.L.C.*, 169 FERC ¶ 61,239 (2019) at P 41.

[2] See for example, the orders initiating investigations into fast-start pricing in the New York ISO, PJM Interconnection, and Southwest Power Pool and the final rule on offer caps in RTOs/ISOs: *New York Independent System Operator, Inc.*, 161 FERC ¶ 61,294 (2017) at P 6; *PJM Interconnection, L.L.C.*, 161 FERC ¶ 61,295 (2017) at P 10; *Southwest Power Pool, Inc.*,161 FERC ¶ 61,296 (2017) at P 7; and *Offer Caps in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order 831, 81 Fed. Reg. 87,770 (2016) at P 5, 37.

Merchant Generation

Table 1 shows merchant generation capacity additions over the past seven years. As shown, merchant generation sharply increased as a share of capacity in 2015 and has since fluctuated, with 2018 representing the highest share to date.

Table 1. Merchant Generation, 2013-2019

Year	Total New Net Summer Capacity (MW)	New Merchant Capacity (MW)	% Merchant
2013	14,680.3	348.0	2.4%
2014	17,638.2	839.9	4.8%
2015	18,316.9	3,531.6	19.3%
2016	28,355.8	2,037.0	7.2%
2017	21,347.0	6,212.8	29.1%
2018	31,220.8	11,830.1	37.9%
2019	22,689.2	3,695.2	16.3%

This growth of resources dependent upon market revenues has not been a positive development for resource diversity, environmental goals, and risks to consumers. Downsides to the expansion of merchant power plants include:

- **Potential impacts on natural gas prices and pipeline capacity.** Decisions based upon individual analyses are made without regard to how the collective merchant new builds could affect natural gas prices and pipeline capacity.

- **Excess procurement.** Regions where merchant capacity construction is greatest are also those demonstrating an excess procurement of capacity, thereby raising costs to consumers. In particular, PJM, where two-thirds of all new merchant generation was constructed over the past two years, procured 9,500 MW of excess capacity in 2018 and 11,100 MW in 2019.[3]

- **Fuel security concerns.** The growth of natural gas generation is in direct contrast to the RTO/ISOs' increasing concerns about fuel security. For example, ISO New England (ISO-NE), which represented 30% of the new merchant natural gas generation last year, stated that the region has an "energy security problem" largely because it "relies most on gas delivered through its constrained pipeline system."[4]

- **Support for costly market rules.** Merchant generation creates a pool of resources with a continued interest in propping up their earnings by administratively increasing energy and capacity prices, such as through problematic minimum offer requirements in the capacity markets. Such efforts pose impediments to state and utility efforts to develop particular types of resources and increase costs to consumers.

[3] Table 5-7, Quarterly State of the Market Report for PJM: January through June, Monitoring Analytics (August 2020). The surplus capacity is calculated as the difference between the actual reserve margin and required installed reserve margin. http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2020/2020q2-som-pjm-sec5.pdf

[4] *ISO New England Inc.*, Compliance Filing of Energy Security Improvements Addressing New England's Energy Security Problems, Dockets EL18-182-000 and ER20-1567-000, Federal Energy Regulatory Commission (April 2020) at 3.

About this Analysis

This paper used the list of new generating units, including technology type, location and capacity, from the Energy Information Administration (EIA).[5] EIA data excludes capacity below one megawatt (although there are a few units with a capacity between 700 and 900 kilowatts), and therefore does not include residential rooftop solar or other small distributed resources. But the information is not limited to units that participate in the wholesale markets.

The megawatts provided are net summer capacity, defined by EIA as the "maximum output, commonly expressed in megawatts, that generating equipment can supply to system load, as demonstrated by a multi-hour test, at the time of summer peak demand (period of May 1 through October 31). This output reflects a reduction in capacity due to electricity use for station service or auxiliaries."

This paper obtained information on the financial arrangements behind the new capacity primarily from utility and developer websites and news articles, as well as FERC's monthly Energy Infrastructure Update and the American Wind Energy Association's Wind Industry Fourth Quarter Market Reports for 2018 and 2019.[6]

This paper examines five types of financial arrangements:

Bilateral Contracts: A contract between the owner of the resource and a utility or end-use customer for the purchase of power. While most of the contracts are traditional power purchase agreements (PPAs), this category also includes:

> ***Virtual power purchase agreements*** (VPPAs), where the end-user purchases renewable energy credits instead of the electrons. Increasingly popular among corporate buyers of renewable energy, the owners of VPPAs still receive a steady cash flow as they would under a traditional PPA. The purchaser and seller can be located within different RTOs/ISOs or even different interconnections.[7]
>
> ***Virtual net metering*** is where a solar developer sells its net metering credits to another entity, typically a town purchasing the credits to offset the electricity cost of its facilities. Because the developer is not an end user of electricity, it does not have a utility bill to offset and cannot benefit from net metering. Virtual net metering is also used for community solar.

Ownership: This category primarily covers the construction, operation and ownership of a resource by a utility to meet the needs of its customers, but also includes ownership by an end-user - such as a factory, university or hospital - to supply its own electricity needs.

Merchant Generation: Resources that earn the revenue needed to cover their costs, plus profits, through sales into the wholesale markets. Merchant generation has no guaranteed stream of revenue.[8]

Financial Hedges: Arrangements where the owner or entity financing the project receives a guaranteed price from a third-party financial entity for all or some of the energy output. The financial entity takes on the risk of the price fluctuations, and the owner receives a steady stream of revenue, enabling it to obtain lower-cost financing. These hedges tend to be between 12 to 13 years, shorter than traditional PPAs.[9]

Community Solar: This is treated as a separate category because it does not fit neatly into the other categories. In some cases, a third party constructs and owns the facility and administers the program, which is available for customers of a certain utility, while in other cases the utility owns or contracts for the capacity and in turn, offers shares to its customers.[10]

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[5] Table 6.3, New Utility Scale Generating Units by Operating Company, Plant, Month, and Year, Electric Power Monthly (February 2019 and February 2020), US Energy Information Administration. Accessed August 2020.

[6] Where no information was available, assumptions were made about the project based on whether it is a restructured state, in which the project was assumed to be merchant or sold to a customer, or a vertically-integrated state, where it was assumed to have a contract with a utility. Units without any available information were all small and totaled less than 1% of all new capacity.

[7] *Introduction to the Virtual Power Purchase Agreement*, by Rachit Kansal, The Rocky Mountain Institute (November 2018). https://rmi.org/wp-content/uploads/2018/12/rmi-brc-intro-vppa.pdf

[8] These resources might have some short-term hedges provided by financial entities, but such data is not publicly available.

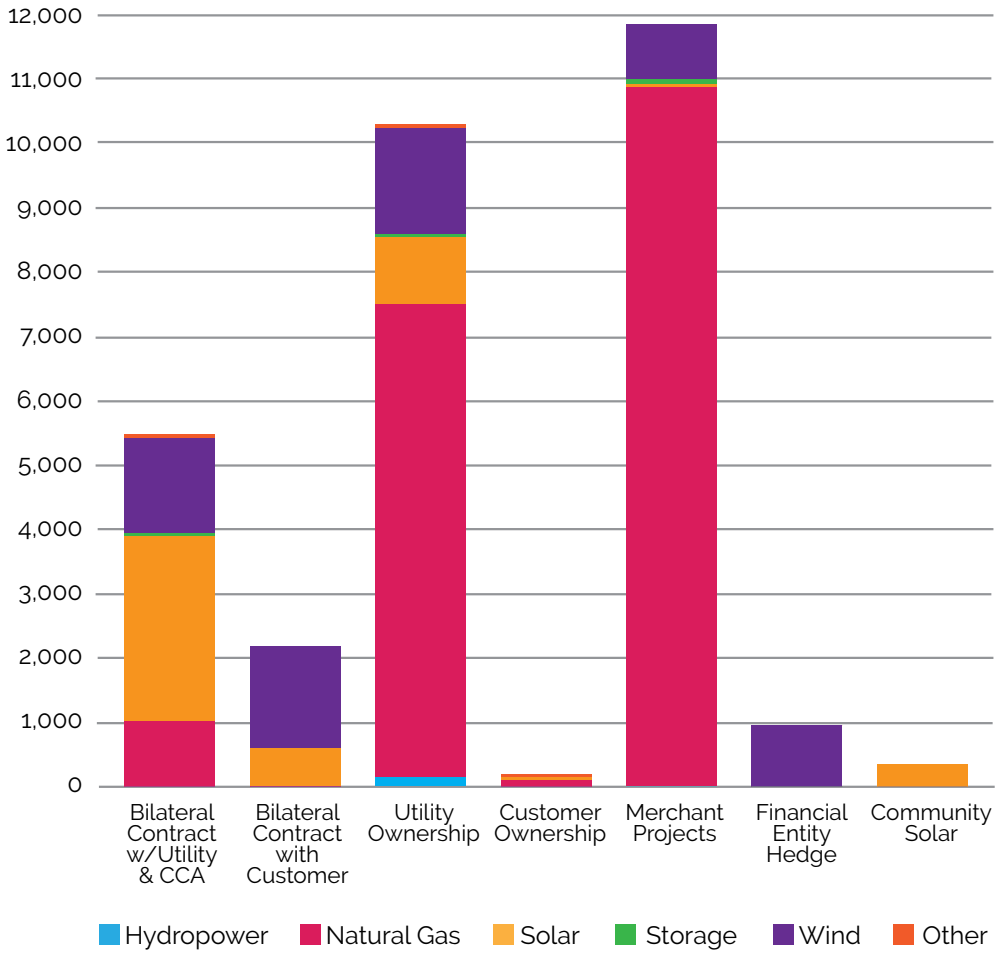
[9] *Reducing Risk in Merchant Wind and Solar Projects through Financial Hedges*, by Jay Bartlett, Resources for the Future (February 2019). https://www.rff.org/publications/working-papers/reducing-risk-merchant-wind-and-solar-projects-through-financial-hedges/

[10] *Community Solar Design Models*, Smart Electric Power Alliance (2018). https://sepapower.org/resource/community-solar-program-designs-2018-version/thank-you/

Financial Arrangements Behind New Capacity

In 2018, roughly 31,200 MW of capacity came online, greatly exceeding the 18,750 MW of capacity that retired,[11] at a time when electricity consumption has been relatively flat.[12] In 2019, about 22,700 MW of capacity came online, exceeding the 18,760 MW of capacity that retired.[13] Figures 1 and 2 show the different types of financial arrangements providing revenue to each generation technology for each year. The exact data are provided in Tables A-1 and A-2 in the Appendix.

Figure 1. New Capacity by Financial Arrangement, 2018

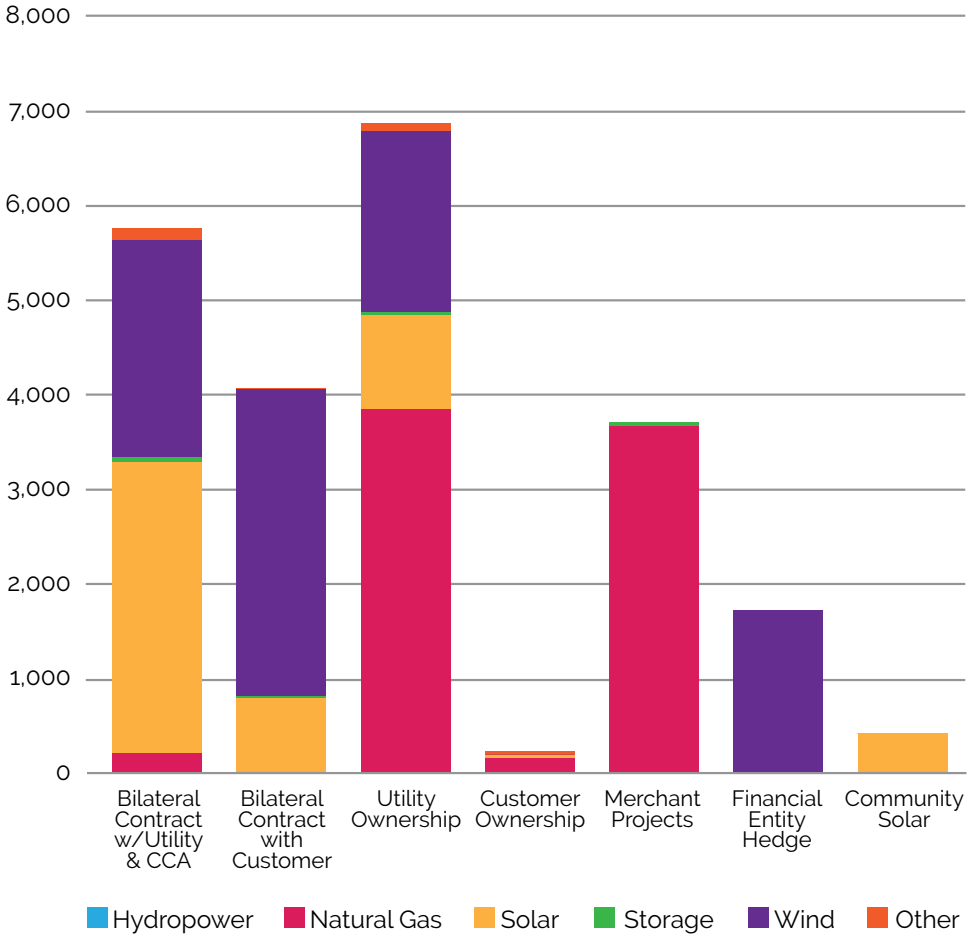


"Other" includes geothermal, biomass/biogas and petroleum.

[11] Table 6.4. Retired Utility Scale Generating Units by Operating Company, Plant, Month, and Year, Electric Power Monthly from February 2019, US Energy Information Administration. Accessed August 2020.
[12] See Table 5.1. Sales of Electricity to Ultimate Customers: Total by End-Use Sector, 2009 - December 2019 (Thousand Megawatt-hours). Between 2013 and 2018, electricity consumption rose by about 4%, which occurred entirely between 2017 and 2018. From 2018 to 2019, consumption fell by 3%.
[13] Table 6.4. Retired Utility Scale Generating Units by Operating Company, Plant, Month, and Year, Electric Power Monthly from February 2020, US Energy Information Administration. Accessed August 2020.

Merchant generation accounted for 38% of the new capacity 2018 but just 16% in 2019. In both years, the amount of new merchant generation came close to the amount by which new capacity exceeded the retirements, indicating that new merchant generation could have been a contributing factor to the surplus of new capacity compared to retirements.

Figure 2. New Capacity by Financial Arrangement, 2019



"Other" includes biomass/biogas, fuel cells, landfill gas, combined heat and power and petroleum.

About half of the capacity in both years was funded by utility contracts or ownership. Contracts with customers financed about 6% of capacity in 2018 and 15% in 2019. Each year saw a small amount of customer ownership. The vast majority of these contracts (with customers such as Apple, Facebook, General Motors, Google, Microsoft, Target, and Walmart) were for renewable energy, in the form of both physical and virtual PPAs.

While new merchant resources consisted almost entirely of natural gas-fired generation, owned or contracted-for projects showed a much greater diversity of resources.

Figures 3 and 4 show the distribution of the utility projects among different technologies, and Tables A-3 and A-4 in the Appendix show the data.

Figure 3. Utility-Owned or Contracted New Capacity, 2018

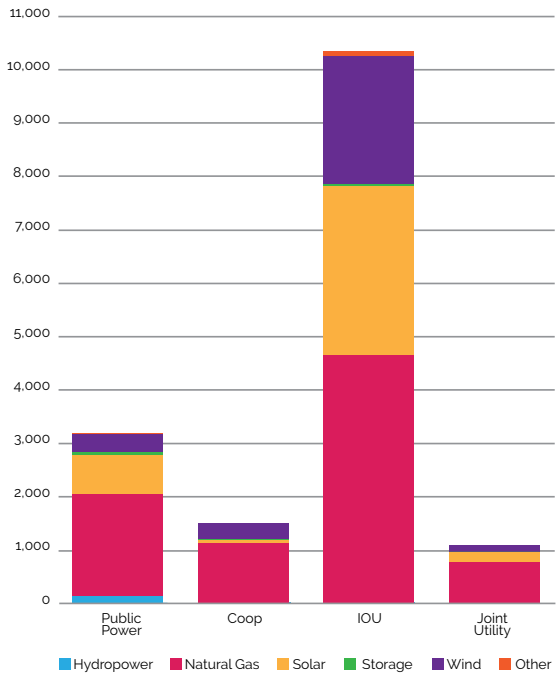
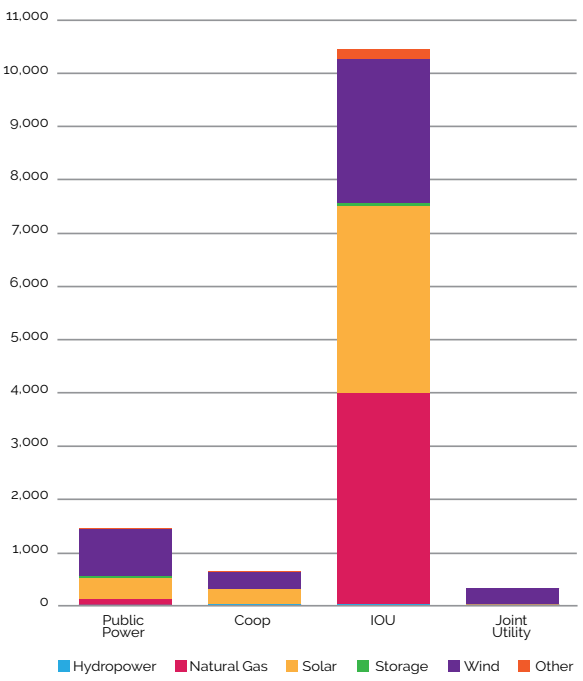


Figure 4. Utility-Owned or Contracted New Capacity, 2019



As shown, the capacity constructed or contracted by utilities is far more diverse than the merchant generation and includes hydropower and geothermal projects, which are not present in new merchant or customer-funded capacity. Public power accounted for almost 20% of new capacity and 17% of all renewables and storage in 2018, greater than its 15% share of sales to ultimate consumers. In 2019, public power's share of all capacity was 11%, and it accounted for 15% of renewables and storage.

The types and distribution of financial arrangements are also impacted by the wholesale and retail market structures. Table 2 presents an overview of the distribution of technologies and merchant generation in each RTO/ISO for both years.

Table 2. Merchant Generation and Largest Technology Share for New Capacity by RTO, 2018 and 2019

	2018		2019	
	% Merchant	**Largest Technology (share)**	**% Merchant**	**Largest Technology (share)**
CAISO	2%	Solar (57%)	0%	Solar (71%)
ERCOT	30%	Wind (51%)	2%	Wind (84%)
ISO-NE	92%	Natural Gas (92%)	81%	Natural Gas (81%)
MISO	7%	Wind (61%)	0%	Wind (81%)
NYISO	77%	Natural Gas (77%)	11%	Solar (87%)
PJM	73%	Natural Gas (97%)	87%	Natural Gas (86%)
SPP	13%	Wind (99%)	0%	Wind (99%)

The three RTO/ISOs dominated by retail choice states and which have mandatory capacity markets (ISO-NE, PJM, and NYISO) had the highest proportion of new capacity that was both merchant and natural gas generation, although there was no new merchant generation in the NYISO in 2019.

The distribution of new capacity in the rest of the RTOs/ISOs and non-RTO/ISO regions shows a different pattern. Only the Midcontinent ISO (MISO) has a capacity market, but it is voluntary. SPP and MISO are predominantly characterized by vertically integrated utilities, the Electric Reliability Council of Texas (ERCOT) has retail choice, and retail choice in the California ISO (CAISO) has been expanding rapidly due to the growth of community choice aggregators (CCAs). In 2018, there was some merchant generation additions in these RTO/ISOs, ranging from 2% in the CAISO to 30% in ERCOT. However, there was almost none in the other RTOs/ISOs in 2019, which are characterized by a variety of financial arrangements. Other than SPP, whose new capacity was almost entirely wind in both years, the other RTOs/ISOs and non-RTO/ISO regions show a diversity of new resources. In 2019, however, more than 80% of the new capacity in ERCOT and MISO was composed of wind generation.

Tables A-5 through A-8 in the Appendix provide additional details on the distribution of new capacity by RTO/ISO.

APPENDIX

All data are in MW of net summer capacity.

Table A-1. New Generating Capacity by Financial Arrangement and Fuel Type, 2018

	Hydropower	Natural Gas	Solar	Storage	Wind	Other*	Total	% of Total
CONTRACTS								
With Utility		1,013.5	2,751.3	47.2	1,487.4	60.0	**5,359.4**	17.2%
With CCA			106.8				**106.8**	0.3%
With Marketer/ Retail Supplier			254.8				**254.8**	0.8%
With Customer		1.4	335.4	1.5	1,574.4		**1,912.7**	6.1%
Financial Entity Hedge					947.0		**947.0**	3.0%
Subtotal Contracts		**1,014.9**	**3,448.3**	**48.7**	**4,008.8**	**60.0**	**8,580.7**	**27.5%**
Percent of Contracts		**11.8%**	**40.2%**	**0.6%**	**46.7%**	**0.7%**		
OWNERSHIP								
Utility Ownership	135.2	7,349.6	1,036.6	45.5	1,648.8	57.7	**10,273.4**	32.9%
Customer Ownership		97.0	35.5	4.0	7.5	46.7	**190.7**	0.6%
Subtotal Ownership	**135.2**	**7,446.6**	**1,072.1**	**49.5**	**1,656.3**	**104.4**	**10,464.10**	**33.5%**
Percent of Ownership	**1.3%**	**71.2%**	**10.2%**	**0.5%**	**15.8%**	**1.0%**		
Community Solar			345.9				**345.9**	**1.1%**
MERCHANT		**10,844.1**	**53.4**	**79.6**	**853.0**		**11,830.1**	**37.9%**
Percent of Merchant		**91.7%**	**0.5%**	**0.7%**	**7.2%**			
Total New Capacity	**135.20**	**19,305.6**	**4,919.7**	**177.8**	**6,518.1**	**164.4**	**31,220.8**	
Percent of Total	**0.4%**	**61.8%**	**15.8%**	**0.6%**	**20.9%**	**0.5%**		

*Other includes geothermal, biomass/biogas and petroleum.

Table A-2. New Generating Capacity by Financial Arrangement and Fuel Type, 2019

	Hydropower	Natural Gas	Solar	Storage	Wind	Other*	Total	% of Total
CONTRACTS								
With Utility	6.5	203.4	2,735.3	56.9	2,293.1	125.5	**5,420.7**	23.9%
With CCA			324.0				**324.0**	1.4%
With Marketer/ Retail Supplier			250.0	9.9	352.8		**612.7**	2.7%
With Customer			532.7	14.6	2,883.8	8.1	**3,439.2**	15.2%
Financial Entity Hedge					1,715.1		**1,715.1**	7.6%
Subtotal Contracts	**6.5**	**203.4**	**3,842.0**	**81.4**	**7,244.8**	**133.6**	**11,511.7**	**50.7%**
Percent of Contracts		**1.8%**	**33.4%**	**0.7%**	**62.9%**	**1.2%**		
OWNERSHIP								
Utility Ownership	3.4	3,829.2	995.2	23.0	1,914.3	79.5	**6,844.6**	30.2%
Customer Ownership		157.3	29.8	2.0		34.9	**224.0**	1.0%
Subtotal Ownership	**3.4**	**3,986.5**	**1,025.0**	**25.0**	**1,914.3**	**114.4**	**7,068.60**	**31.2%**
Percent of Ownership	**0.05%**	**56.4%**	**14.5%**	**0.4%**	**27.1%**	**1.6%**		
Community Solar			413.7				**413.7**	**1.8%**
MERCHANT		3,647.8	7.6	39.8			**3,695.2**	**16.3%**
Percent of Merchant		**98.7%**	**0.2%**	**1.1%**				
Total New Capacity	**9.9**	**7,837.7**	**5,288.3**	**146.2**	**9,159.1**	**248.0**	**22,689.2**	
Percent of Total	**0.04%**	**34.5%**	**23.3%**	**0.6%**	**40.4%**	**1.1%**		

*Other includes biomass/biogas, fuel cells, landfill gas, combined heat and power and petroleum.

Table A-3. New Generating Capacity Built or Contracted for by Utilities, 2018

	Hydropower	Natural Gas	Solar[1]	Storage	Wind	Other	Total	% of Total
Public Power	134.0	1,888.9	735.8	37.6	338.7	22.0	3,157.0	19.8%
Cooperative		1,113.6	52.8	20.0	303.9	1.3	1,491.6	9.3%
Investor-Owned	1.2	4,607.6	3,145.2	35.1	2,374.6	94.4	10,258.1	64.2%
Joint Utility[2]		753.0	200.0		119.0		1,072.0	6.7%
Total Utility	**135.2**	**8,363.1**	**4,133.8**	**92.7**	**3,136.2**	**117.7**	**15,978.7**	
Technology as a % of Utility Total	**0.8%**	**52.3%**	**25.9%**	**0.6%**	**19.6%**	**0.7%**		
Public Power Share	99.1%	22.6%	17.8%	40.6%	10.8%	18.7%	19.8%	

[1] Includes community solar projects.
[2] For 2018, this category includes joint projects between public power and IOUs

Table A-4. New Generating Capacity Built or Contracted for by Utilities, 2019

	Hydropower	Natural Gas	Solar[1]	Storage	Wind	Other	Total	% of Total
Public Power		93.6	391.3	37.5	886.9	10.0	1,419.3	11.2%
Cooperative	6.5		275.0	2.9	328.4	12.4	625.2	4.9%
Investor-Owned	3.4	3,939.0	3,474.6	39.5	2,692.8	182.6	10,331.9	81.5%
Joint Utility[2]			3.3		299.3		302.6	2.4%
Total Utility	**9.9**	**4,032.6**	**4,144.2**	**79.9**	**4,207.4**	**205.0**	**12,679.0**	
Technology as a % of Utility Total	**0.1%**	**31.8%**	**32.7%**	**0.6%**	**33.2%**	**1.6%**		
Public Power Share	0.0%	2.3%	9.4%	46.9%	21.1%	4.9%	11.2%	

[1] Includes community solar projects.
[2] For 2019, this category primarily includes joint projects between public power and cooperatives, with a small amount between public power, cooperatives and IOUs.

Table A-5. New Generating Capacity in PJM, ISO-NE and NYISO, 2018

	Natural Gas	Solar	Storage	Wind	Other	Total	% of RTO
PJM	**10,794.6**	**181.5**	**20.8**	**114.0**	**14.8**	**11,125.7**	
Technology %	**97.0%**	**1.6%**	**0.2%**	**1.0%**	**0.1%**		
Merchant	8,014.0	38.4	19.8			**8,072.2**	**72.6%**
Utility	2,698.6	23.4				**2,722.0**	**24.5%**
Customer	82.0	119.7	1.0	114.0	14.8	**331.5**	**3.0%**
ISO-NE	**1,566.4**	**135**	**7.1**	**1.5**		**1,710.0**	
Technology %	**91.6%**	**7.9%**	**0.4%**	**0.1%**			
Merchant	1,565.0					**1,565.0**	**91.5%**
Utility		117.5	7.1			**124.6**	**7.3%**
Customer	1.4	17.5		1.5		**20.4**	**1.2%**
NY-ISO	**824.1**	**82.2**		**158.3**		**1,064.6**	
Technology %	**77.4%**	**7.7%**		**14.9%**			
Merchant	824.1					**824.1**	**77.4%**
Utility		39.2		79.9		**119.1**	**11.2%**
Customer		43.0		78.4		**121.4**	**11.4%**

Table A-6. New Generating Capacity in PJM, ISO-NE and NYISO, 2019

	Natural Gas	Solar	Storage	Wind	Other	Total	% of RTO
PJM	**2,446.7**	**288.0**	**19.8**	**90.0**		**2,844.5**	
Technology %	**86.0%**	**10.1%**	**0.7%**	**3.2%**			
Merchant	2,446.7	7.6	19.8			**2,474.1**	**87.0%**
Utility		187.7				**187.7**	**6.6%**
Customer		92.7		90.0		**182.7**	**6.4%**
ISO-NE	**1,101.1**	**153.0**	**25.3**	**59.0**	**18.2**	**1,356.6**	
Technology %	**81.2%**	**11.3%**	**1.9%**	**4.3%**	**1.3%**		
Merchant	1,101.1					**1,101.1**	**81.2%**
Utility		141.5	22.2	44.0	14.5	**222.2**	**16.4%**
Customer		11.5	3.1	15.0	3.7	**33.3**	**2.5%**
NY-ISO		**164.9**	**25.0**			**189.9**	
Technology %		**86.8%**	**13.2%**				
Merchant			20.0			**20.0**	**10.5%**
Utility		153.0	5.0			**158.0**	**83.2%**
Customer		11.9				**11.9**	**6.3%**

Table A-7. New Generating Capacity in the CAISO, ERCOT, MISO, SPP and Non-RTO/ISO Regions, 2018

	Hydropower	Natural Gas	Solar	Storage	Wind	Other	Total	% of RTO
CAISO		**529.5**	**1,129.7**	**71.8**	**199.0**	**47.0**	**1,977.0**	
Technology %		**26.8%**	**57.1%**	**3.6%**	**10.1%**	**2.4%**		
Merchant				40.0			**40.0**	**2.0%**
Utility		527.5	916.5	31.3		16.0	**1,491.3**	**75.4%**
Other*		2.0	213.2	0.5	199.0	31.0	**445.7**	**22.5%**
ERCOT		**666.6**	**713.6**	**21.3**	**1,437.7**		**2,839.2**	
Technology %		**23.5%**	**25.1%**	**0.8%**	**50.6%**			
Merchant		441.0	15.0	19.8	361.0		**836.8**	**29.5%**
Utility		225.6	491.6	1.5	230.0		**948.7**	**33.4%**
Other*			207.0		346.7		**553.7**	**19.5%**
Financial Hedge					500.0		**500.0**	**17.6%**
MISO		**957.3**	**381.8**	**1.0**	**2,052.4**		**3,392.5**	
Technology %		**28.2%**	**11.3%**	**0.03%**	**60.5%**			
Merchant					244.7		**244.7**	**7.2%**
Utility		944.3	380.6	1.0	1,495.7		**2,821.6**	**83.2%**
Customer		13.0	1.2		212.0		**226.2**	**6.7%**
Financial Hedge					100.0		**100.0**	**2.9%**
SPP		**9.3**	**10.0**	**0.8**	**1,823.3**	**6.0**	**1,849.4**	
Technology %		**0.5%**	**0.5%**	**0.04%**	**98.6%**	**0.3%**		
Merchant					247.3		**247.3**	**13.4%**
Financial Hedge					347.0		**347.0**	**18.8%**
Utility		9.3	10.0	0.8	598.7	6.0	**624.8**	**33.8%**
Customer					630.3		**630.3**	**34.1%**
Non-RTO	**135.2**	**3,957.8**	**2,285.9**	**55.0**	**731.9**	**96.6**	**7,262.4**	
Technology %	**1.9%**	**54.5%**	**31.5%**	**0.8%**	**10.1%**			
Utility	135.2	3,957.8	2,155.0	51.0	731.9	95.7	**7,126.6**	**98.1%**
Customer			130.9	4.0		0.9	**135.8**	**1.9%**

*Other for CAISO includes customers, retail supplier/CCAs, and for ERCOT includes customers and marketers.

Table A-8. New Generating Capacity in the CAISO, ERCOT, MISO, SPP and Non-RTO/ISO Regions, 2019

	Hydropower	Natural Gas	Solar	Storage	Wind	Other	Total	% of RTO
CAISO		**30.3**	**1,035.5**	**30.5**	**353.4**	**2.0**	**1,451.7**	
Technology %		**2.1%**	**71.3%**	**2.1%**	**24.3%**	**0.1%**		
Utility		29.4	696.6	29.0	351.6		**1,106.6**	**76.2%**
Other*		0.9	338.9	1.5	1.8	2.0	**345.1**	**23.8%**
ERCOT		**177.5**	**489.2**	**19.9**	**3,657.2**		**4,343.8**	
Technology %		**4.1%**	**11.3%**	**0.5%**	**84.2%**			
Merchant		100.0					**100.0**	**2.3%**
Utility			105.0	10.0	678.0		**793.0**	**18.3%**
Other*		77.5	384.2	9.9	1,447.9		**1,919.5**	**44.2%**
Financial Hedge					1,531.3		**1,531.3**	**35.3%**
MISO		**387.8**	**214.2**	**1.0**	**2,703.4**	**53.3**	**3,359.7**	
Technology %		**11.5%**	**6.4%**	**0.03%**	**80.5%**			
Utility		376.6	202.6	1.0	2,113.2	53.3	**2,746.7**	**81.8%**
Customer		11.2	11.6		590.2		**613.0**	**18.2%**
SPP			**6.3**		**2,036.7**	**5.8**	**1,849.4**	
Technology %			**0.3%**		**99.4%**	**0.3%**		
Financial Hedge					183.8		**183.8**	**9.0%**
Utility			6.3		961.2	5.8	**973.3**	**47.5%**
Customer					891.7		**891.7**	**43.5%**
Non-RTO	**9.9**	**3,694.3**	**2,933.9**	**28**	**259.4**	**168.7**	**7,094.2**	
Technology %	**0.1%**	**52.1%**	**41.4%**	**0.4%**	**3.7%**			
Utility	9.9	3,626.6	2,648.2	16.0	59.4	131.4	**6,491.5**	**91.5%**
Customer		67.7	285.7	12.0	200.0	37.3	**602.7**	**8.5%**

*Other for CAISO includes customers, retail supplier/CCAs, and for ERCOT includes customers and marketers.

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