

POWER PLANTS ARE NOT BUILT ON SPEC

An Analysis of New Electric Generation Projects Constructed in 2011

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I Introduction and Summary of Findings

This paper analyzes a selected group of new generation projects completed in 2011. The majority of these projects are from the *Energy Infrastructure Update*¹ (Update) issued each month by the Federal Energy Regulatory Commission (FERC). These FERC reports provide monthly and cumulative data on new natural gas facilities (pipelines, storage and liquefied natural gas), hydropower (license filed or issued, and facility placed in service), electric generation capacity, and transmission projects. For each of these categories, FERC staff selects certain projects to highlight and provides brief project descriptions. These highlighted projects do not cover all new generation constructed, but do provide additional details and insight into a significant portion of the new capacity coming on line each month. In 2011, the highlighted projects represented a little more than half of the new generation capacity.

In addition to the projects described in the Update, APPA obtained supplemental information from a report on new generation in 2011 prepared by SNL Energy.² The SNL report included a table showing the 10 largest generation developments completed in 2011. Three of these projects were not highlighted in FERC's Infrastructure Updates.³ Adding these projects brings the total megawatts (MWs) covered in this paper to 65 percent of the new generating capacity.

For this report, the information provided by FERC and SNL was supplemented where needed with additional details obtained primarily from the project owner's or purchaser's web site, or through local press articles. Appendix A provides the full list of highlighted projects.

This analysis of these new generation projects shows that almost all new capacity is being built under one of two financial arrangements: a long-term contract with a utility purchasing the power to serve customer load or ownership by an integrated utility to supply power to its customers. Only two percent of the projects' capacity, and 12 percent of the number of projects, was constructed for market sales. None of the new coal or natural gas

¹ *Energy Infrastructure Update, January – December 2011*, Office of Energy Projects, Federal Energy Regulatory Commission, <http://www.ferc.gov/legal/staff-reports.asp>. No information is provided on why these projects were selected for inclusion in the report.

² "After sharp decline, generating capacity additions edged up in 2011," February 15, 2012, *SNL Energy*, <http://www.snl.com/InteractiveX/article.aspx?ID=14202624>. Subscription required.

³ These projects are the 760-MW expansion of the Trimble County coal plant in Kentucky; the 620-MW Jack County natural-gas plant constructed by Brazos Electric Cooperative in Texas; and the 620-MW Buck County combined-cycle natural-gas plant built by Duke Energy. Another project, GenPower Holdings' 800-MW Longview coal plant in West Virginia, was actually completed in January 2012 and is therefore not included in this analysis. First Reserve, the holding company for GenPower, states that Longview "will sell a portion of its electricity to various parties under intermediate term power purchase agreements, into the PJM merchant market, and under additional long-term contracts."
<http://www.firstreserve.com/go.asp?Go=!SiteStation&x=TPLGen&ResType=Page&ResID=2022&TPL=PortfolioPageTemplate.htm>

plants were built for market sales. This paper also shows that public power utilities played a significant role in the construction of new capacity.

II Background

The primary purpose of the analysis is to discern the predominant financial arrangements supporting the construction of recently constructed generation. Such real-world experiences are relevant as the country addresses the need for a new mix of generation resources in the near future. This pending shift in resources is the result of a variety of factors, including the projected retirement of a significant portion of the nation's coal-fired electric generation capacity, the potential for load growth to rebound, the expansion of renewable resources to comply with state renewable portfolio standards, and the need for conventional generation to address the intermittency of these often variable renewable energy resources.

How to best address these many developments in a manner that maintains a reliable supply of power without harming consumers and the economy has been the subject of much debate and discussion. Almost all of the Regional Transmission Organizations (RTOs) are engaged in at least one process to determine how to address future resource needs. For example, ISO New England has announced a Strategic Planning Initiative to address five key challenges in the near future, including increased reliance on natural gas, generator retirements, integration of variable resources, and improving the alignment of markets with planning.⁴ The California ISO recently implemented a stakeholder process to address concerns about a shortfall in flexible capacity resources to respond to a growing supply of variable energy resources.⁵ PJM Interconnection is in the process of developing a voluntary long-term capacity auction to support future capacity investment.⁶

Several states have expressed frustration with the ability of the current RTO market structures to address these new resource needs, and have taken steps to obtain needed new generation. Two of the most notable and highly contested are the actions taken by Maryland and New Jersey to implement competitive-bidding processes to procure long-term contracts for new natural-gas generation. The Maryland Public Service Commission, for example, concluded that "Maryland continues to face the threat of insufficient new capacity, as PJM's capacity market construct, the Reliability Pricing Model ("RPM"), has been unsuccessful in attracting appreciable new

⁴ *ISO on Background – Strategic Planning Initiative*, ISO New England, October 6, 2011, http://www.iso-ne.com/nwsiss/pr/2011/final_2011_on_background_presentation.pdf

⁵ *Flexible Capacity Procurement*, Market and Infrastructure Policy Issue Paper, California ISO, January 27, 2012, <http://www.caiso.com/Documents/IssuePaper-FlexibleCapacityProcurement.pdf>

⁶ PJM Interconnection LLC, Cover Letter for proposed revisions to its Open Access Transmission Tariff under FPA section 205 as a result of a triennial review and performance assessment of the Reliability Pricing Model ("RPM"), Docket ER12-513-00, at pages 30-31, <http://www.pjm.com/~media/documents/ferc/2011-filings/20111201-er12-513-000.ashx>

generation to the State since its inception in 2007...⁷ A white paper by the New Jersey Board of Public Utilities staff found that “New Jersey’s reliance on the Reliability Pricing Model (“RPM”) capacity market, however, has been a disappointing experience which can impact the state’s economic health and its prospects for recovery from a severe and lengthy recession.... Instead of incentivizing new and efficient resources, RPM has predominantly incentivized the prolonged service of old, inefficient resources that should have been retired.”⁸

Representatives of merchant generation owners and other market supporters have strongly opposed these state efforts, claiming that “competition” and “price signals” in the RTO markets will be sufficient to produce new, more efficient resources. For example, a recent paper prepared for the Compete Coalition by Continental Economics declares:

States that belong to transmission organizations like PJM can access competitively priced wholesale electricity, and benefit from improved system reliability. Competitive wholesale markets for energy and capacity provide clear market signals, and promote innovation and greater efficiency.⁹

The ISO/RTO Council has proclaimed the following benefits of RTO markets¹⁰:

ISOs/RTOs provide important price signals for new investment.

ISOs/RTOs provide greater access for infrastructure investment necessary to keep up with growing demand for electricity in the United States and Canada.

ISOs/RTOs are seeing robust investment in environmentally-friendly power generation in their regions.

A central question is, therefore, whether RTO “markets” and “price signals” are the main drivers of investment in new, more efficient generation capacity. Proponents of RTO markets often point to the quantity of capacity within RTO regions compared to non-RTO regions to support the contention that it is these markets that are the central factor in the development of new

⁷ *Notice of Approval of Request for Proposals for New Generation to be issued by Maryland Electric Distribution Companies*, Case 9214, Maryland Public Service Commission, September 29, 2011, http://webapp.psc.state.md.us/Intranet/Casenum/NewIndex3_VOpenFile.cfm?filepath=C:\Casenum\9200-9299\9214\Item_77\RFP%2009292011.pdf

⁸ *Board Staff Report on New Jersey Capacity, Transmission Planning And Interconnection Issues*, Docket Nos. EO11050309 and EO09110920, December 2011, <http://nj.gov/bpu/pdf/announcements/2011/capacityissues.pdf>

⁹ *Electricity Competition at Work: The Link Between Competitive Electricity Markets, Job Creation, and Economic Growth*, Prepared for COMPETE Coalition by Continental Economics, Inc., September 2011, <http://www.continentalecon.com/publications/cebp/2011.09.pdf>

¹⁰ *10 Reasons ISOs/RTOs are Good for North America*, ISO/RTO Council, http://www.isorto.org/atf/cf/%7B5B4E85C6-7EAC-40A0-8DC3-003829518EBD%7D/10_Reasons_ISORTOs_Are_Good.pdf

capacity.¹¹ But this paper shows that the financial arrangements supporting a generation project are an important factor in determining whether a project is built, regardless of whether it is located in an RTO region.¹²

Generation that is owned by a vertically integrated utility and constructed to serve load cannot be attributed to RTO market “price signals.” Similarly, an independent power producer (IPP) that arranges a twenty-year purchased-power agreement for the output of a new facility is also bypassing centralized RTO-run markets. Power and capacity sold through long-term contracts are typically settled through a contract-for-differences that maintains the agreed upon price regardless of the RTO energy or capacity market price. In fact, many IPPs are seeking stable prices to ensure a predictable revenue stream needed to obtain financing for new projects. Similarly, utilities often wish to lock in less volatile prices that are closer to actual costs and not subject to the actions of market participants.

Supporters of the centralized RTO-operated markets often characterize projects subject to long-term contracts as “subsidized” while projects sold into these RTO-run markets without such contracts are termed “competitive.”¹³ But projects owned or contracted for by utilities or customers are actually the product of competition. Utilities that construct power plants or agree to long-term power contracts select these options only after a thorough market analysis, which may include a competitive bidding process. A given utility chooses to construct generating facilities or sign long-term power contracts if its analysis shows that these options are expected to cost less than purchasing power on the market. Once the decision is made, the utility selects the developer or generation contract through a competitive bidding process.

III Findings of Review of 2011 New Electric Generation Projects

There are 92 projects reviewed in this paper (89 projects highlighted in FERC’s monthly *Energy Infrastructure Update* and the three additional projects from the SNL report). As shown in Table 1, these projects account for 65 percent of all new MWs completed in 2011, 82 percent of the new coal, 80 percent of the new gas-fired capacity, just over half of the solar, and one-third of

¹¹ For example, the Electric Power Supply Association (EPSA) stated that: “Organized wholesale electricity markets have facilitated this effort to increase the amount of renewable energy available, with 81% of new wind capacity installed last year located in Regional Transmission Organization (RTO) or Independent System Operator (ISO) regions.” New Reports Confirm Regional Power Markets Reliably Facilitate Renewable Energy, April 2009, <http://www.epsa.org/forms/documents/DocumentFormPublic/view?id=FD570000007>

¹² However, it is worth noting that only 48 percent of the new capacity reviewed in this study was constructed within RTO regions, even though those regions represent two-thirds of all electricity customers. Specifically, residential customers in states where the majority of the land is within an RTO region represent 65 percent of all customers, and commercial and industrial customers represent 63 percent. Data on the number of customers is from 2010 and was obtained from the US Energy Information Administration, <http://www.eia.gov/electricity/data.cfm#sales>.

¹³ See for example, Continental Economics, September 2011, p. 12.

the wind.¹⁴ Out of the total of new generation constructed last year, the largest category was natural gas, accounting for half of all new MW, followed by wind, which is almost 30 percent of the new capacity. The “Other” category includes storage, geothermal, waste heat, fuel cells, oil and hydropower. Because hydropower projects are highlighted in a separate section of the Infrastructure Updates, they are not included in the projects covered in this paper.

Table 1: Subset of New Electric Generation Projects Reviewed as a Portion of Total New Electric Generation

	Biomass	Coal	Natural Gas	Solar	Wind	Other	Total
MW of Projects Reviewed	120	2,140	7,727	402	1,897	56	12,342
Total MW of New Generation	305	2,595	9,719	783	5,475	253	19,130
Technology as a % of Total New Generation	2%	14%	51%	4%	29%	1%	100%
Reviewed Projects as a % of Total New Generation	39%	82%	80%	51%	35%	22%	65%

Table 2 shows the distribution of the capacity of these projects by financial arrangement. The bulk of the new MW highlighted by the FERC and SNL reports was constructed under one of two arrangements; an independent power producer owns the generation and sells the output to a utility under a long-term power purchase agreement (29 percent of the MWs) or a utility owns the new generation source and uses the power to supply its load or in some cases to provide balancing or other ancillary services within its operating area (61 percent). Another seven percent are long-term purchase agreements between an independent power producer and a merchant generator, power marketer or individual customer. A small portion of the new capacity, about one percent, is owned by an end-use customer to serve its own load. Federal stimulus funding, as well as utility and state financial assistance played a role in a number of the projects.

That means just two percent of the new capacity is left to sell output into the wholesale market. (This estimate may be high as this category included projects for which no information on a purchase agreement could be found.)

¹⁴ Total new generation is from “New Generation In-Service, January – December 2011 Cumulative,” p. 4, *Energy Infrastructure Update for December 2011*, December 31, 2011, <http://www.ferc.gov/legal/staff-reports/01-13-12-energy-infrastructure.pdf>. The 760-MW Trimble County coal plant, which came on line in the end of January 2011, was added to the FERC data because it does not appear to be included in the infrastructure totals.

Table 2: Distribution of 2011 Highlighted Generation Projects by Installed Capacity

Sale or Ownership Arrangement	Generation Technology (Megawatts of Capacity)							% of Highlighted
	Biomass	Coal	Natural Gas	Solar	Wind	Other	Total	
IPP Owner/Power Purchased by Utility	29		2,121	307	1,079	31	3,567	29%
IPP Owner/ Power Purchased by Customer	6			10	101		117	1%
IPP Owner/ Power Purchased by Merchant Generator or Marketer			565	3	128		696	6%
Utility Owner		1,985	5,041	51	485		7,562	61%
Customer Owner	15	155		13		5	188	1%
Market Sales	70			18	104	20	212	2%
Total	120	2,140	7,727	402	1,897	56	12,342	100%

Because the highlighted wind projects covered just over one-third of all wind constructed in 2011, additional data on wind installations were obtained from the American Wind Energy Association’s (AWEA) *Fourth Quarter 2011 Market Report*.¹⁵ According to this report, there were 102 new wind power installations in 2011, totaling 6,810 MWs of capacity (about 1,300 MWs greater than reported by FERC). For each installation, the report provides the owner and power purchaser, or whether the project was built for merchant power sales.

An analysis of the AWEA data, summarized in Table 3, shows that only 18 percent of the new wind capacity (MWs) that came on-line in 2011 and 11 percent of the installations were built for merchant sales. Conversely, 82 percent of the capacity and 89 percent of the installations have a power purchase agreement or are owned by a utility or customer, with the majority of the capacity (64 percent) built under a purchased power agreement.

Table 3. Distribution of Wind Power Installations in 2011

Category	MW	% of Total	No. of Projects	% of Total
Merchant	1,211	18%	11	11%
Utility Ownership	1,222	18%	13	13%
Customer Ownership	3	0.04%	2	2%
Purchased Power Agreement	4,374	64%	76	74%
Total	6,810	100%	102	100%

¹⁵ http://www.awea.org/learnabout/publications/reports/upload/4Q-2011-AWEA-Public-Market-Report_1-31.pdf

Table 4 distributes the highlighted generation by number of projects (although there can be multiple units at a single project location). The most frequent financial arrangements by project number were an independent power producer selling the power to a utility under a long-term purchase agreement (45 percent of the projects) or ownership by a utility (26 percent). Just 12 percent of the new projects were built to sell their output into the wholesale market. This is a greater proportion than the percentage of MW in the market sales category because smaller projects such as solar power or landfill gas-to-energy facilities are more commonly constructed with the intent to sell the output into the wholesale market than are larger generation plants.

Table 4: Distribution of 2011 Highlighted Generation Projects by Number

Sale or Ownership Arrangement	Generation Technology (Number of Projects)							Total	
	Biomass	Coal	Natural Gas	Solar	Wind	Other	Total		
IPP Owner/Power Purchased by Utility	4		4	17	12	4	41	45%	
IPP Owner/ Power Purchased by Customer	2			3	1		6	6%	
IPP Owner/ Power Purchased by Merchant Generator or Marketer			1	1	1		3	3%	
Utility Owner		4	12	3	5		24	26%	
Customer Owner	1	1		4		1	7	8%	
Market Sales	4			4	2	1	11	12%	
Total Highlighted Projects	11	5	17	32	21	6	92	100%	

The types of financial arrangements vary within each generation technology. Almost all of the new coal generation highlighted in the updates was built under utility ownership with the exception of one cogeneration plant owned by a plastics company. All of the new natural gas plants were constructed under a long-term purchase power arrangement or utility ownership.

As shown in Table 2, biomass was the only category with the majority of the MWs built for market sales (58 percent, primarily consisting of landfill gas-to-energy projects). For wind and solar, the greatest amount of MWs was constructed by an independent entity with a long-term contract with a utility (76 percent of the solar MW and 64 percent of the wind according to the AWEA data in Table 3). These data stand in sharp contrast to the claims that RTO markets promote the development of renewable energy.

Table 5 shows the distribution of the 90 percent of the new MWs that are either purchased or owned by a utility. The table shows the type of utility and generating method within each category of financial arrangement (purchase from an IPP or ownership). Table 6 presents aggregated information for all capacity in the study by purchaser or owner type.

A total of 3,567 MWs of the new capacity reviewed is owned by IPPs, with the output sold to a utility under a purchased power agreement. The investor-owned utility (IOU) sector and the public power sector each account for 49 percent of these purchases. In this category, power

purchase agreements with public power utilities accounted for over half of the new natural gas capacity and one-third of both the new wind and solar capacity.

Of the 7,562 MWs of capacity constructed for utility ownership, 63 percent is owned by vertically integrated IOUs and the remainder by public power, rural electric cooperatives (“co-ops”), or jointly owned by public power and co-ops or public power and an IOU. More than two-thirds of the new coal capacity in this utility ownership category is owned either fully or jointly by a public power utility or co-op. Almost three-fourths of the new natural gas capacity is owned by IOUs, and most of the remaining fourth by co-ops. All of the solar and most of the wind generation constructed under utility ownership was built by vertically integrated IOUs.¹⁶

Table 5: Distribution by Type of Utility of New Generation Capacity (MW) Owned or Purchased by a Utility

Type of Owner or Purchaser	Biomass	Coal	Natural Gas	Solar	Wind	Other	Total	% of category
IPP Sale to Utility with PPA								
Vertically Integrated-IOU	17			197	618	31	863	24%
Distribution Company IOU			820		60		880	25%
Public Power	6		1,301	109	320		1,736	49%
Rural Electric Cooperative	6			1	41		48	1%
Public Power/Co-op					40		40	1%
Subtotal	29		2,121	307	1,079	31	3,567	100%
Utility Ownership								
Vertically Integrated-IOU		615	3,687	51	392		4,745	63%
Public Power		220	156		15		391	5%
Public Power/IOU		760					760	10%
Rural Electric Cooperative			1,198		78		1,276	17%
Public Power/Co-op		390					390	5%
Subtotal		1,985	5,041	51	485		7,562	100%

As shown in Table 6, in sum, 53 percent of new capacity is owned or subject to a contract with a vertically integrated or distribution IOU, 37 percent is under public power or rural electric cooperative ownership or contracts (including co-ownership with an IOU), 8 percent is owned or purchased by customers, merchant generators or power marketers, and 2 percent was constructed for sales to the market.

¹⁶ A portion of the utility-owned solar is from distributed rooftop solar panels, and about three-fourths of the is attributable to large-scale solar power installations.

Table 6: Distribution of 2011 Highlighted Generation Capacity (MW) by Owner or Purchaser Type

Type of Owner or Purchaser	Biomass	Coal	Natural Gas	Solar	Wind	Other	Total	% of total
Vertically Integrated-IOU	17	615	3,687	248	1,010	31	5,608	46%
Distribution Company IOU			820		60		880	7%
Public Power	6	220	1,457	109	335		2,127	17%
Public Power/IOU		760					760	6%
Rural Electric Cooperative	6		1,198	1	119		1,324	11%
Public Power/Co-op		390			40		430	3%
Non-Utility Ownership or Purchase	21	155	565	26	229	5	1,001	8%
Total Ownership or Purchase Agreements	50	2,140	7,727	384	1,793	36	12,130	98%
Market Sales	70			18	104	20	212	2%

IV Conclusion

The findings presented in this paper demonstrate that the construction of new power plants necessitates stable long-term financial arrangements. While supporters of RTO-run centralized markets argue that “competition” and “price signals” are key determinants of new infrastructure development, such claims are not supported by real-world evidence. Long-term contracts and vertically-integrated utility ownership of generation are the predominant means of supporting new capacity, especially for lower-emission coal, natural gas, wind, and solar power, all of which will be needed in the future to replace the shrinking supply of electricity from retiring coal plants. Policymakers should recognize the importance of these types of financial arrangements and the failure of the RTO-run centralized markets to incent new generation as they discuss how to best address the dramatic changes in the future generation supply.

Appendix A

List of 2011 New Generation Projects Included in the Study

List of 2011 New Generation Projects Included in the Study

Sources: *Energy Infrastructure Update*, Federal Energy Regulatory Commission, Office of Energy Projects; *After sharp decline, generating capacity additions edged up in 2011*, February 15, 2012, SNL Energy. (Projects from SNL are indicated by *)

Ownership by Non-Utility Entity¹ and Power Purchase Agreement (PPA) with Utility

<u>Plant Name</u>	<u>Technology</u>	<u>Capacity in MWs</u>	<u>Length of PPA/Other</u>	<u>Power Purchaser</u>	<u>Type of Purchaser</u>	<u>Plant Owner</u>	<u>State</u>
Puna Geothermal Venture	Geothermal	8	20-years	Hawaii Electric Light Co.	Vertically-Integrated IOU	Ormat Technologies	HI
San Emido Project	Geothermal	8.6	25-years	Sierra Pacific Power Company	Vertically-Integrated IOU	US Geothermal, Inc.	NV
Jersey Valley Geothermal Project	Geothermal	15	Not Specified	NVEnergy	Vertically-Integrated IOU	Ormat Technologies	NV
Wayne County Landfill	Landfill Gas to Energy	3	Not Specified	Progress Energy	Vertically-Integrated IOU	Methane Power	NC
Zemel Road Landfill	Landfill Gas to Energy	5.6	20-years	Orlando Utilities	Public Power	Lime Energy	FL
Old Dominion Landfill	Landfill Gas to Energy	6.4	Not Specified	Old Dominion Electric Cooperative	Rural Electric Cooperative	Richmond Energy	VA
Apex and Lockwood Landfills	Landfill Gas to Energy	14	20-years	NVEnergy	Vertically-Integrated IOU	Republic Services & Waste Management	NV
GennConn	Natural Gas	200	30-years	Connecticut Light and Power	Distribution Company IOU	GennConn Energy	CT
Astoria Energy II	Natural Gas	575	20-years	New York Power Authority	Public Power	GDF SUEZ and International Power	NY
Kleen Energy	Natural Gas Rebuild ²	620	15-year capacity purchase	Connecticut Light and Power	Distribution Company IOU	Kleen Energy Systems	CT
Coolidge Generating Station	Natural Gas	726	Not Specified	Salt River Project	Public Power	TransCanada Corp.	AZ
Hickory Ridge Landfill	Solar Landfill Cap	1	Not Specified	Georgia Power	Vertically-Integrated IOU	Republic Services	GA
Chevron Mining	Solar CPV	1	Not Specified	Kit Carson Electric Cooperative	Rural Electric Cooperative	Chevron Mining	NM

Ownership by Non-Utility Entity and Power Purchase Agreement (PPA) with Utility (continued)

<u>Plant Name</u>	<u>Technology</u>	<u>Capacity in MWs</u>	<u>Length of PPA/Other</u>	<u>Power Purchaser</u>	<u>Type of Purchaser</u>	<u>Plant Owner</u>	<u>State</u>
Twentynine Palms	Solar	2	20-years	Southern California Edison	Partially-Integrated IOU ³	SEPV LLC	CA
West Vineland PV Project	Solar	4.8	25-years	Vineland Municipal Electric Utility	Public Power	Constellation Energy	NJ
Ontario & Rancho Cucamonga	Rooftop Solar	5.56	20-years	Southern California Edison	Partially-Integrated IOU ³	Photon LLC	CA
USAF Solar	Solar	6	Not Specified	US Air Force Academy/ Colorado Springs Utilities	Federal Govt/ Public Power	SunPower Corporation	CO
Vineland Solar	Solar	6.5	25-years	Vineland Municipal Electric Utility	Public Power	Constellation Energy	NJ
SUN Park	Solar	10	20-year PPA for energy, 15% of RECs ⁴	City of Dover	Public Power	LS Power	DE
Greater Sandhill Solar	Solar	19	Not Specified	Xcel Energy	Vertically-Integrated IOU	MetLife and John Hancock	CO
Copper Crossing Solar Ranch	Solar	20	20-years	Salt River Project	Public Power	Iberdrola Renewables	AZ
Roadrunner Solar	Solar	20	20-years	El Paso Electric	Vertically-Integrated IOU	NRG Solar	NM
Webberville Solar	Solar	30	25-years	Austin Energy	Public Power	Gemini Solar	TX
San Luis Valley Solar	Solar	30	Not Specified	Public Service Company of Colorado	Vertically-Integrated IOU	Iberdrola Renewable	CO
Long Island Solar Farm	Solar	32	20-years	Long Island Power Authority	Public Power	BP Solar and Met Life	NY
SunEdison Solar	Solar	32.3	20-years	Xcel Energy	Vertically-Integrated IOU	SunEdison	NM
Mesquite Solar 1	Solar	42	20-years	Pacific Gas & Electric	Partially-Integrated IOU ³	Sempra Energy	CA
Avenal Solar	Solar	45	20-years	Pacific Gas & Electric	Partially-Integrated IOU ³	NRG Solar & Eurus Energy America	CA
Xtreme Power Storage	Storage ⁵	0.015	Not Specified	Hawaii Electric Light Co.	Vertically-Integrated IOU	First Wind	HI

Ownership by Non-Utility Entity and Power Purchase Agreement (PPA) with Utility (continued)

<u>Plant Name</u>	<u>Technology</u>	<u>Capacity in MWs</u>	<u>Length of PPA/Other</u>	<u>Power Purchaser</u>	<u>Type of Purchaser</u>	<u>Plant Owner</u>	<u>State</u>
Spruce Mountain	Wind	20	Not Specified	13 MA Municipal Utilities	Public Power	Patriot Renewables, LLC	ME
Sheffield Wind Project	Wind	40	Not Specified	Burlington Electric Department, Vermont Electric Cooperative, Inc. & the Washington Electric Cooperative, Inc.	Public Power/ Rural Electric Cooperatives	First Wind	VT
Petersburg Wind Farm	Wind	40.5	20-years	Omaha Public Power District	Public Power	Third Planet Windpower	NE
Elk Wind Project	Wind	41	20-years	Central Iowa Power Cooperative	G&T Electric Cooperative	RPMAccess	IA
Macho Springs Wind	Wind	50	20-years	Tucson Electric Power	Vertically-Integrated IOU	Element Power	NM
Rollins Wind Project	Wind	60	20-years	Bangor Hydro-Electric & Central Maine Power	Distribution Company IOUs	First Wind	ME
Dry Lake Wind Power	Wind	60	Not Specified	Salt River Project	Public Power	Iberdrola Renewables	AZ
Rockland Wind Farm	Wind	79	Not Specified	Idaho Power	Vertically-Integrated IOU	Ridgeline Energy	ID
Shiloh III Wind Project	Wind	100	20-years	Pacific Gas & Electric	Partially-Integrated IOU ³	enXco (EDF EN subsidiary)	CA
Idaho Wind Partners Project	Wind	183	20-years	Idaho Power	Vertically-Integrated IOU	Multi-Investor Partnership ⁶	ID
Caney River Wind Farm	Wind	200	20-years	Tennessee Valley Authority	Federal Power Agency	Enel Green Power North America	KS
Lakefield Wind	Wind	205.5	20-years	Indianapolis Power & Light	Vertically-Integrated IOU	enXco	MN

Owned by Independent Non-Utility/Purchase Agreement with Merchant Generator or Power Marketer

<u>Name</u>	<u>Technology</u>	<u>MW</u>	<u>Length of PPA/Other</u>	<u>Purchaser</u>	<u>Type</u>	<u>Owner</u>	<u>State</u>
York Energy Center	Natural Gas	565	Six-year Tolling Agreement ⁷	Constellation Energy	Merchant Generator/Utility Affiliate	Calpine Corporation	PA
Kleen Energy	Natural Gas/Rebuild	N/A ⁸	7-Year Tolling Agreement for Energy	Constellation Energy	Merchant Generator/Utility	Kleen Energy Systems	CT
Frenchtown 1	Solar	3	Not Specified	Con Edison Energy	Power Marketer/Utility Affiliate	Con Edison Development & Garden Solar	NJ
Blue Creek Wind Farm	Wind	128	20-year PPA	First Energy Solutions	Merchant Generator/Retail Provider/Utility Affiliate	Iberdrola Renewables Inc	OH

Ownership by Non-Utility/PPA with Individual Customer

<u>Name</u>	<u>Technology</u>	<u>MW</u>	<u>Length of PPA/Other</u>	<u>Purchaser</u>	<u>Owner</u>	<u>State</u>
McKinney Landfill	Landfill Gas to Energy	3.2	Not Specified	Raytheon	Montauk Energy	TX
Midland Gas-to-Energy	Landfill Gas to Energy	3.2	Not Specified	Midland Wastewater Treatment & Dow Chemical (PPA)	Midland, Michigan	MI
FedEx Field	Solar	2	Not Specified	FedEx Field	NRG Solar	MD
United Stationers	Rooftop Solar	3.25	Not Specified	United Stationers	KDC Solar	NJ
Denver Airport Solar	Solar	4.4	20-years	Denver International Airport	Constellation Energy	CO
Minco II	Wind	100.8	20-years	Google	NextEra Energy Resources	OK

Ownership by Utility for Customer Load⁹

<u>Name</u>	<u>Technology</u>	<u>MW</u>	<u>Owner</u>	<u>Type</u>	<u>State</u>
Whelan Energy Center Unit 2	Coal	220	Public Power Generation Agency ¹⁰	Public Power	NE
Dry Fork Station	Coal	390	Basin Electric Power Cooperative & Wyoming Municipal Power Agency	Cooperative and Public Power Utilities	WY
Oak Creek	Coal/Expansion	615	Wisconsin Electric Power	Vertically-Integrated IOU	WI
Trimble County*	Coal	760	Louisville Gas and Electric Company, Indiana Municipal Power Agency and Illinois Municipal Electric Agency	Vertically-Integrated IOU & Public Power	KY
Teche Unit 4	Natural Gas	33	Cleco Power	Vertically-Integrated IOU	LA
Highwood Generating Station	Natural Gas	45	Southern Montana Electric	G&T Electric Cooperative	MT
Marshfield Plant	Natural Gas	60	Marshfield Utilities	Public Power	WI
Riverside Energy Resource Center	Natural Gas/Expansion	96	Riverside Public Utilities	Public Power	CA
Mill Creek	Natural Gas	150	Northwestern Energy	Vertically-Integrated IOU	MT
Harry Allen Expansion	Natural Gas/Expansion	484	NVEnergy	Vertically-Integrated IOU	NV
Chouteau 2	Natural Gas/Expansion	533	Associated Electric Cooperative, Inc.	G&T Electric Cooperative	OK
Power Block 5	Natural Gas/ Dual Fuel	570	Progress Energy	Vertically-Integrated IOU	NC
Bear Garden Power Station	Natural Gas	580	Dominion Virginia Power	Vertically-Integrated IOU	VA
Jack County*	Natural Gas	620	Brazos Electric Cooperative	G&T Electric Cooperative	TX
Buck County*	Natural Gas/Expansion	620	Duke Energy	Vertically-Integrated IOU	NC
West County Energy Center	Natural Gas/Expansion	1,250	Florida Power and Light	Vertically-Integrated IOU	FL
SCE Distributed Solar	Solar	12.5	Southern California Edison ¹¹	Partially-Integrated IOU ³	CA
Paloma and Cotton Center Solar	Solar	34	Arizona Public Service	Vertically-Integrated IOU	AZ
Alamogordo Solar Energy Center	Solar	5	PNM	Vertically-Integrated IOU	NM

Ownership by Utility for Customer Load (continued)

<u>Name</u>	<u>Technology</u>	<u>MW</u>	<u>Owner</u>	<u>Type</u>	<u>State</u>
Berkshire Wind Power Project	Wind	15	Berkshire Wind Power Cooperative ¹²	Public Power	MA
Pomeroy Wind Farm	Wind	30	MidAmerican Energy	Vertically-Integrated IOU	IA
Golden Spread Panhandle Wind	Wind	78.2	Golden Spread Electric Cooperative	G&T Electric Cooperative	TX
Glacier Hills Wind Park	Wind	162	Wisconsin Electric Power	Vertically-Integrated IOU	WI
Bent Tree Wind Farm	Wind	200	Wisconsin Power & Light	Vertically-Integrated IOU	MN

Ownership by Customer

<u>Name</u>	<u>Technology</u>	<u>MW</u>	<u>Customer/Owner</u>	<u>Additional Arrangements</u>	<u>State</u>
Renewable Energy Center	Biomass	15	Eastern Illinois University	Performance Contract with Honeywell	IL
Point Comfort Cogeneration	Coal/Cogeneration	155	Formosa Plastics		TX
WTC Freedom Tower	Fuel Cells	4.8	Port Authority and WTC Properties		NY
Ford-DTE Energy	Solar	0.5	Ford's Michigan Assembly Plant		MI
Depot Park	Solar	3	Depot Park	Surplus power sold to the Sacramento Municipal Utility District	CA
Denver Federal Center	Solar	3.5	Denver Federal Center/Xcel	Xcel will purchase RECs	CO
Bean Federal Center	Solar	6	Bean Federal Center		IN

Sale into Market/No Contract or Ownership

<u>Name</u>	<u>Technology</u>	<u>MW</u>	<u>Owner</u>	<u>State</u>
Synergy Dairy	Biogas	1.4	Not Specified	NY
Weed Biomass Cogeneration	Biomass	15	Roseburg Forest Products	CA
Lufkin Biomass Power Plant	Biomass	50	Aspen Power	TX
Renesselear County Flywheel	Flywheel Storage	20	Beacon Power Corporation ¹³	NY
SX Renewable Energy	Landfill Gas to Energy	3.2	SX Landfill Energy LLC	NJ
Nichols Farm	Solar CPV	1	Nichols Farm	CA
Edgeboro Landfill	Solar Landfill Cap	4.3	Not Available	NJ
Paradise Solar Energy Center	Solar	5	NextEra Energy Resources	NJ
Vineland Mays Landing & Manalapan Village Solar	Solar	7.7	Not Available	NJ
Clovis Wind Farm	Wind	5	Not Available	NM
Blue Canyon Wind Farm VI	Wind	99	EDP Renewables	OK

Footnotes

- ¹ Includes both independent power producers and merchant generators affiliated with distribution utilities.
- ² The plant was rebuilt following an explosion in February 2010.
- ³ Under the California restructuring process, the IOUs sold a portion of their generating assets but retained their coal, hydropower and nuclear facilities.
- ⁴ The remaining RECs will be purchased by Delmarva Power, the Delaware Municipal Electric Corporation, and the Delaware Sustainable Energy Utility.
- ⁵ This is a new storage facility integrated with an existing wind farm.
- ⁶ Partnership includes GE Energy Financial Services, Reunion Power, Exergy Development Group, and Atlantic Power Corporation.
- ⁷ In a tolling agreement, the purchaser supplies the fuel and purchases power from the generator.
- ⁸ There are two separate agreements — a PPA for capacity with Connecticut Light & Power and a tolling agreement for energy with Constellation Energy — but the MW are only included in the first category to avoid double counting.
- ⁹ Includes ownership of generation by Generation and Transmission (G&T) Rural Electric Cooperatives with power sold to members.
- ¹⁰ The PPGA was formed for the sole purpose of constructing and operating the plant. It includes Heartland Consumers Power District, Municipal Energy Agency of Nebraska, Hastings Utilities, Grand Island Utilities and Nebraska City Utilities.
- ¹¹ Southern California Edison owns the solar panels but leases the rooftop from ProLogis.
- ¹² The Berkshire Wind Power Cooperative includes 14 Massachusetts municipal utilities and their joint action agency, the Massachusetts Municipal Wholesale Electric Co.
- ¹³ As part of a bankruptcy plan, Beacon Power has put the Flyweel Project up for sale to repay a Department of Energy loan, but plans to continue to manage the facility.