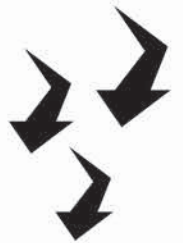


# The Pennsylvania Electric Power Generation Association

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Council of Industrial Boiler Owners  
March 4, 2014





EPGA is a regionally-focused, Pennsylvania-based trade association of electric generating companies.



# Pennsylvania: The Keystone State of Electric Generation



Coal



Nuclear



Gas



Wind



Solar



Hydro



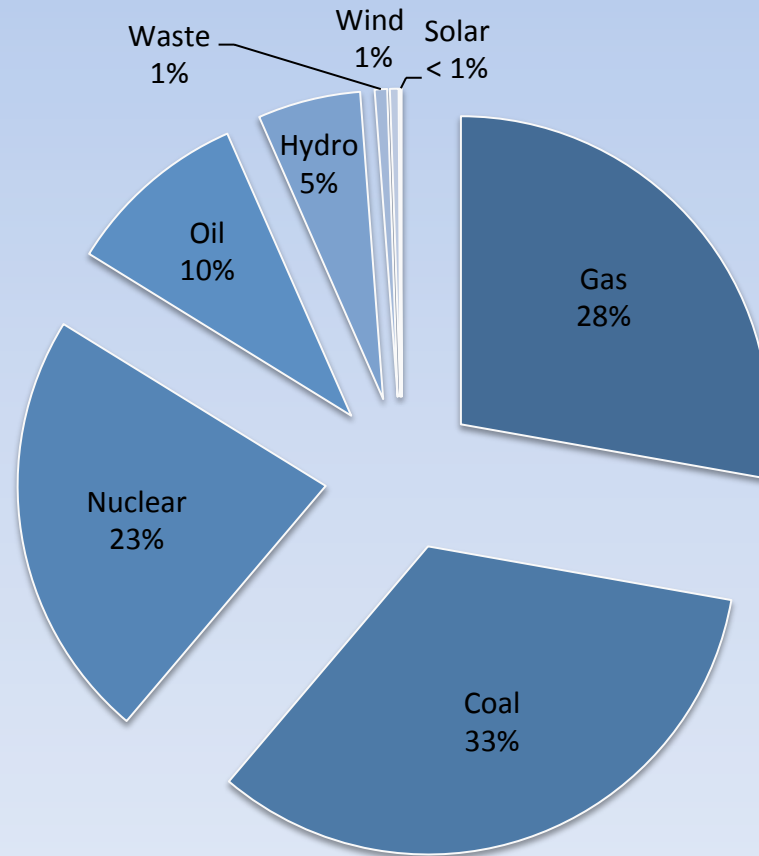
Pumped Storage Hydro

# Bulk Power System in Significant State of Transition

- Natural gas has been game changer.
- Coal dominance continues to decline due to increased environmental regulation and market conditions.
- Nuclear Renaissance stalled by Fukushima and market conditions – baseload nuclear under very real threat.
- Demand response and energy efficiency have dominated growth in system due to state incentives and overcompensation in wholesale markets.
- Wholesale markets continue to be skewed by RPS mandates and other subsidized forms of energy.

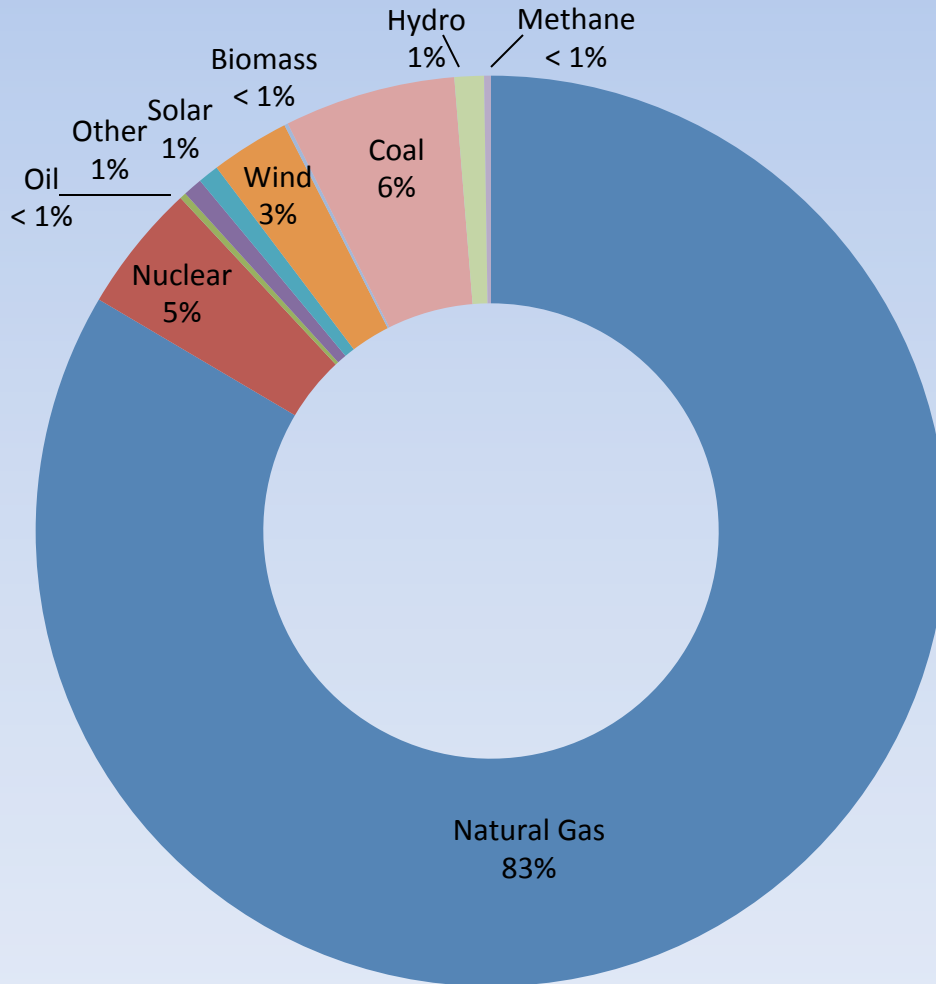
# Current Installed Capacity in Pennsylvania

Fuel Type	Capacity
Coal	14,772
Gas	12,293
Nuclear	10,005
Oil	4,250
Hydro	2,238
Waste	288
Wind	201
Solar	39
<b>Total</b>	<b>44,086</b>



Source: PJM 2013 RTEP and SNL

# Queued PA Capacity Additions



<u>Fuel Type</u>	<u>MW</u> s
Natural Gas	11,744
Nuclear	643
Coal	855
Hydro	147
Wind	394*
Solar	104**
Biomass	18
Methane	34
Oil	32
Other	96
<b>Total</b>	<b>14,067</b>

\*Nameplate energy = 2,438 MW

\*\*Nameplate energy = 274 MW

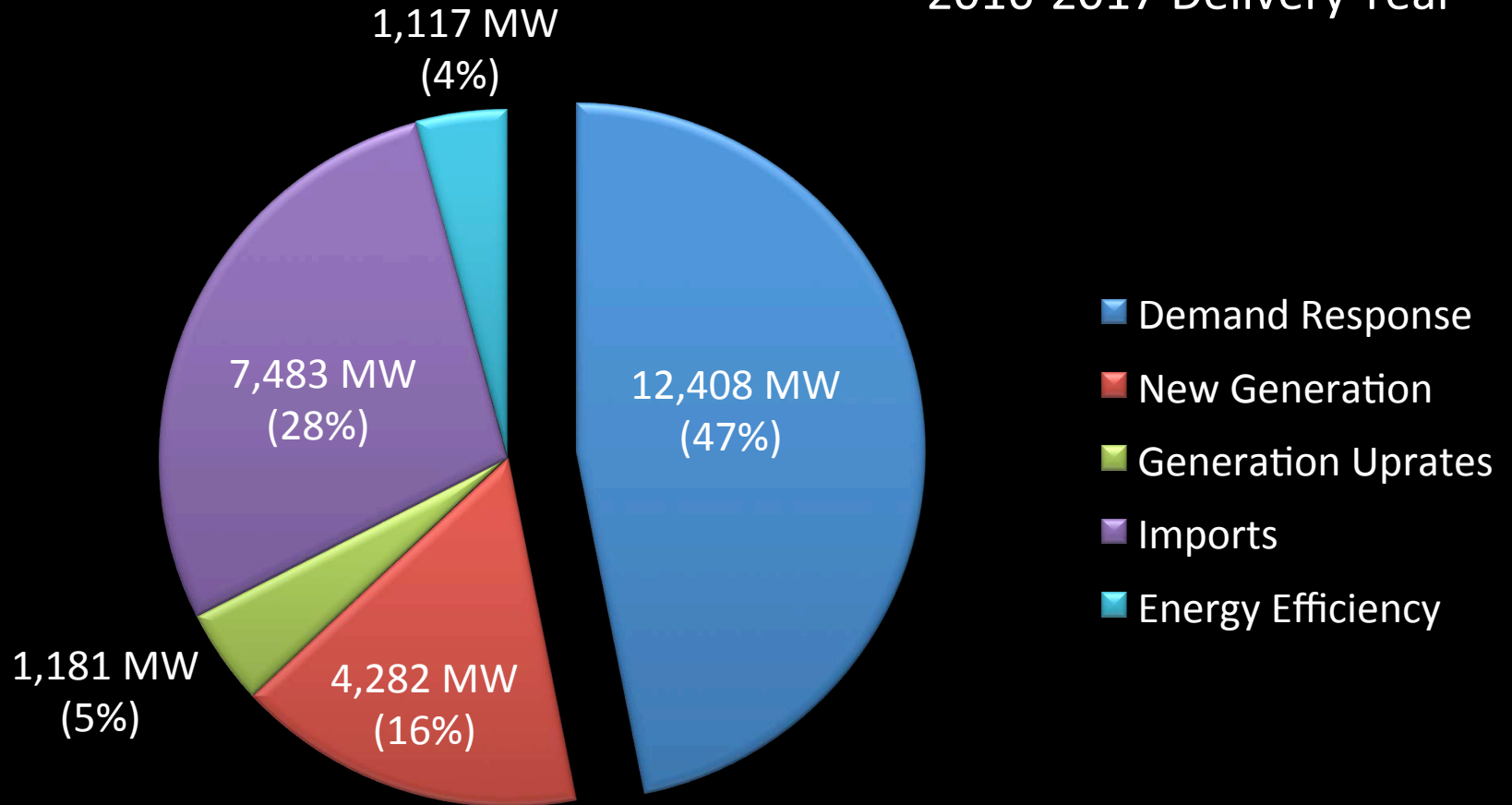
**NOTE: Not all queued capacity will be built**

# PJM Generation Output Trends

Fuel Source	2011		2012		Change in Output	
	GWh	Percent	GWh	Percent		
Coal	359,410	47.1%	332,762	42.1%	(7.4%)	↓
Nuclear	262,968	34.5%	273,372	34.6%	4.0%	↑
Gas	106,853	14.0%	148,230	18.8%	38.7%	↑
Hydroelectric	14,729	1.9%	12,650	1.6%	(14.1%)	↓
Wind	11,037	1.4%	12,634	1.6%	14.5%	↑
Waste	5,200	0.7%	5,178	0.7%	(0.4%)	↓
Oil	2,272	0.3%	5,031	0.6%	121.5%	↑
Solar	56	< 1%	234	< 1%	317.3%	↑
Battery	0.2	< 1%	0.3	< 1%	36.9%	↑
<b>Total</b>	<b>762,526</b>	<b>100%</b>	<b>790,090</b>	<b>100%</b>	<b>3.6%</b>	

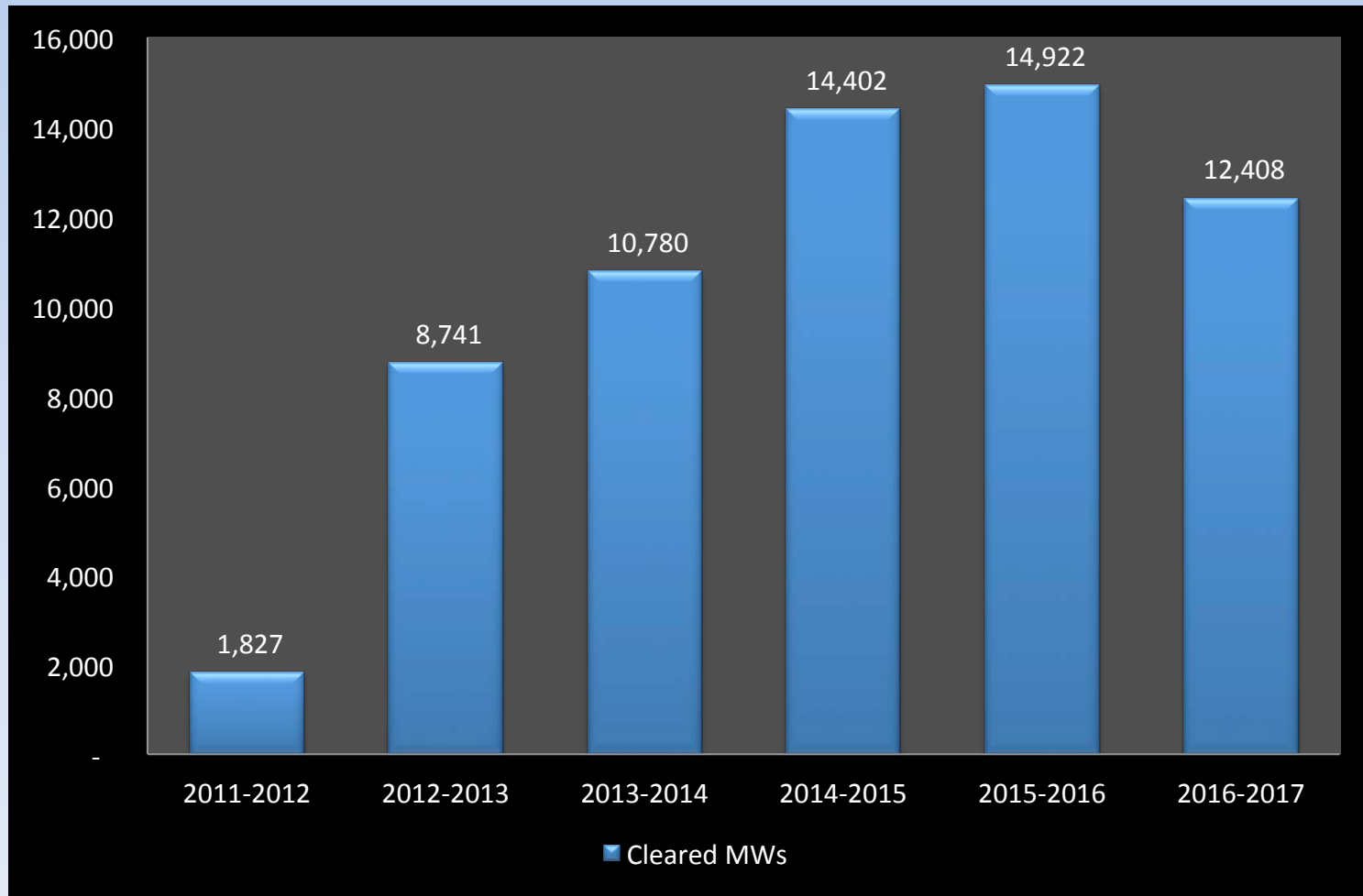
# PJM Capacity Auction Results

2016-2017 Delivery Year

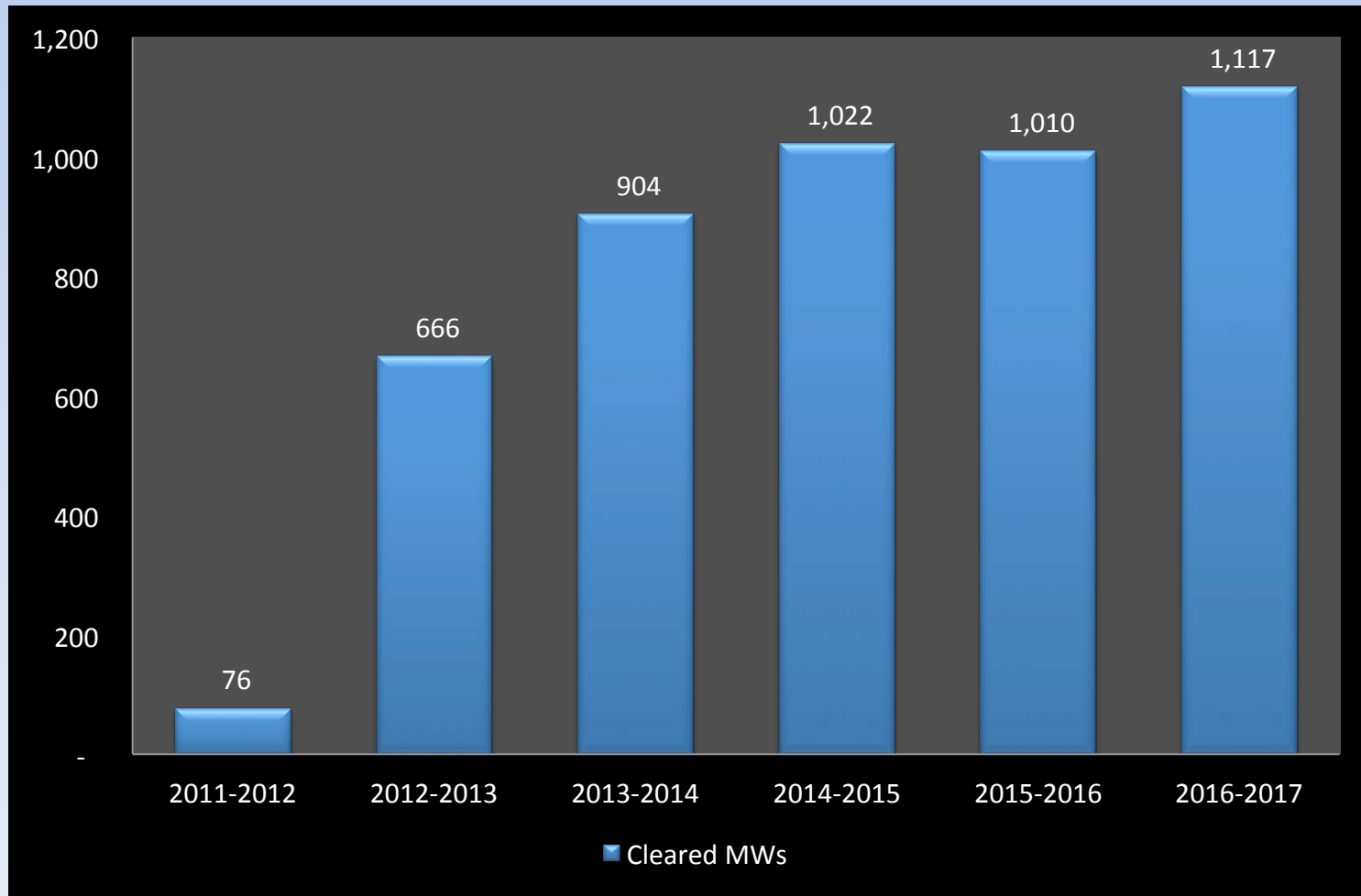




# Growth in Demand Suppression



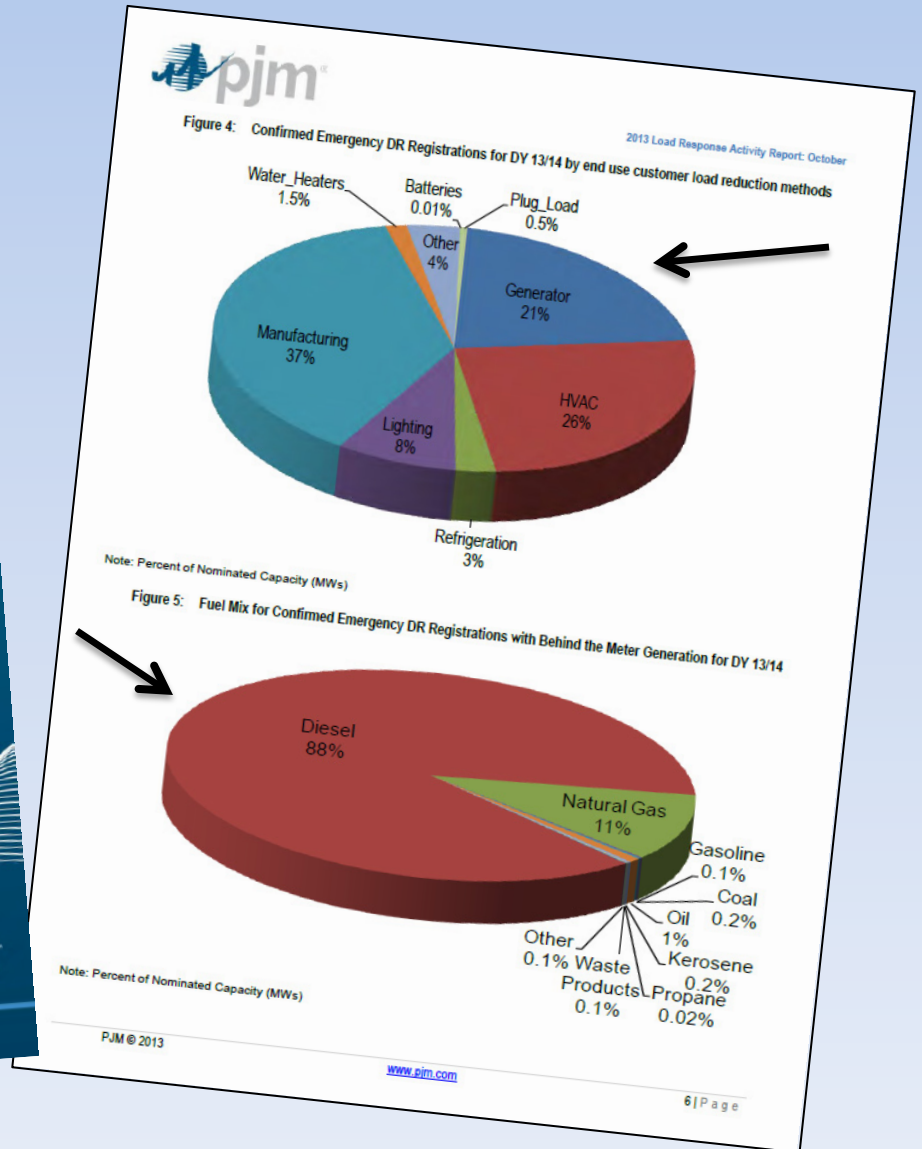
# Energy Efficiency in PJM Wholesale Capacity Market



# Power Generator Concerns

- Competitive power producers must compete with EE and DR and are impacted by state and federal policies that create preferences for those products.
- EE and DR are treated as “capacity” just like a power plant but do not have to follow the same rules.
  - ✓ Limited DR only must be available 60 hrs/year, yet get paid for 8,760 hrs.
  - ✓ Full exemption from environmental rules for certain backup generators
  - ✓ Generators have actual realized costs (fuel, labor, capital, operating). EE and DR do not. Yet EE and DR paid full LMP.
- In wholesale markets, EE and DR are overcompensated for what they provide.
- Result has been extreme growth of EE and DR in wholesale market, putting severe downward pressure on market prices, which coupled with increased regulatory costs and low natural gas costs, are creating uneconomic situations for some competitive baseload generation sources.

# Some DR Not Curtailing Use – Shifting Use



# DR Marketers Targeting Owners of Backup Generators

ENERNOC | DemandSMART

Product Overview


## Generate New Payments for Your Business

Through EnerNOC and Demand Response

If your business has a generator set, you may qualify for a simple and lucrative opportunity to be paid to run your generator. Demand response programs pay businesses to switch to on-site generation when the electrical grid experiences spikes in demand and supply, typically for just a few hours per year. Demand response participants earn substantial payments, increase the reliability of the electrical grid, and get advanced notice of irregular conditions on the grid.

By enrolling in demand response with EnerNOC, you will join the world's largest "virtual power plant," a network of more than 10,000 energy users worldwide. You will also enjoy a range of benefits.

**EMERGENCY PREPAREDNESS**  
What would you do if you knew there would be a blackout in two hours? Demand response participation gives you advance notice of any irregular conditions on the grid and helps ensure your readiness for a true grid emergency. By testing your generators regularly and under load, your business will be confident that your backup system will perform during a real emergency.



On-site generators can earn your business regular payments through demand response.

**FINANCIAL REWARDS FROM DAY ONE**  
Unlike capital-intensive energy management programs that don't deliver results until years later, demand response starts creating a bottom-line impact immediately. Our demand response customers have earned millions of dollars of payments – revenue they've reinvested into their operations to purchase equipment and pursue important upgrades of transfer switches and other equipment. Participating in demand response will deliver dependable, regular payments that you can count on.

**EASY ENABLEMENT**  
EnerNOC's engineers work directly with your facilities and engineering staff to determine your eligibility for a variety of

**"We realized that we were already testing our generators anyway, so it made sense to put them to work during brief emergency periods."**

Joe LaRoche, Director of Facilities Management, Berkshire Health Systems

© 2011 EnerNOC, Inc.

"Generate New Payments for Your Business"

"...you may qualify for a simple and lucrative opportunity to be paid to run your generator."

"...join the world's largest 'virtual power plant...'"

"Our demand response customers have earned millions of dollars of payments..."

Source: [www.enernoc.com](http://www.enernoc.com)

# DR Participants Paid a Premium for Curtailment

- All demand response is an economic activity
- Backup “emergency” generators are being repurposed as for-profit machines

- 2008 = \$140 Million
- 2009 = \$300 Million
- 2010 = \$510 Million
- 2011 = \$482 Million
- 2012 = \$332 Million

Figure 23: Emergency Demand Response Monthly Capacity Revenue from RPM (2013)

Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
AECO	\$411,097	\$371,313	\$411,097	\$397,836	\$411,097	\$1,002,307	\$1,035,717	\$1,035,717	\$1,002,307
AEP	\$425,101	\$383,962	\$425,101	\$411,388	\$425,101	\$749,663	\$774,652	\$774,652	\$749,663
APS	\$185,478	\$167,528	\$185,478	\$179,495	\$185,478	\$477,348	\$493,260	\$493,260	\$477,348
ATSI	\$19,859	\$17,937	\$19,859	\$19,218	\$19,859	\$365,564	\$377,750	\$377,750	\$365,564
BGE	\$5,430,108	\$4,904,613	\$5,430,108	\$5,254,943	\$5,430,108	\$7,487,232	\$7,736,807	\$7,736,807	\$7,487,232
COMED	\$405,926	\$366,643	\$405,926	\$392,831	\$405,926	\$782,114	\$808,185	\$808,185	\$782,114
DAY	\$63,670	\$57,508	\$63,670	\$61,616	\$63,670	\$42,849	\$44,278	\$44,278	\$42,849
DEOK	\$8,185	\$7,393	\$8,185	\$7,921	\$8,185	\$16,115	\$16,653	\$16,653	\$16,115
DOM	\$306,929	\$277,226	\$306,929	\$297,028	\$306,929	\$585,863	\$605,391	\$605,391	\$585,863
DPL	\$1,547,049	\$1,397,335	\$1,547,049	\$1,497,145	\$1,547,049	\$1,915,174	\$1,979,013	\$1,979,013	\$1,915,174
DUQ	\$49,718	\$44,907	\$49,718	\$48,114	\$49,718	\$143,269	\$148,045	\$148,045	\$143,269
EKPC						\$1,495	\$1,544	\$1,544	\$1,495
JCPL	\$1,495,628	\$1,350,890	\$1,495,628	\$1,447,382	\$1,495,628	\$2,215,048	\$2,288,883	\$2,288,883	\$2,215,048
METED	\$1,044,281	\$943,222	\$1,044,281	\$1,010,595	\$1,044,281	\$2,174,111	\$2,246,581	\$2,246,581	\$2,174,111
PECO	\$2,660,069	\$2,402,643	\$2,660,069	\$2,574,260	\$2,660,069	\$5,142,792	\$5,314,219	\$5,314,219	\$5,142,792
PENELEC	\$1,144,857	\$1,034,064	\$1,144,857	\$1,107,926	\$1,144,857	\$2,884,571	\$2,980,723	\$2,980,723	\$2,884,571
PEPCO	\$1,906,591	\$1,722,082	\$1,906,591	\$1,845,088	\$1,906,591	\$4,092,964	\$4,229,396	\$4,229,396	\$4,092,964
PPL	\$3,247,272	\$2,933,020	\$3,247,272	\$3,142,521	\$3,247,272	\$7,019,745	\$7,253,736	\$7,253,736	\$7,019,745
PSEG	\$2,354,400	\$2,126,555	\$2,354,400	\$2,278,452	\$2,354,400	\$8,574,172	\$8,859,978	\$8,859,978	\$8,574,172
RECO	\$14,896	\$13,454	\$14,896	\$14,415	\$14,896	\$249,408	\$257,721	\$257,721	\$249,408
Total	\$22,721,111	\$20,522,294	\$22,721,111	\$21,988,172	\$22,721,111	\$45,921,805	\$47,452,531	\$47,452,531	\$45,921,805
Total Capacity Credits:					\$297,422,472				

Note: Only indicates capacity revenue – does not include revenues from energy or ancillary services markets

# Market Impact of Uncontrolled For-Profit Backup Generators

- Displaces cleaner, more reliable generation
- As system loses other capacity, it becomes more reliant on these resources
- Distorts market signals that are necessary for regulated incumbent generators and well-controlled prospective generators
- Is not necessary because competitive markets can procure resources necessary to meet demand (clean DR, etc.)



# Negative Environmental Impacts

- Much higher emission rates
- Dispatched on worst air quality days of year
- Tend to be congregated in non-attainment areas of the state
- Will be dispatched more often and for longer periods of time, exacerbating issues
- Other point-source permitted users will be required to “do more” to account for increase in emissions from these units





# Generators Need Fair Markets to Compete

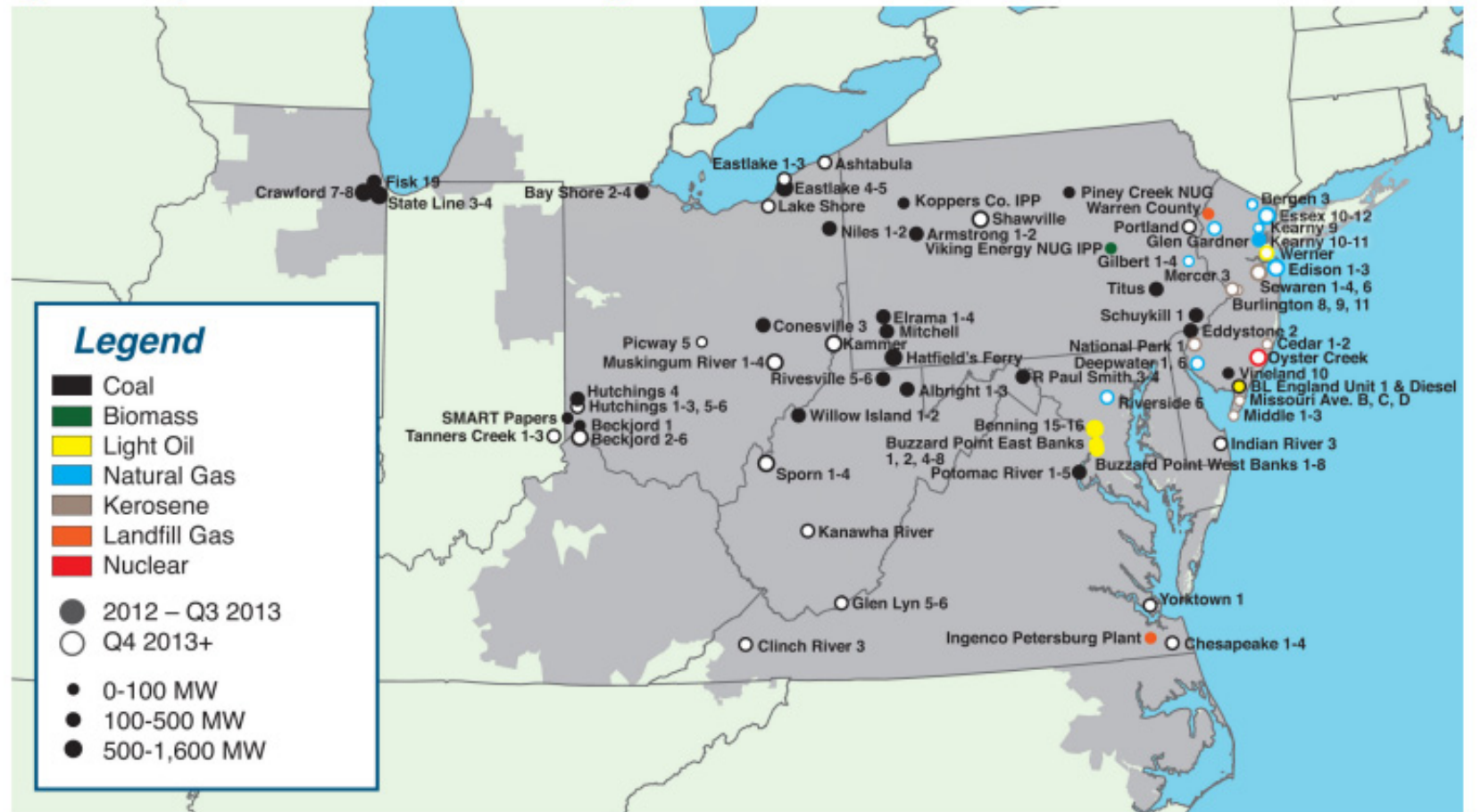
- Distorted markets that include subsidized products - especially those designed to suppress prices - creates uncompetitive results.
- Generators have raised the necessity for fairness and level playing fields to ensure that power plants can compete and are not forced to retire or deactivate prematurely.
- Artificial price suppression can force existing plants to be uneconomic and result in unnecessary and premature closures that have negative impacts for employees, communities and the state.

**Conserve Energy  
Generate Revenue**



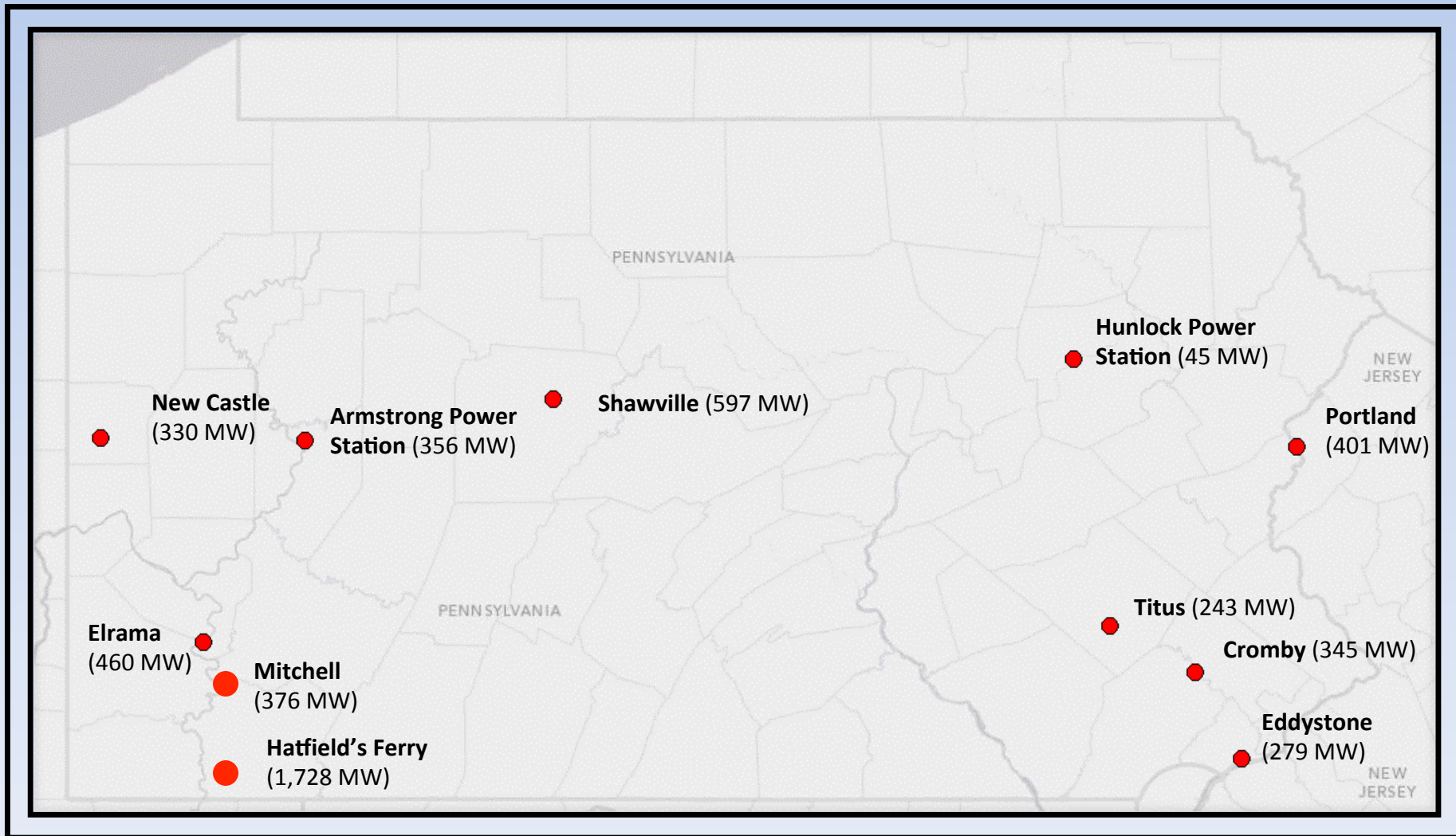
# PJM Generator Retirements

Figure 12-1 Map of unit retirements in PJM: 2012 through 2019



2012 – 2019

# Announced Pennsylvania Deactivations and Retirements



# PA Electric Generators Emissions

- ↓ **SO<sub>2</sub> Reduced by 74.7%**
- ↓ **NO<sub>x</sub> Reduced by 41.5%**
- ↓ **CO<sub>2</sub> to be Reduced by 21%<sup>1</sup>**
- ↓ **PM 10 Reduced by 74.7%**

**PA EGU EMISSIONS REDUCTIONS**  
**2000-2012**

<sup>1</sup>Includes actual and projected emission reductions estimated by PA DEP from 2007 levels through 2016

# Challenges Facing Generation Industry

## ➤ Competitive Market Issues

- Out of market subsidies
- Mandates for renewables
- Managing through growth of demand response and energy efficiency

## ➤ Economic Issues

- Slow growth in economy
- Abundance of low-cost natural gas

## ➤ Environmental Issues

- Adapting to increased environmental requirements at federal level



Thank you!



The Electric Power Generation As