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MARCH 28-30, 2011
HILTON SAN FRANCISCO UNION SQUARE
SAN FRANCISCO, CA

INDUSTRIAL ENERGY STRATEGIES WORKSHOP

Day Zero

Kim M. Wissman
Director, Department of Energy and Environment
Public Utilities Commission of Ohio

History of Electric (De)Regulation in Ohio

- A 1999 law restructured Ohio's electric industry by allowing customers to shop for electricity. The law took effect January 2001, and provided a five-year market development period, during which, the rates were frozen to allow a competitive market to develop.
- As the end of the market development period neared, there were a limited number of competitive electric suppliers and low degree of market activity. Therefore, there was concern that an immediate shift to market-based rates in 2006 would not be in the best interest of customers.
- To avoid rate "sticker shock" and gradually transition customers to market-based rates, the Public Utilities Commission of Ohio (PUCO) worked with Ohio's electric utilities to develop rate stabilization plans (RSPs).

Ohio Electric Choice

- Choice began on January 1, 2001 in all investor-owned electric distribution utility service areas.
  - **AEP (Ohio Power, Columbus Southern Power)**
  - **Duke Energy**
  - **DP&L**
  - **FirstEnergy (Ohio Edison, The Illuminating Company, Toledo Edison)**

Ohio Electric Choice-MDP

- 5 year market development period (MDP), during which time rates are frozen

- Local utility delivers electricity and maintains infrastructure
- Utility is default supplier

Ohio Electric Choice-MDP

- Initial results early during the MDP showed significant “switching” in some service territories primarily due to the high costs in the northern part of Ohio. Governmental aggregation was the success story in Ohio. The moderate-to-low priced utilities experienced little, if any, customer switching.

- The success of government aggregation aside, it was apparent that a fully competitive market had not developed as quickly as envisioned by lawmakers in Senate Bill 3.

Ohio Electric Choice-MDP

PLUS…Many things happened during the 5-year MDP period

- The California crisis and Enron scandals
- Extreme volatility and upward movement of market prices (due to rising gas prices, rising coal prices, and construction facilities not matching the projected increases in demand)
- And the slower than expected development of RTO's.

Ohio Electric Choice -- RSPs

- The market development period, established in Senate Bill 3, intended to provide time for a competitive retail electric market to develop. However, when the market development period expired on Dec. 31, 2005, Ohio's electric customers could have been subject to market-based pricing.
- Consequently, RSP's (Rate Stabilization Plans) were negotiated by the stakeholders and adopted by the PUCO in 2006.
- Most RSP's lasted through 2008.

PUCO Responses to the Federal Energy Policy Act of 2005

PUCO Response to The Energy Policy Act of 2005

- On December 14, 2005, the Commission opened an investigation *(PUCO Case No. 05-1500-EL-COI)* in the matter of a review of Congress's amendments to the Public Utilities Regulatory Policy Act of 1978 (PURPA) in the new Federal Energy Policy Act 2005 (EPACT05) regarding –
  - ***Net metering,***
  - ***"Smart" metering and demand response,***
  - ***Stand-by power for cogeneration and power production and***
  - ***Interconnection***

- Ohio recognized an electric customer can shave their peak off the power they would otherwise buy on a hot summer day – or when electricity prices are too high, by using a customer owned generator.
- Self generation provide options for customers who prefer to use renewable energy.
- Self generation can be a popular method for maximizing the energy efficiency of an industrial combined heat and power installation.

PUCO Response to The Energy Policy Act of 2005

Purpose

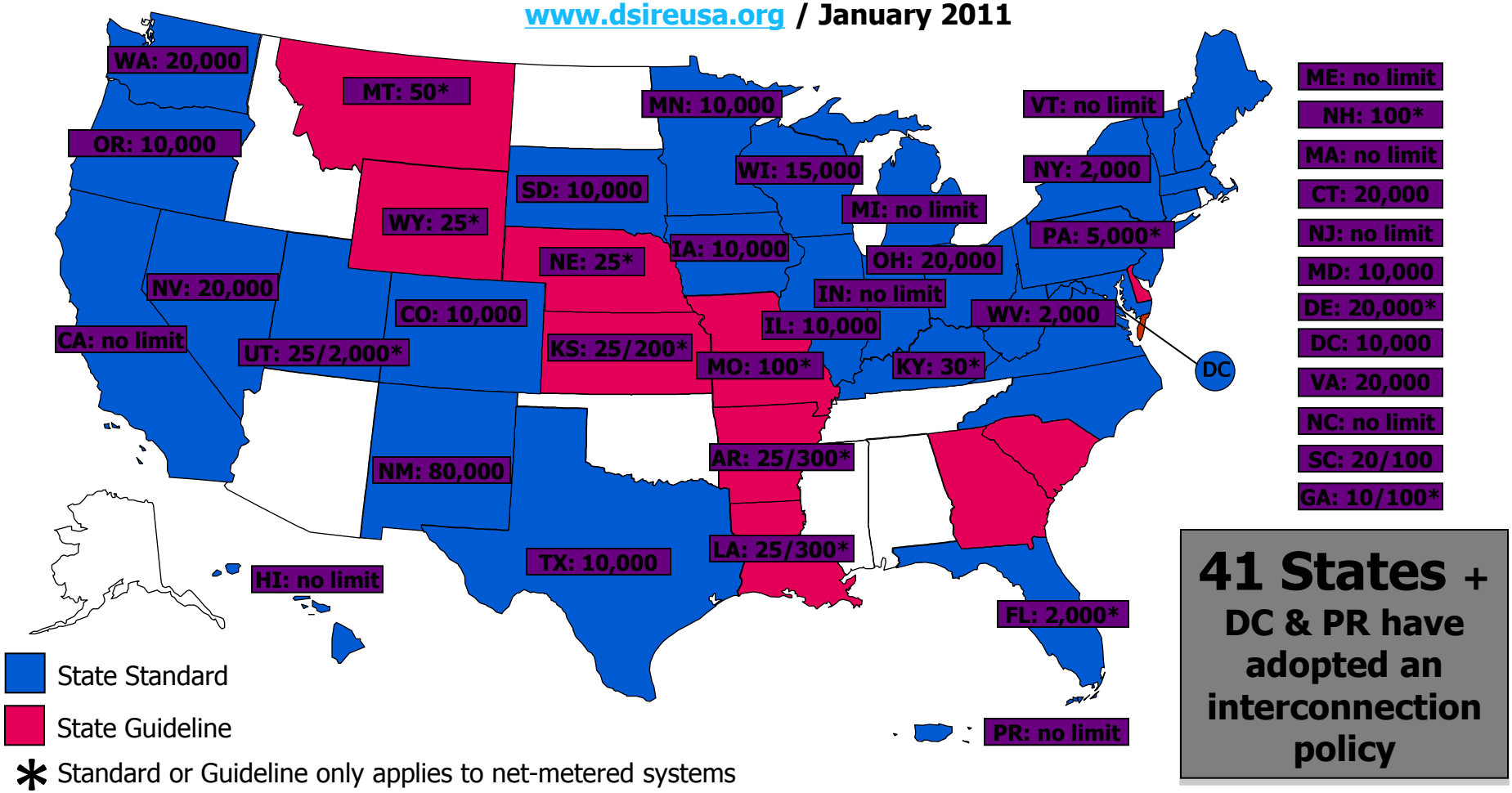
- to explore opportunities to increase Ohio's use of alternative energy
- to seek ways to lessen the burden of high energy prices on Ohioans and meet long term energy needs
- to review past actions with respect to net metering, advanced metering infrastructure and price responsive demand, cogeneration and small power production, stand-by power, and interconnection.

Results

- EDU's filed new market-based standby tariffs.
- Net-metering rules were clarified
- PUCO interconnection rules were revised in requiring distribution interconnection to be based on IEEE Standard 1547 for distributed generation.

Interconnection Policies

www.dsireusa.org / January 2011



41 States + DC & PR have adopted an interconnection policy

Notes: Numbers indicate system capacity limit in kW. Some state limits vary by customer type (e.g., residential/non-residential). "No limit" means that there is no stated maximum size for individual systems. Other limits may apply. Generally, state interconnection standards apply only to investor-owned utilities.

Ohio's Interconnection Rules

Chapter 4901:1-22, Ohio Administrative Code

- Standardize interconnection to reduce costs of manufacturing distributed generation equipment
- Increase use of renewable energy
- Support net metering units to be interconnected primarily for the customer's own use
- Include new equipment certification and installation under Institute of Electrical and Electronics Engineers (IEEE) 1547 Standards
- Use a customized multi-level approach to match unit size and circuit location to streamline processing of customer interconnection requests

The PUCO Interconnection Rules --

- *Do NOT prohibit a customer from selling excess energy into Ohio's competitive retail market through a PUCO-certified retail supplier.*
- *Do NOT prohibit a customer from selling excess energy into the Midwest ISO/PJM wholesale markets.*
- *Do NOT prohibit non-certified equipment from being interconnected if it meets feasibility, system impact, and facilities tests.*
- *Do NOT require a customer generator already interconnected and operating to go through the interconnection process again.*

Ohio law and the PUCO rules require interconnection to distribution circuits to be consistent with IEEE standards:

- IEEE Std 1547™ Standard for Distributed Resources Interconnected with Electric Power Systems,
- IEEE Std 1547.1™ Standard for Conformance test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems,
- IEEE Std 1547.2™ Application Guide for IEEE Standard 1547, Interconnecting Distributed Resources with Electric Power Systems,
- IEEE Std 1547.3™ Guide for Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems,

The customized multi-level approach:

(Not for interconnection to a high voltage transmission line).

Simplified Procedure

*Level 1- *10 kWs or less*

* *Uses renewable fuel,*
* *Meets technical requirements to locate on radial circuit or spot network;*

*Level 1.1- * 10 kWs or less,*

* *Meets technical requirements to locate on load side of an area network;*

*Level 1.2 - * 50 kWs or less,*

- *Meets technical requirements to locate on an area network.*

** *All Level 1 units must be inverter- based, meet **IEEE1547 non-islanding standard,** and require **no** construction by the utility company*

Expedited procedure

*Level 2 -*2 MWs or less in size,*

* *Meets IEEE 1547 and UL 1741stds.*

- *Meets IEEE1547 non-islanding standard.*
- *Did not qualify for Simplified Procedure,*

Standard Procedure

- *Level 3- *20 MWs or less in size, including less that 2 MWs not certified or non-inverter-based, Are more likely to be required to be subject to*
  - *feasibility,*
  - *system impact, and*
  - *facilities tests.*
- *Did not qualify for Simplified or Expedited Procedures.*

PUCO Website

- Step by step process
- How the process works
- Customized multi-level fees
- Rules
- Local Electric Company contact information
- IEEE Standards and related terminology
- Background
- Purpose
- Definitions

“Difficulties mastered are opportunities won.”

-Winston Churchill

Choices

"More than at any time in history mankind faces a crossroads. One path leads to despair and utter hopelessness, the other to total extinction. Let us pray that we have the wisdom to choose correctly."

-Woody Allen

Daily Negation: I'll take the other one.

Ohio's Energy Plan Post 2008

middle-ground approach to electricity regulation

- **evidence demonstrated few competitive options exist at the retail level, and action is necessary to secure Ohio's energy future.**
- **did not close the door on market pricing, but required a demonstration that competition is effective.**
- **PUCO also can set rates and allow utilities to recoup the cost for new generation and modernization of the electric system.**

- In September 2007, “Energy, Jobs and Progress” plan was released.

- The plan is a comprehensive, long-term approach to the challenges of supplying reliable and affordable power while ALSO address the approaching expiration of Rate Stabilization Plans (RSPs).

OHIO S.B. 221 Policy Principles…

- Ensure availability of adequate, reliable, safe, efficient, nondiscriminatory and reasonably priced retail electric service
- Ensure diversity of electricity supplies and suppliers
- Encourage innovation and market access for const-effective supply- and demand-side retail electric service

221 OHIO Policy Principles…

- Ensure transmission and distribution available for deliverability
- Recognize continuing emergence of competitive electricity market through development and implementation of flexible regulatory treatment
- Provide coherent, transparent means of giving appropriate incentives to technologies that can adapt successfully to potential environmental mandates

The Plan…

Attract energy jobs of the future through an Ohio advanced energy portfolio standard

Safeguard Ohio families by empowering consumers

-demand greater efficiency, transparency and service from their utility companies

-encouraging investment and modernization of Ohio's energy infrastructure, which is not only a benefit for consumers but also protects and secures the state's economy.

Ensure affordable and stable energy prices to protect Ohio consumers and existing Ohio jobs

Ohio Alternative Energy Portfolio Standard

25% by 2025

- 25% of retail electricity sold by:
  - Ohio's electric distribution utilities – American Electric Power, Dayton Power & Light, Duke Energy, and First Energy, or;
  - Competitive electric service companies
- Must be generated from **alternative** sources:
  - **Renewable** energy sources
  - **Advanced** energy technology

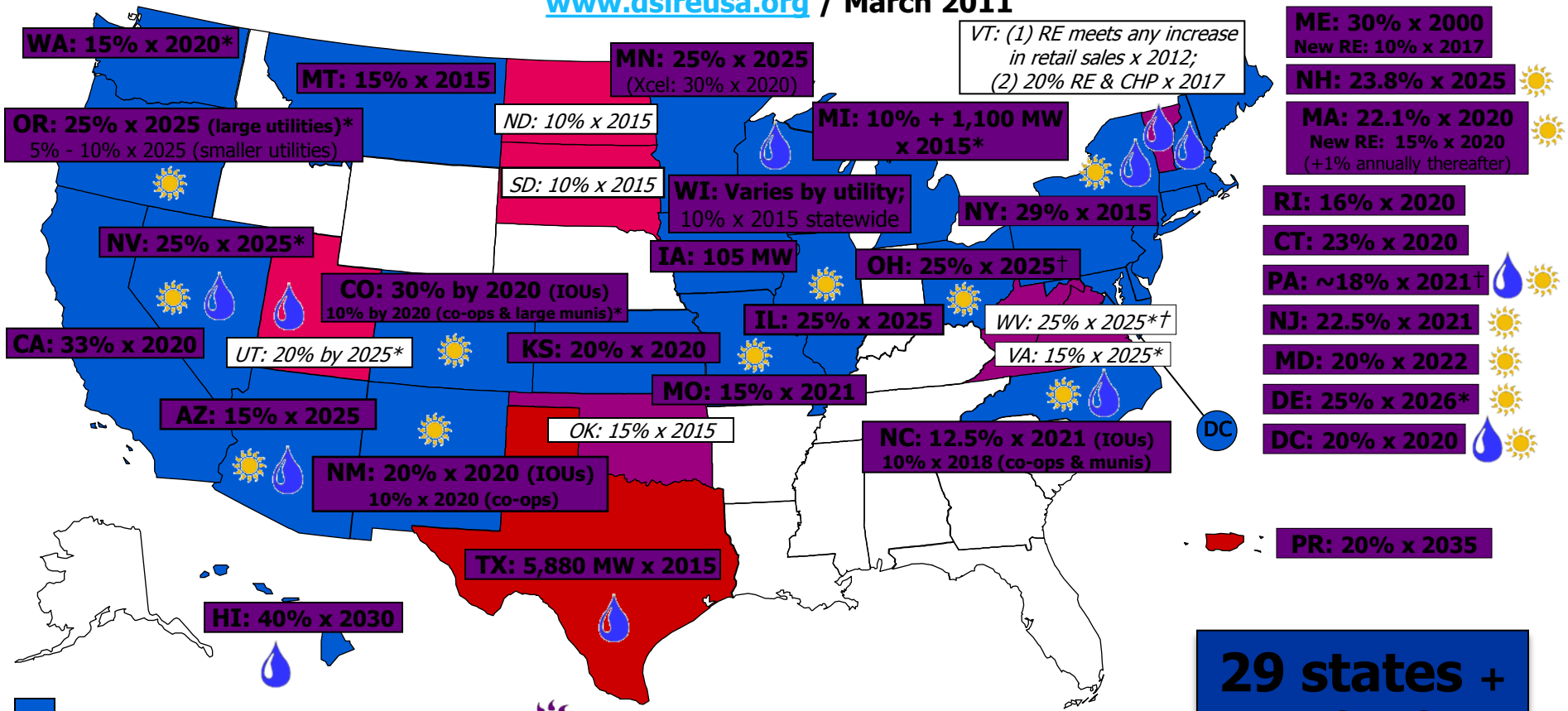
S.B. 221

25% (of total kWh) by 2025

- Half may be from advanced energy resources
- At least half from renewable, .5% solar
- At least half of renewable through facilities located in the state, remainder deliverable
- Compliance payments/forfeitures
- Cost of compliance not to exceed three percent of otherwise acquired

RPS Policies

www.dsireusa.org / March 2011



Renewable portfolio standard

Renewable portfolio goal

Solar water heating eligible

Minimum solar or customer-sited requirement

* Extra credit for solar or customer-sited renewables

† Includes non-renewable alternative resources

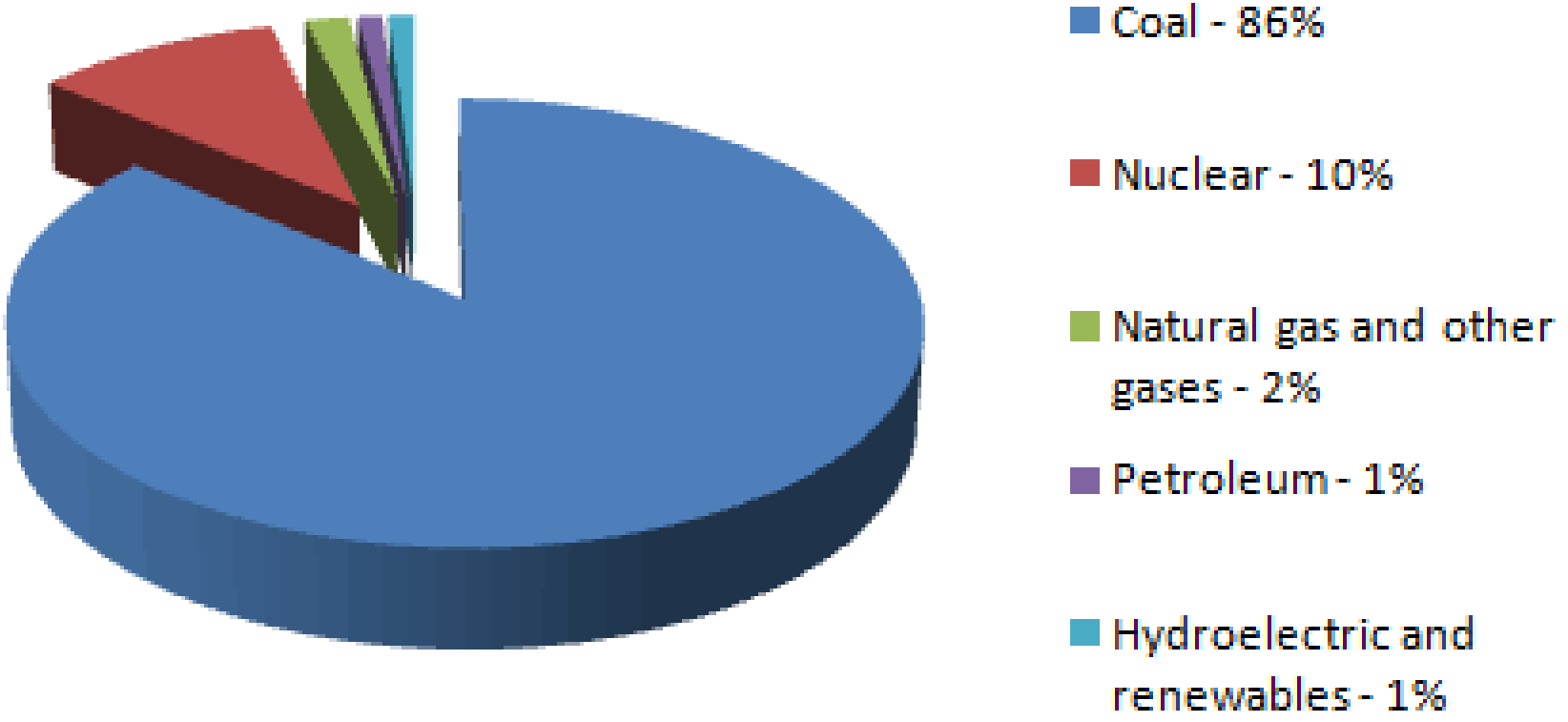
29 states + DC and PR have an RPS

(7 states have goals)

Impact

- Ohio ranks 4th among states in retail electric sales
- Ohio ranks 6th in net generation
- Ohio's emissions from electric generation, including, SO2, NOx and CO2, rank highly among states

Ohio Electric Generation by Fuel Source



“ *When I heated my home with oil, I used an average of eight hundred gallons a year. I have found that I can keep comfortably warm for an entire winter with slightly over half that quantity of beer.”*

-Dave Barry

Qualified Renewable Resources

Solar

Wind

Hydroelectric

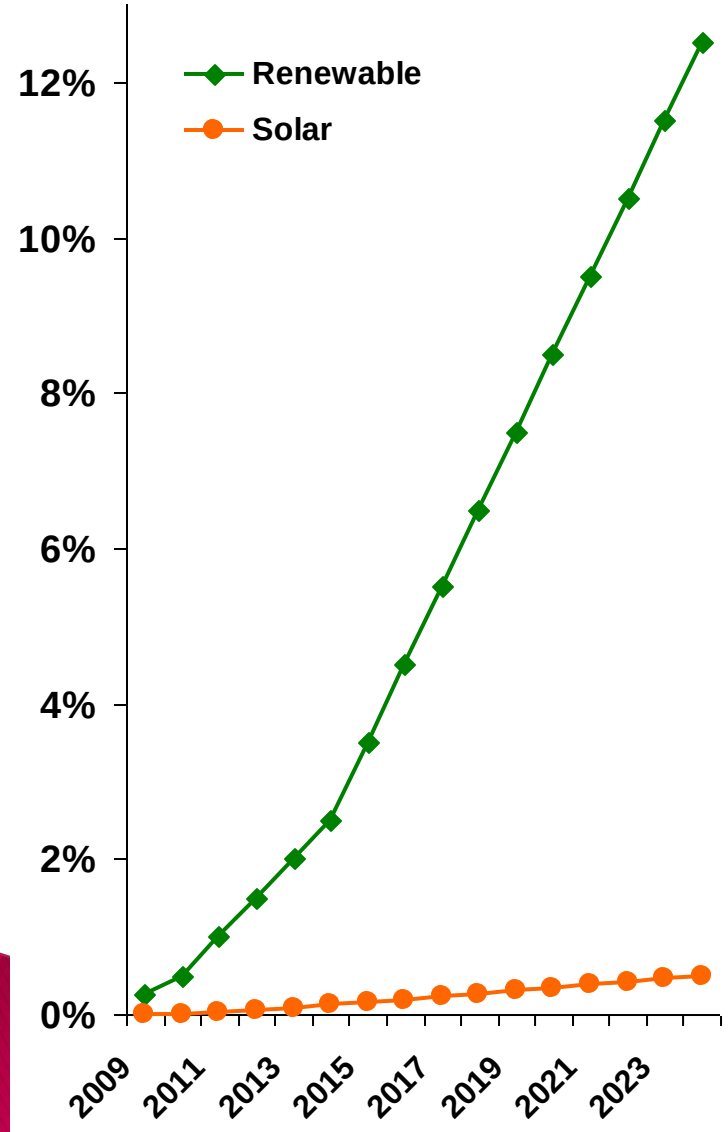
Geothermal

Fuel Cells

Storage

Biomass

Benchmarks



By end of year	Renewable Energy	Solar Energy
2009	0.25%	0.004%
2010	0.5%	0.01%
2011	1%	0.03%
2012	1.5%	0.06%
2013	2%	0.09%
2014	2.5%	0.12%
2015	3.5%	0.15%
2016	4.5%	0.18%
2017	5.5%	0.22%
2018	6.5%	0.26%
2019	7.5%	0.3%
2020	8.5%	0.34%
2021	9.5%	0.38%
2022	10.5%	0.42%
2023	11.5%	0.46%
2024 +	12.5%	0.5%

Year	Sales (MWHs)	Baseline (MWHs)	Non-Solar Renewables (MWHs)		Solar (MWHs)	
			Totals	Ohio Minimum	Totals	Ohio Minimum
2006	*135,788,000*	N/A	N/A	N/A	N/A	N/A
2007	*143,358,000*	N/A	N/A	N/A	N/A	N/A
2008	*140,739,000*	N/A	N/A	N/A	N/A	N/A
2009	*128,938,000*	139,961,667	344,305.70	172,152.85	5,598.47	2,799.23
2010	130,476,000	137,678,333	674,623.83	337,311.92	13,767.83	6,883.92
2011	132,006,000	133,384,333	1,293,828.03	646,914.02	40,015.30	20,007.65
2012	133,529,000	130,473,333	1,878,816.00	939,408.00	78,284.00	39,142.00
2013	135,044,000	132,003,667	2,521,270.03	1,260,635.02	118,803.30	59,401.65
2014	137,003,000	133,526,333	3,177,926.73	1,588,963.37	160,231.60	80,115.80
2015	138,948,000	135,192,000	4,528,932.00	2,264,466.00	202,788.00	101,394.00
2016	140,878,000	136,998,333	5,918,328.00	2,959,164.00	246,597.00	123,298.50
2017	142,792,000	138,943,000	7,336,190.40	3,668,095.20	305,674.60	152,837.30
2018	144,691,000	140,872,667	8,790,454.40	4,395,227.20	366,268.93	183,134.47
2019	143,779,000	142,787,000	10,280,664.00	5,140,332.00	428,361.00	214,180.50
2020	142,862,000	143,754,000	11,730,326.40	5,865,163.20	488,763.60	244,381.80
2021	141,942,000	143,777,333	13,112,492.80	6,556,246.40	546,353.87	273,176.93
2022	143,232,000	142,861,000	14,400,388.80	7,200,194.40	600,016.20	300,008.10
2023	144,515,000	142,678,667	15,751,724.80	7,875,862.40	656,321.87	328,160.93
2024	145,790,000	143,229,667	17,187,560.00	8,593,780.00	716,148.33	358,074.17
2025	147,058,000	144,512,333	17,341,480.00	8,670,740.00	722,561.67	361,280.83

Behold the turtle.
He makes progress only when he sticks his neck out.

-James B Conant

Renewable Energy Credits

- New Ohio renewable energy credit (REC) trading market created by new law in 2009
- 1 REC = 1 MWh of electricity generated
- Utilities may own renewable facilities or purchase RECs to meet the renewable portion of the standard
- PUCO certifies resources; established tracking systems will issue and track RECs
- RECs have a 5-year lifetime following their acquisition
- Energy and RECs may be sold as separate commodities

Penalties

- Utilities and electric service companies subject to compliance payments if annual renewable and solar benchmarks are not met
- $45/mWh
- Solar $450/MWh in 2009 and declines over time
- Exceptions: force majeure; 3% cost cap

Certification Application

- REN certification is not mandatory for any renewable project, but necessary to create REC's eligible for Ohio utility compliance
- No fee to apply
- May certify facilities prior to commercial operation
- Application will focus on:
  - Resource/technology utilized
  - Placed in-service date
  - Deliverability to the state
- One-time review (unless significant change to facility in future)
- Interested person may seek intervention and request hearing on certification
- Certification status will be conveyed to applicable attribute tracking system

- **Public Utilities Commission website page: Ohio's Renewable and Advanced Energy Portfolio Standard**
- http://www.puco.ohio.gov/

- **Ohio Renewable Energy Resource Generating Facility Certification**
- Application for Certification as an Ohio Renewable Energy Resource Generating Facility
- List of filed cases for certification
- List of approved cases

REN APPLICATIONS RECEIVED

YEAR	FILINGS
2009	186
2010	1,072
2011 (as of 3/1)	614
TOTAL:	**1,872**

" *I know God will not give me anything I can't handle. I just wish that He didn't trust me so much."*

– Mother Teresa

	CERTIFIED FACILITIES			CERTIFIED CAPACITY		
RESOURCE	TOTAL	*IN-STATE*	*CONTIGUOUS*	TOTAL (MW)	*IN-STATE (MW)*	*CONTIGUOUS (MW)*
BIOGAS (ANAEROBIC DIGESTION)	5	*4*	*1*	4.54	*3.74*	*0.80*
BIOGAS (LANDFILL GAS)	29	*7*	*22*	197.40	*92.20*	*105.20*
BIOMASS (COFIRING)	8	*8*	*0*	COFIRING	–	–
BIOMASS (PAPER MANUFACTURING)	4	*3*	*1*	COFIRING	–	–
COAL MINE METHANE	1	*1*	*0*	49.00	*49.00*	*0.00*
HYDROELECTRIC	3	*2*	*1*	125.50	*45.50*	*80.00*
SPV	1138	*211*	*927*	44.53	*21.24*	*23.29*
SOLID WASTE	3	*2*	*1*	97.80	*42.80*	*55.00*
WIND	29	*15*	*14*	1736.80	*10.85*	*1725.95*

As of March 1, 2011

Advanced Energy Resources

- Clean coal
- Nuclear
- Fuel cells
- Customer Co-generation
- Advanced solid waste conversion
- Utility generation plant or demand-side management efficiency measures
- *RECs are not created from advanced resources


RAMIREZ
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GREEN
NUCLEAR
WWW.IBDEDITORIALS.COM/CARTOONS

Another Dream Shattered

Ohio Biomass Program Services

The Ohio Biomass Energy Program provides information, resource referrals, business connections, and assistance to support the development and use of biomass energy resources in Ohio.

Qualified Biomass Resources

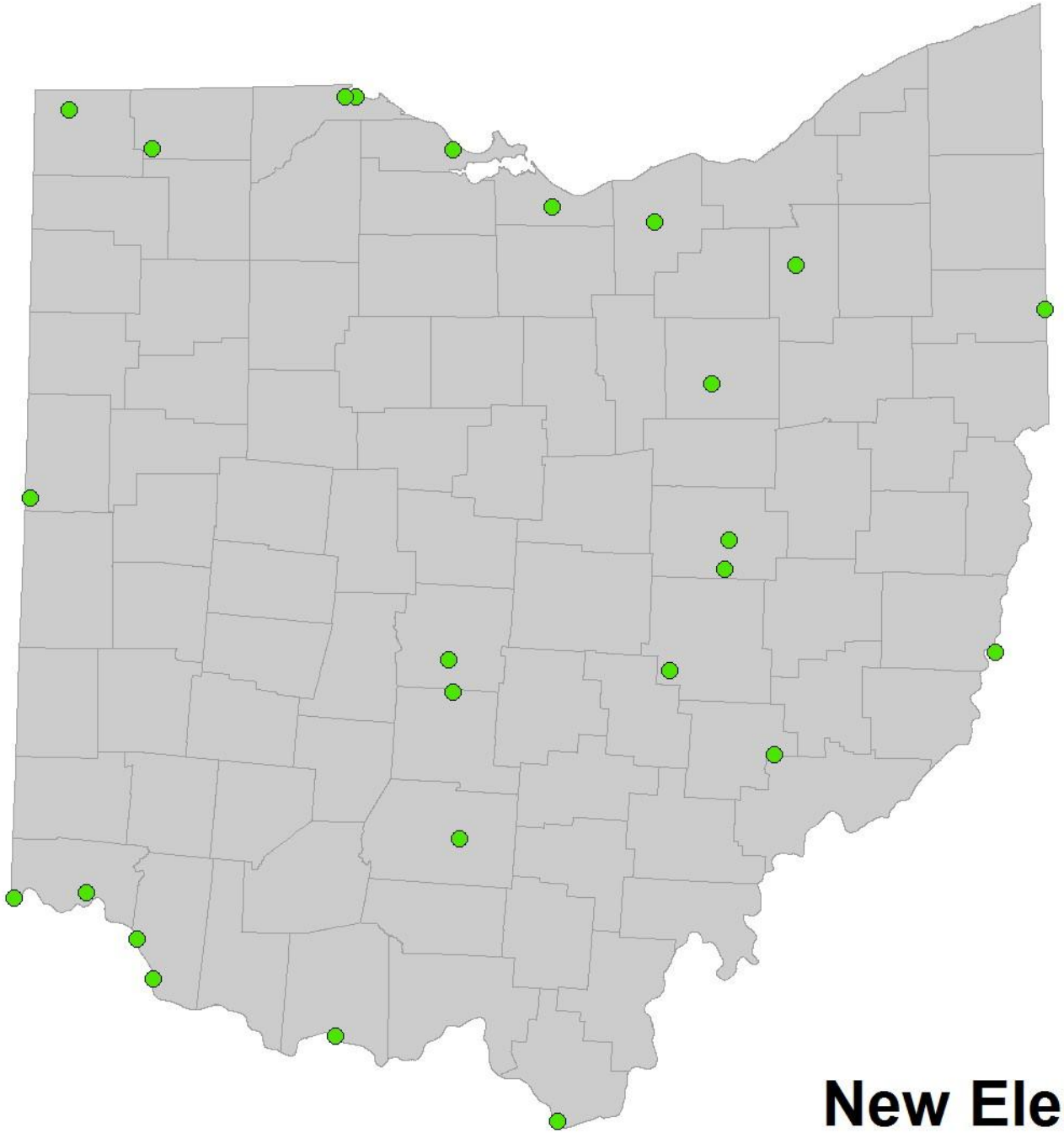
- Biogas: landfill methane gas or
  anaerobic digestion of organic materials such as animal waste, biosolids, food waste, agricultural crops and residues, solid waste
- Agricultural crops, tree crops, crop by-products and residues
- Wood and paper manufacturing waste
- Forestry or vegetation waste
- Algae

Program Objectives

- Promote the environmental and economic benefits of biomass energy
- Develop biomass energy as a green power option within a diversified state energy portfolio
- Encourage investments in biomass energy technologies and projects
- Build coalitions of stakeholders to promote biomass options for power, gas, heat and transportation fuels

Utility-scale biomass projects

- 9 utility applications filed for plants using biomass or biomass co-fired with coal or pet coke
- 1 private 200 MW (2012) plant certified
- Utility RFP's have been issued for biomass fuel
- Ohio Solid Biofuel Working Group to promote fuel supply development



Biomass Power Plants

Includes operating and pending biomass and co-firing facilities

Biomass

New Electric Generation

Wind Momentum

- Federal PTC (Production Tax Credit)
- State Renewable Portfolio Standards (RPS)
- Technological Improvements
- Price Volatility for Other Fuels (i.e., Natural Gas)
- Interest in Green Power / Clean Energy Sources
- Climate Change / Energy Independence

Harnessing wind energy choices:

Wind farms in Ohio can help provide renewable resources to meet Ohio's Alternative Energy Portfolio Standards

BUT ALSO…

Harnessing wind energy choices:

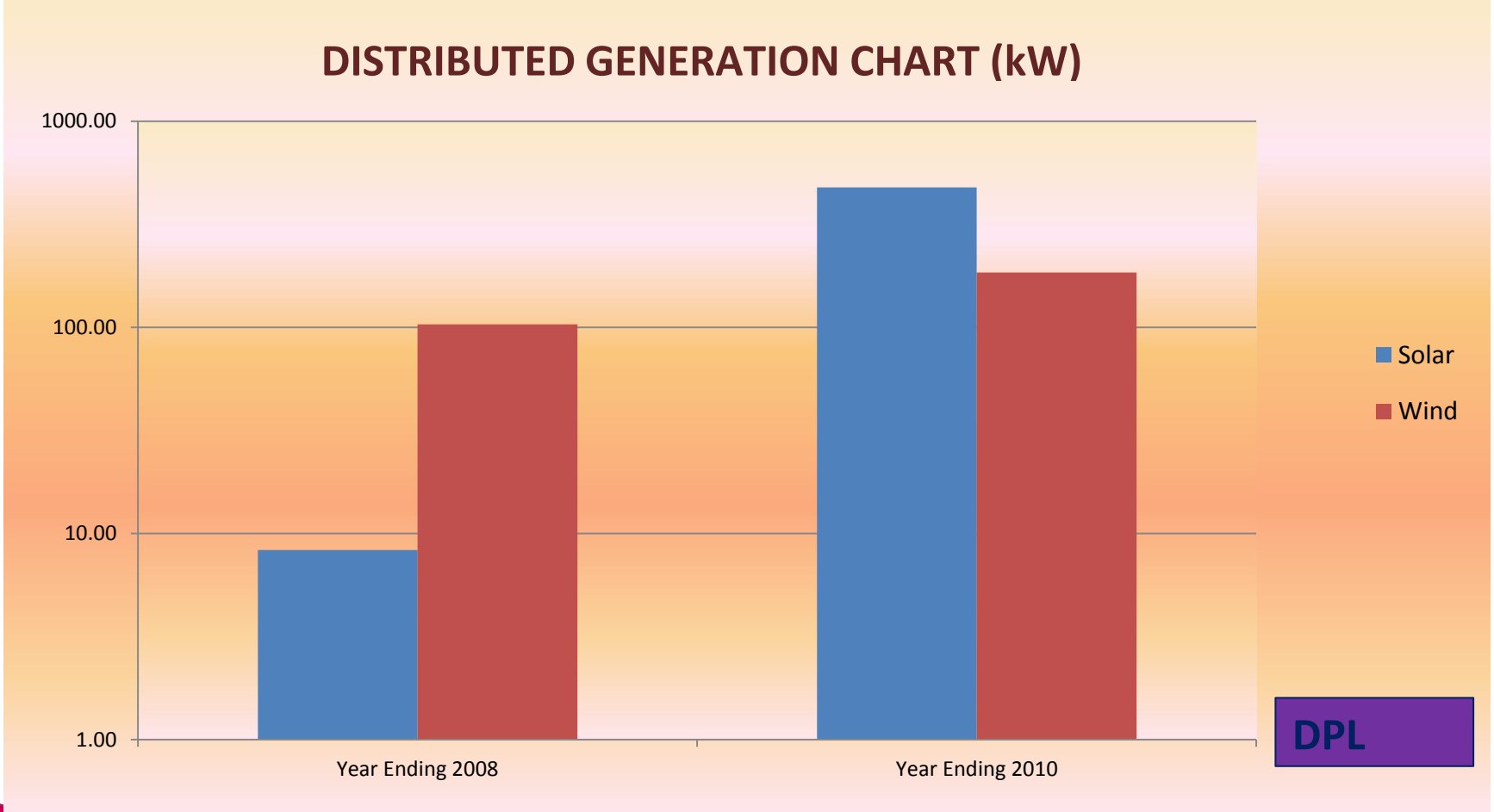
A small wind generator owned by a retail customer

..

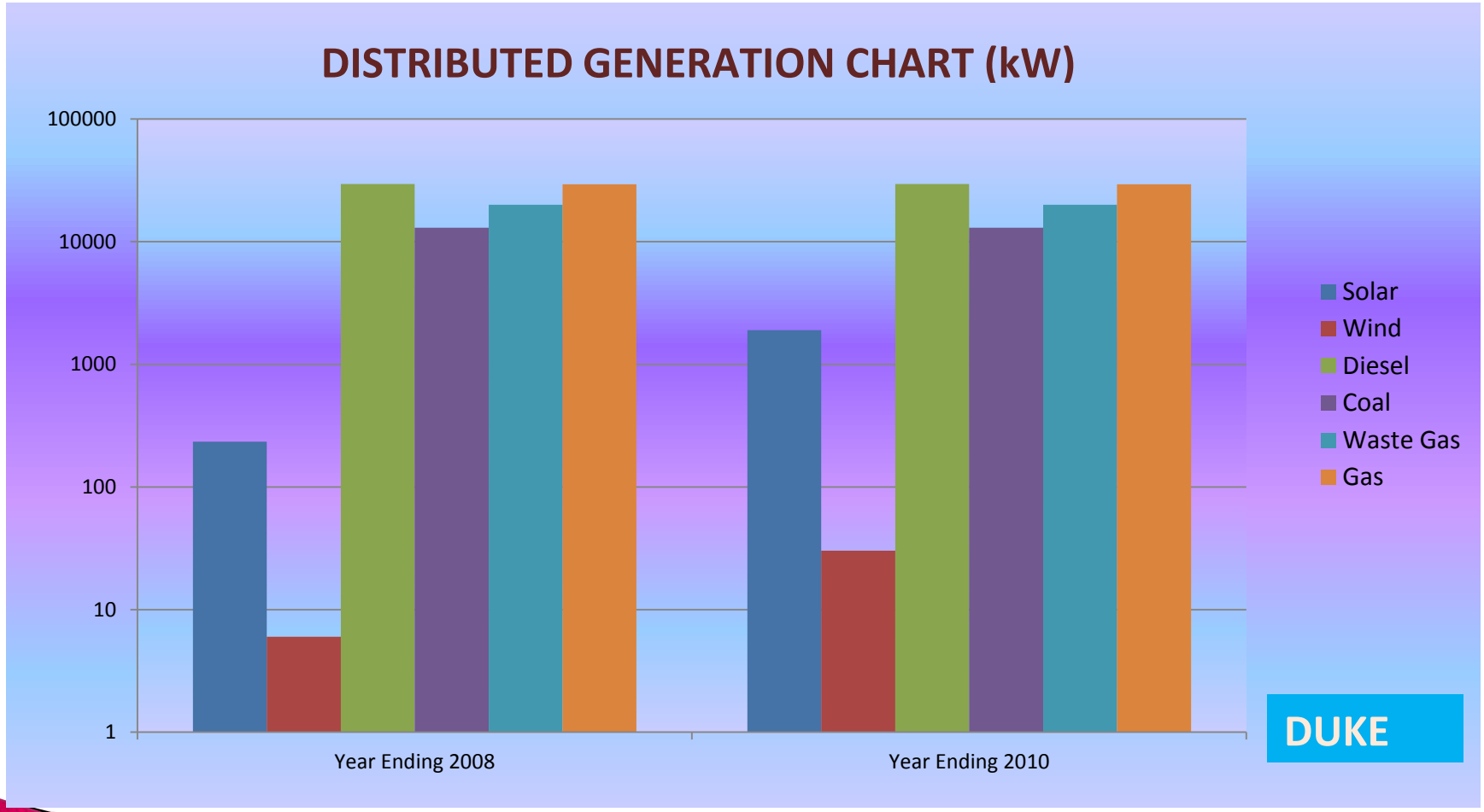
- ***May enable the customer to use a renewable resource to offset his electrical demand and potentially earn a credit for net metering on his electric bill.***

Photo: Courtesy AEP

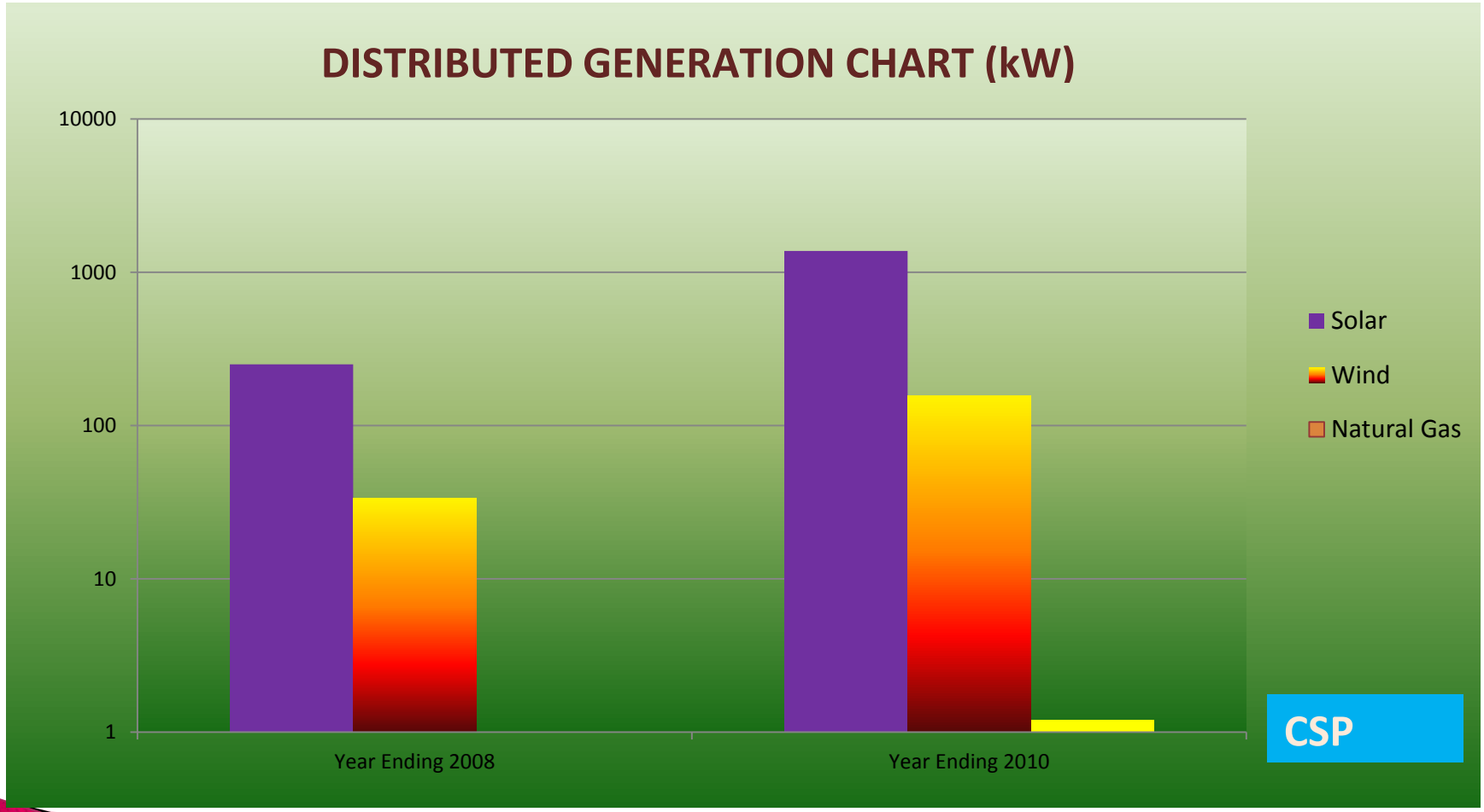
Dayton Power & Light



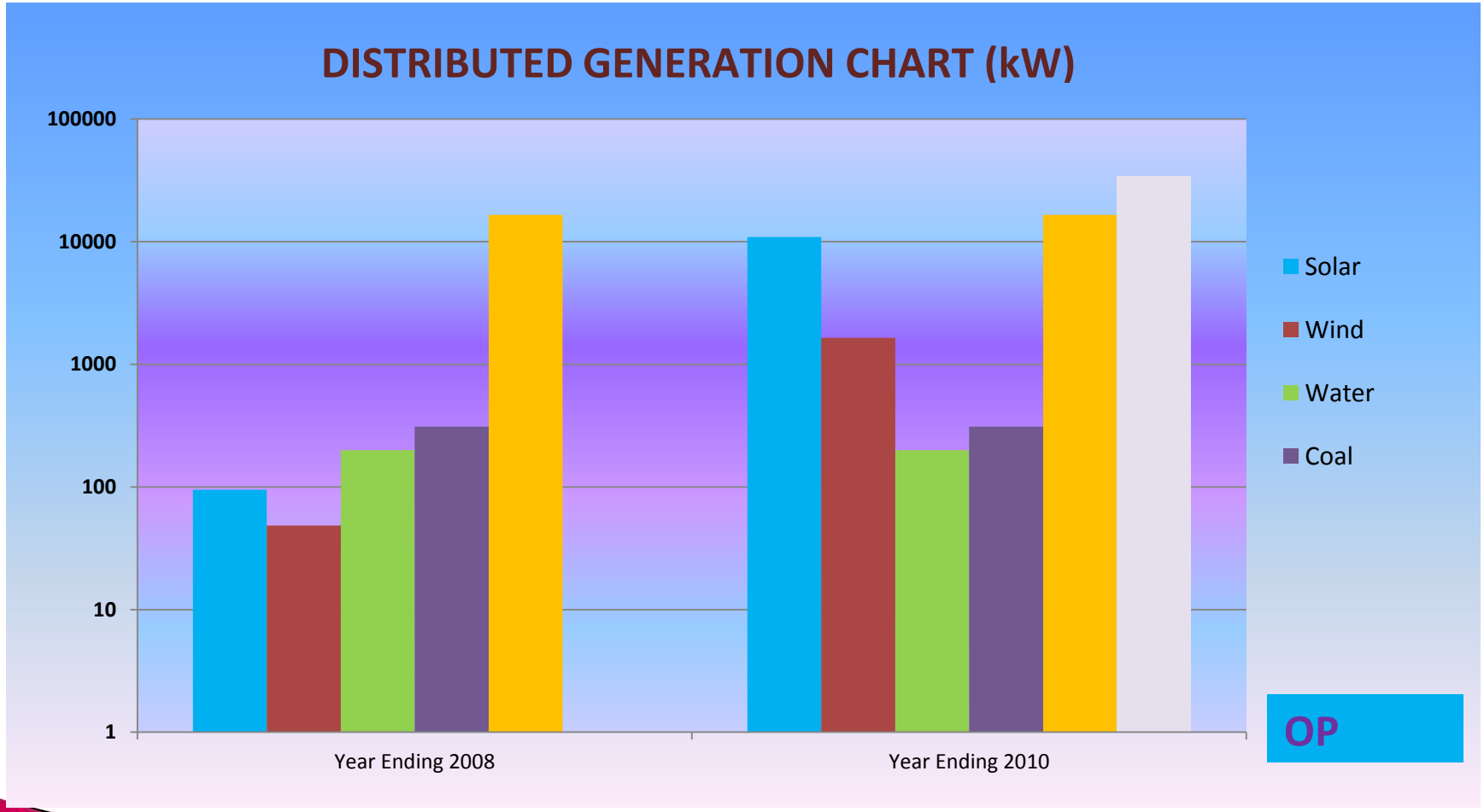
Duke


DISTRIBUTED GENERATION CHART (kW)
100000
10000
1000
100
10
1
Year Ending 2008
Year Ending 2010
Solar
Wind
Diesel
Coal
Waste Gas
Gas
DUKE

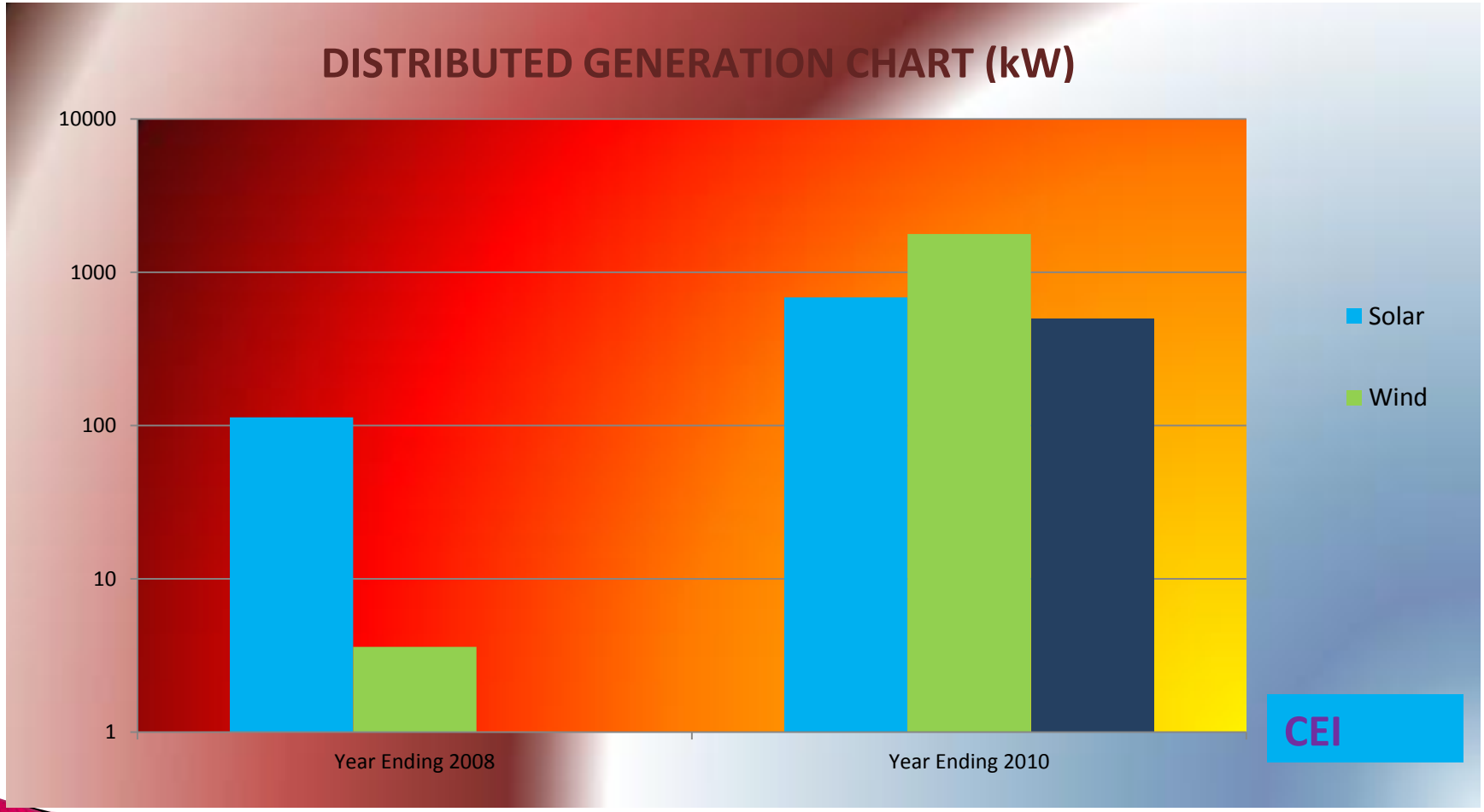
Columbus Southern Power



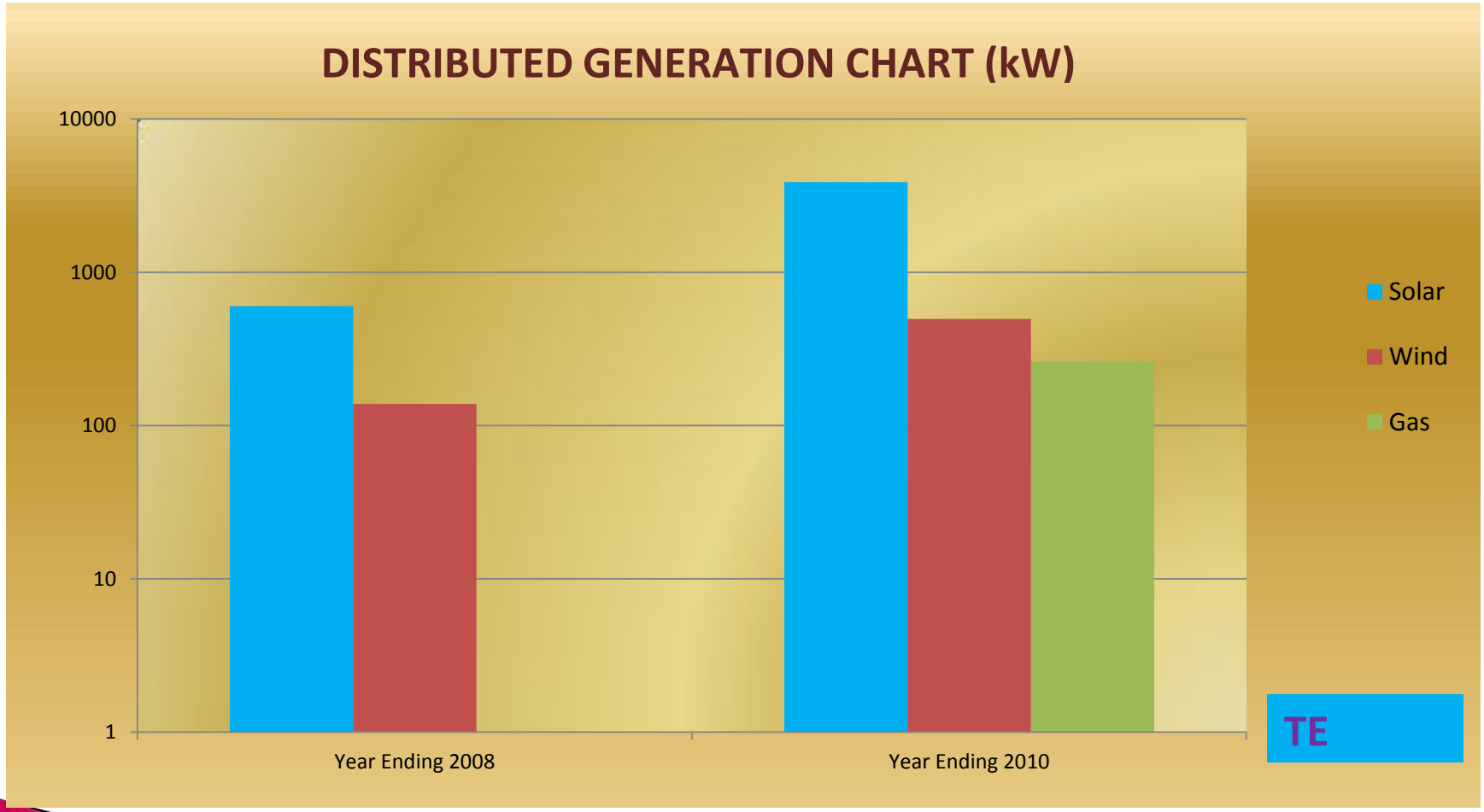
Ohio Power Company



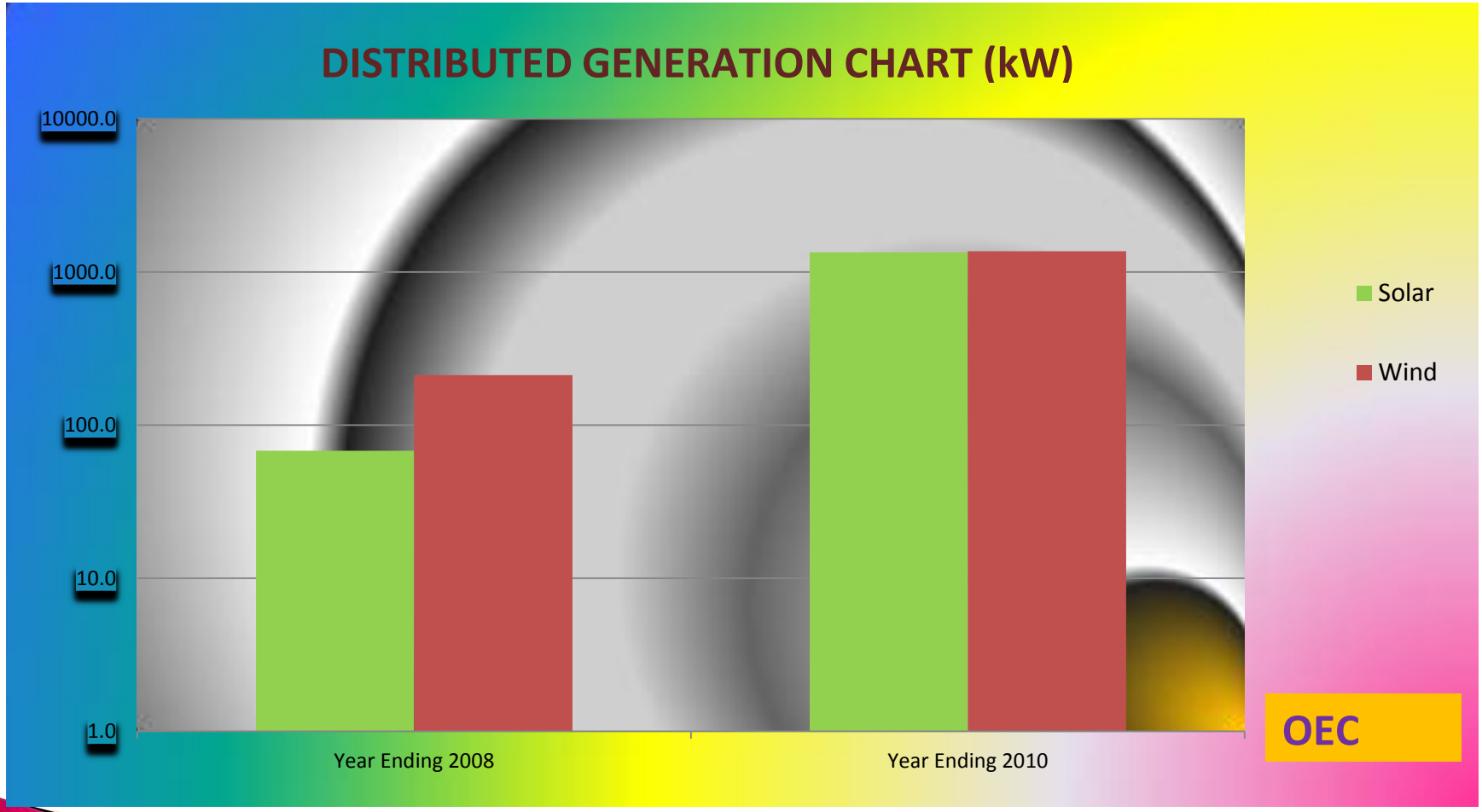
Cleveland Electric Illuminating



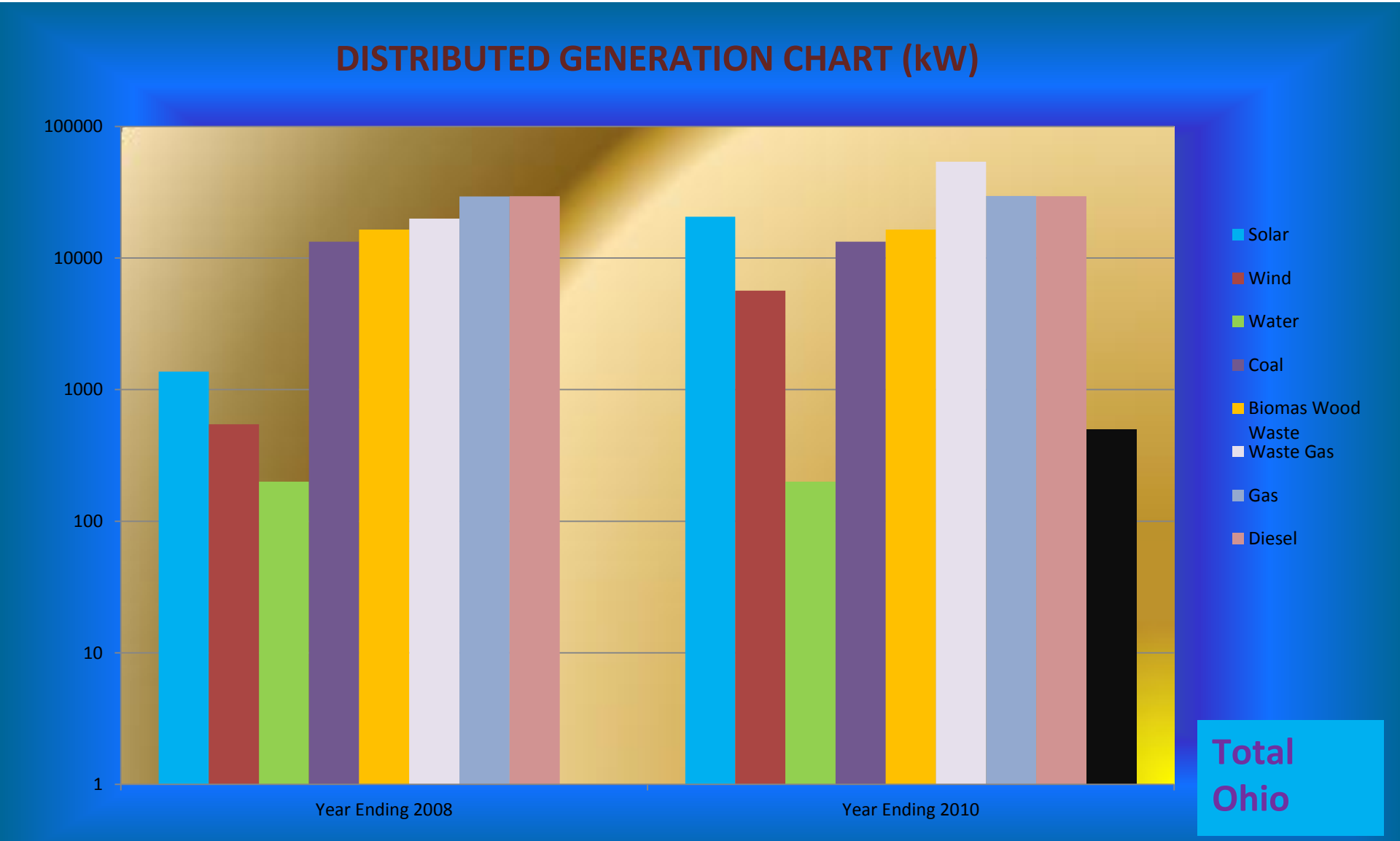
Toledo Edison

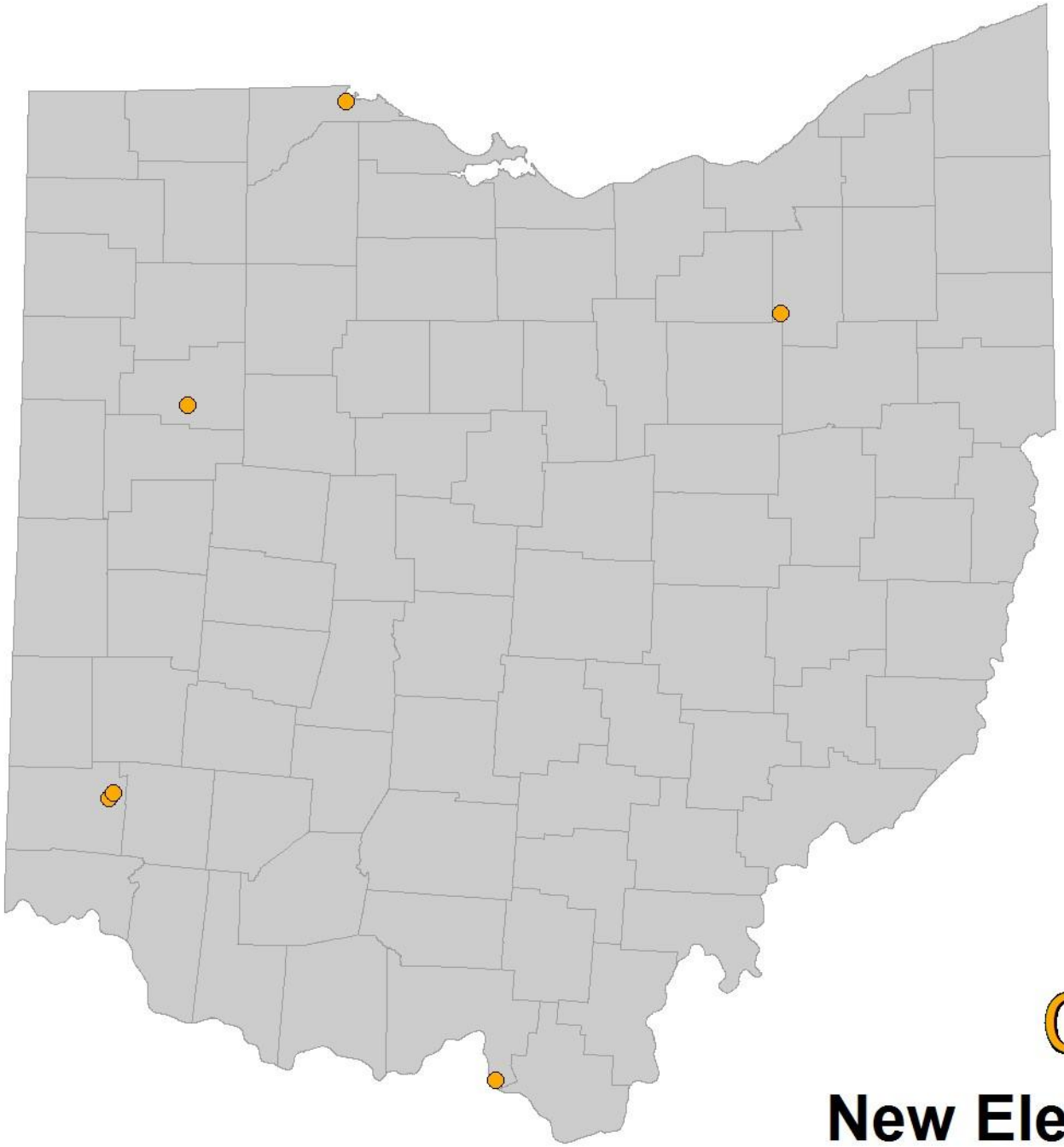


Ohio Edison


DISTRIBUTED GENERATION CHART (kW)
10000.0
1000.0
100.0
10.0
1.0
Year Ending 2008
Year Ending 2010
Solar
Wind
OEC

Total Ohio


DISTRIBUTED GENERATION CHART (kW)
100000
10000
1000
100
10
1
Year Ending 2008
Year Ending 2010
Solar
Wind
Water
Coal
Biomas Wood Waste
Waste Gas
Gas
Diesel
Total Ohio



Co-Gen/Other Plants

Includes constructed and pending facilities since 1998 with at least 50 MW of capacity

Co-Gen/Other

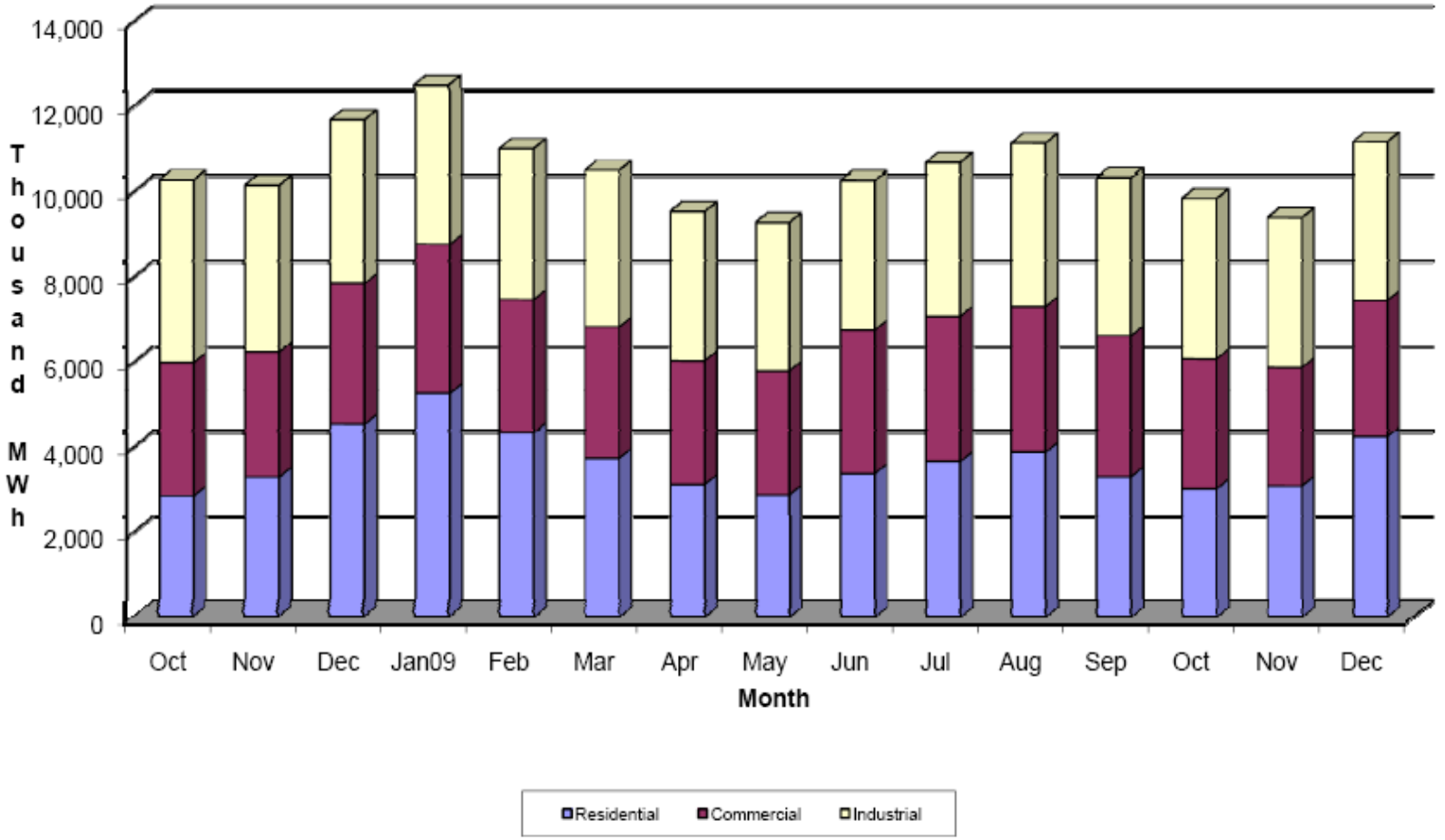
New Electric Generation

SB 221 (OAC 4901:1-39)

Energy Efficiency and Demand Reduction Benchmarks

- Establishes requirements and processes for determining specific benchmarks for energy efficiency and peak reduction programs
- Establishes energy usage and demand baselines for measurement of annual energy savings and demand reductions
- Provides mechanisms by which investments to achieve energy savings and demand reductions by mercantile customers in their own facilities can be recognized in electric utility programs as contributing to specific levels of energy savings and demand reductions.

Electricity Consumption in Investor-Owned Electric Utility Service Areas in Ohio
October 2008 – December 2009



Source: PUCO Form SE-1.

Energy Efficiency Requirement

- 22% + Reduction by 2025
- Could result in annual usage at 13.8 million mWh below 2007

Peak Demand Reduction Standard

- 7.75% by 2018
- Tariffs and Special Contracts available to commit the demand reduction
- Customers enrolled in RTO demand response programs are counted if customer commits the peak demand reduction

- Expectation that electric distribution utilities will implement cost-effective energy efficiency and peak demand reductions, recognizing that the S.B. 221 benchmarks establish a floor for what can be accomplished
- Adoption of the Total Resource Cost Test
- Allow banking of energy savings surplus to meet future energy efficiency or advanced energy benchmarks

- Each Electric Distribution Utility filed a report identifying the 2009 baselines and benchmarks
- Each Electric Distribution Utility filed a program portfolio plan for energy efficiency and peak reduction programs
- Upon approval of the program portfolio plan, an Electric distribution utility may seek cost recovery
- Each year, on April 15th, the Electric Distribution utility must file a portfolio status report that demonstrates its compliance status with its benchmarks and provides an assessment of its performance.

- Commission is to issue an annual verification report for the Electric Distribution Utility's achieved energy savings and peak demand reduction and potentially adopt modifications to the plans.

Merchantile Customer Application to Commit EE and PDR

Ohio Administrative Code 4901:1-39-05(F)

- Permits a merchantile customer to file individually or jointly with an electric utility, an application to commit the customer's existing demand reduction, demand response, and energy efficiency programs for integration with the utility's program
- Expectation the merchantile customers were to be exempt from the EE/PDR Rider of the tariff they are taking service
- Pilot Program adopted by the Commission for ease of application and administration

PILOT PROGRAM REQUIREMENTS

- Standardized application form
- If customer opts for cash rebate in lieu of an exemption from the rider, the application will be automatically approved on the 61st calendar day after filing
- Separate application for each customer program
- Confidential information is protected

Overall EEC case status:

Case Type	Cases Filed	Review Complete or Report Issued	In Process	Suspended
Auto	16	0	0	16
Auto	181	172	0	9
Standard	56	4	52	N.A.
Standard	351	306	45	N.A.

Chapter 4901:1-38 Reasonable Arrangements

- The purpose of this chapter is to facilitate the state's effectiveness in the global economy, to promote job growth and retention in the state, to ensure the availability of reasonably priced electric service, to promote energy efficiency and to provide a means of giving appropriate incentives to technologies that can adapt successfully to environmental mandates in furtherance of the policy of the state of Ohio embodied in section 4928.02 of the Revised Code.

Section 4905.31
Schedule or reasonable arrangement

Filed by

- company, OR
- merchantile customer

Provides Flexibility

Cost recovery for

- economic development/job retention
- revenue foregone from peak demand reduction/energy efficiency programs
- advanced metering/meter replacement

Financial Considerations

Incentives

- Ohio's leadership understands the significant and far-reaching benefits associated with the wise development of energy infrastructure within the state.
- To facilitate this objective, the state offers many incentives which could be applied to certain projects.

"The Puritan hated bear-baiting, not because it gave pain to the bear, but because it gave pleasure to the spectators." – *Thomas Babington Macaulay, History of England*

"I'm not a vegetarian because I love animals; I'm a vegetarian because I hate plants." – *A. Whitney Brown*

"Today I will drink until I see double, not because I am addicted to alcohol, but because I want to recycle two bottles." – *B. Lagowski and R. Mumma, Daily Negations*

Ohio Energy Incentives

- Federal tax credits; state RECs
- State Advanced Energy Fund: grants for renewable generation projects; funding taken out of electric ratepayer bills (AEP, DP&L, FE, Duke)
- Ohio Air Quality Development Authority: provides financing assistance, including state and federal tax incentives; issues project revenue bonds; finances power purchase agreements on a tax-exempt basis
- State/federal rules to promote grid interconnection

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Thanks!