

# The Role of the Regulator in the Promotion and Development of Renewable Energy

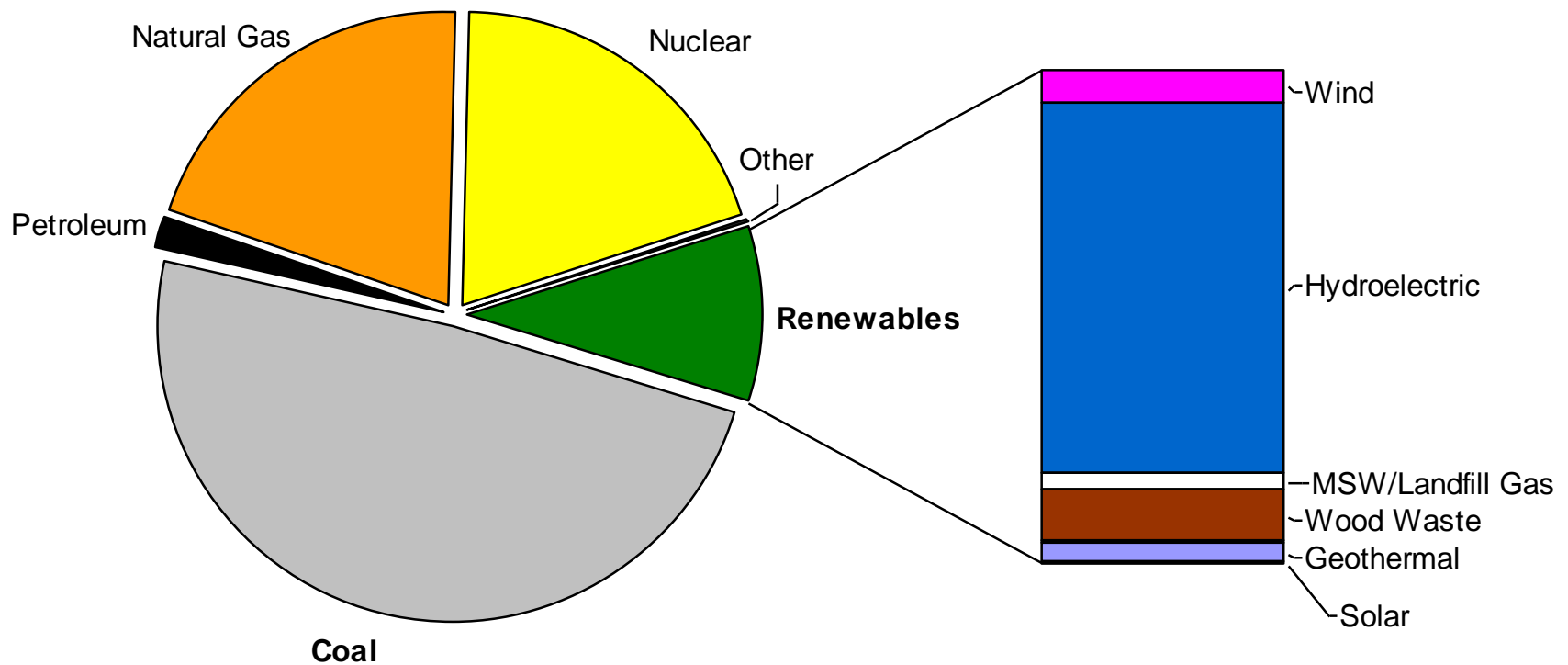
USA / Ohio

Guatemala Renewable Energy Forum

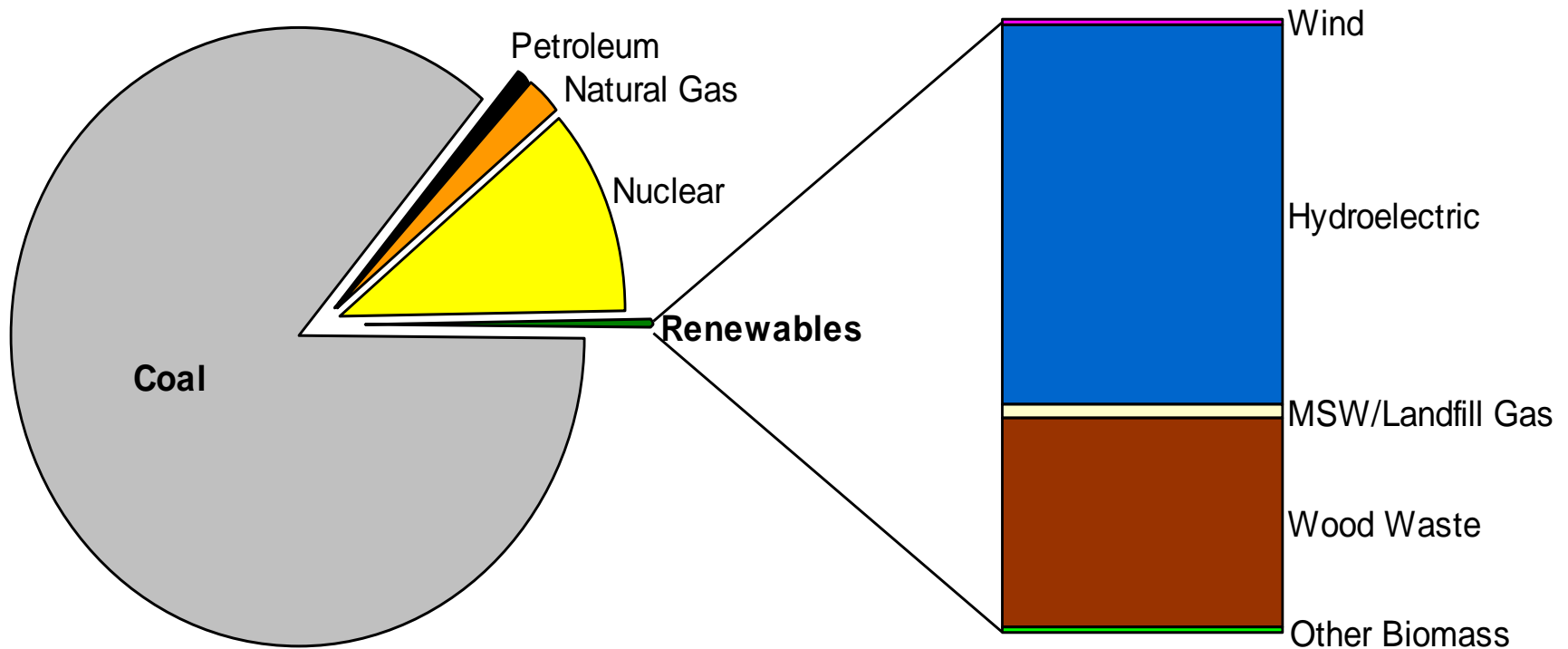
November 10, 2011

Tim Burgener, Public Utilities Commission of Ohio

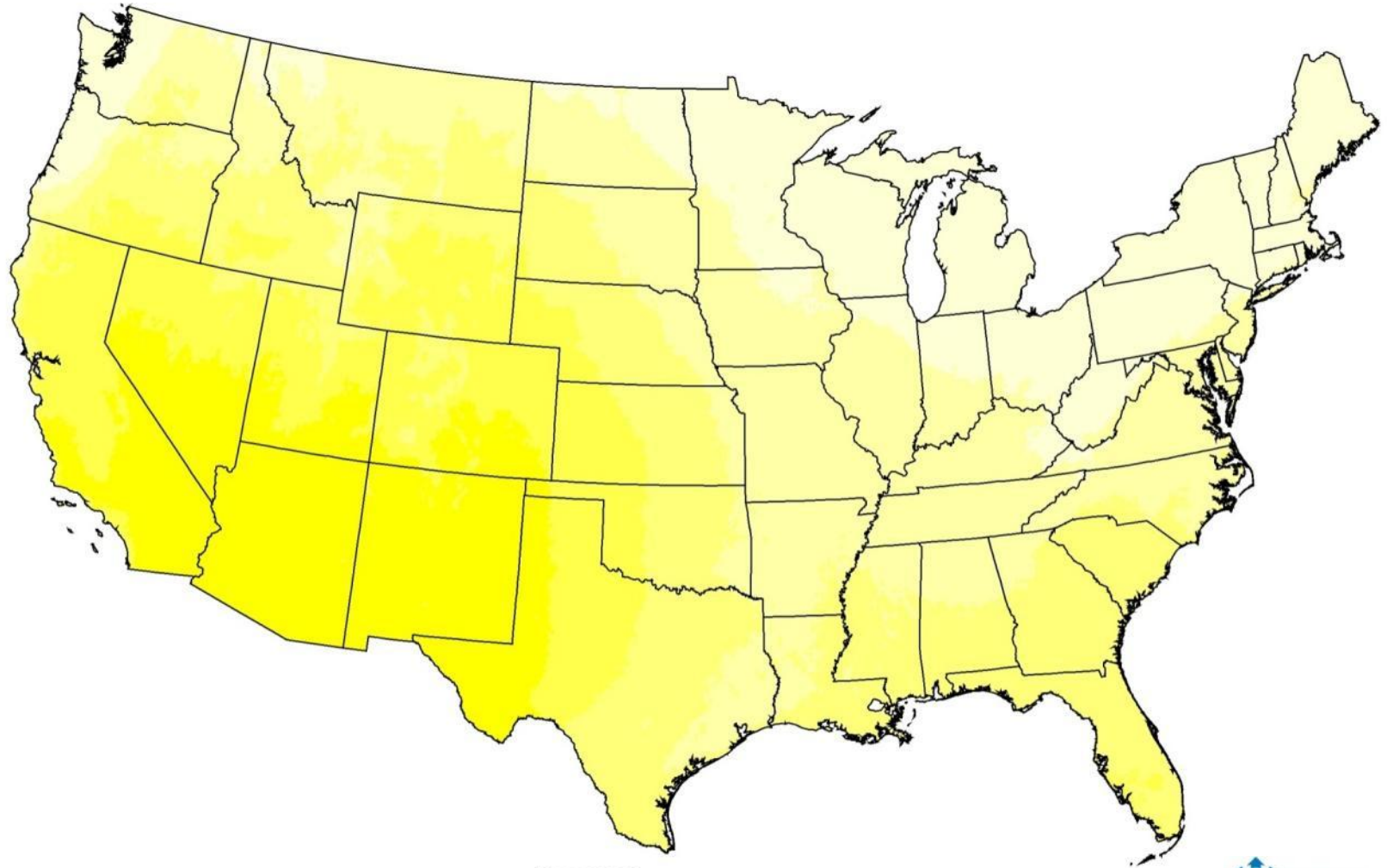
# U.S. Generation Resource Mix



# Ohio Generation Resource Mix



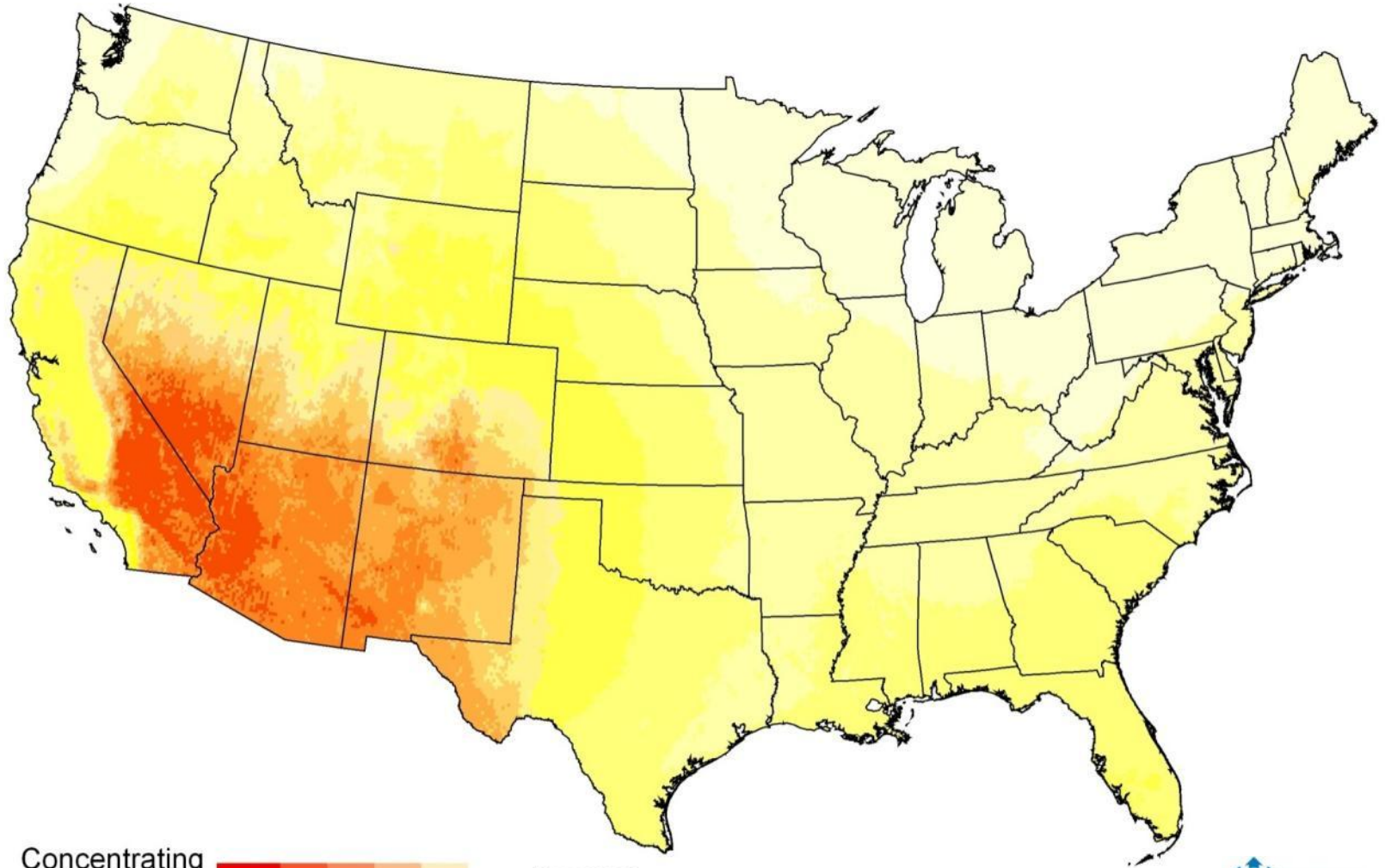
# U.S. Renewable Potential



## Photovoltaics

Resource  
Dark = Higher  
Light = Lower

# U.S. Renewable Potential



Concentrating  
Solar Thermal



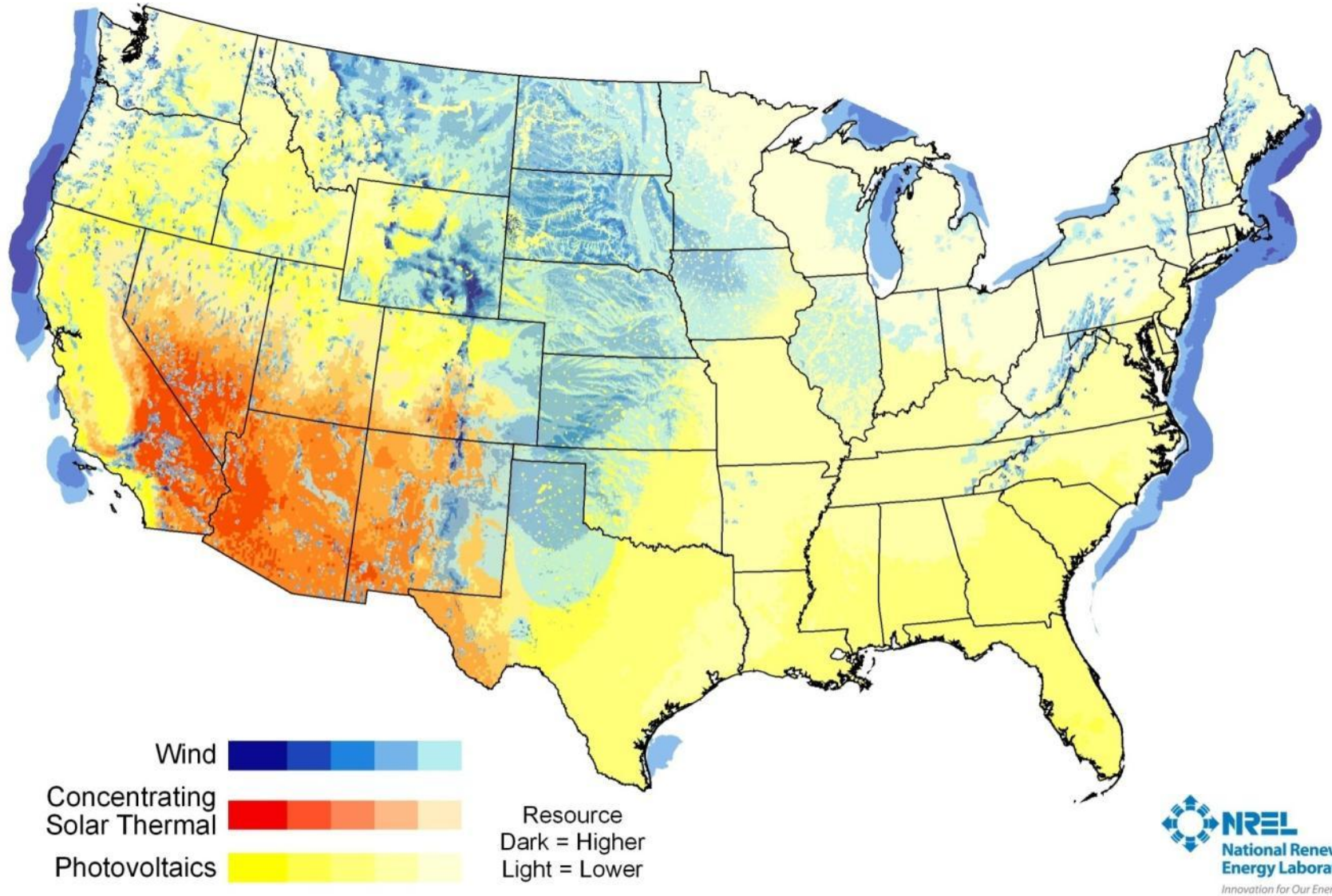
Photovoltaics



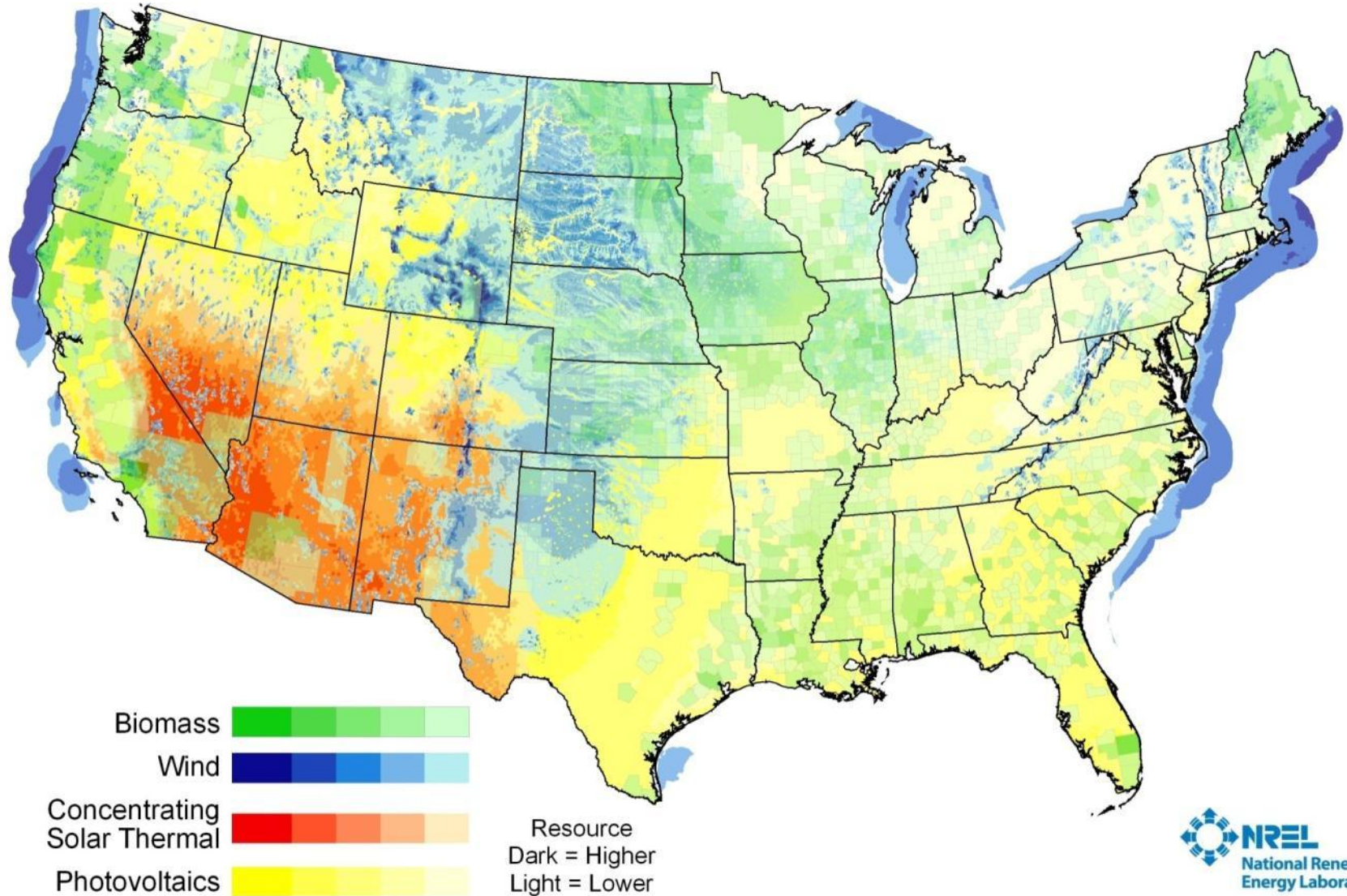
Resource  
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# U.S. Renewable Potential

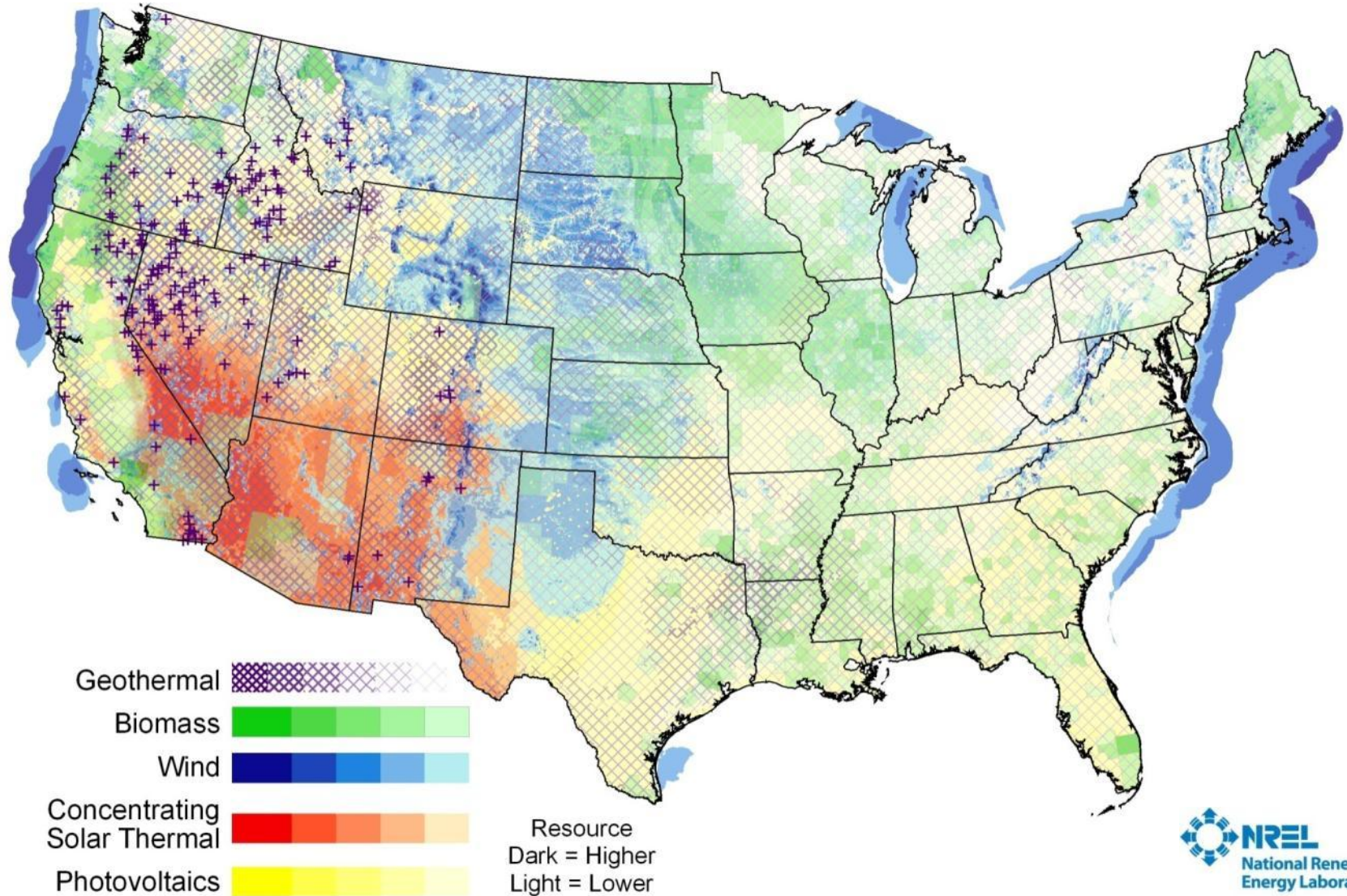


# U.S. Renewable Potential



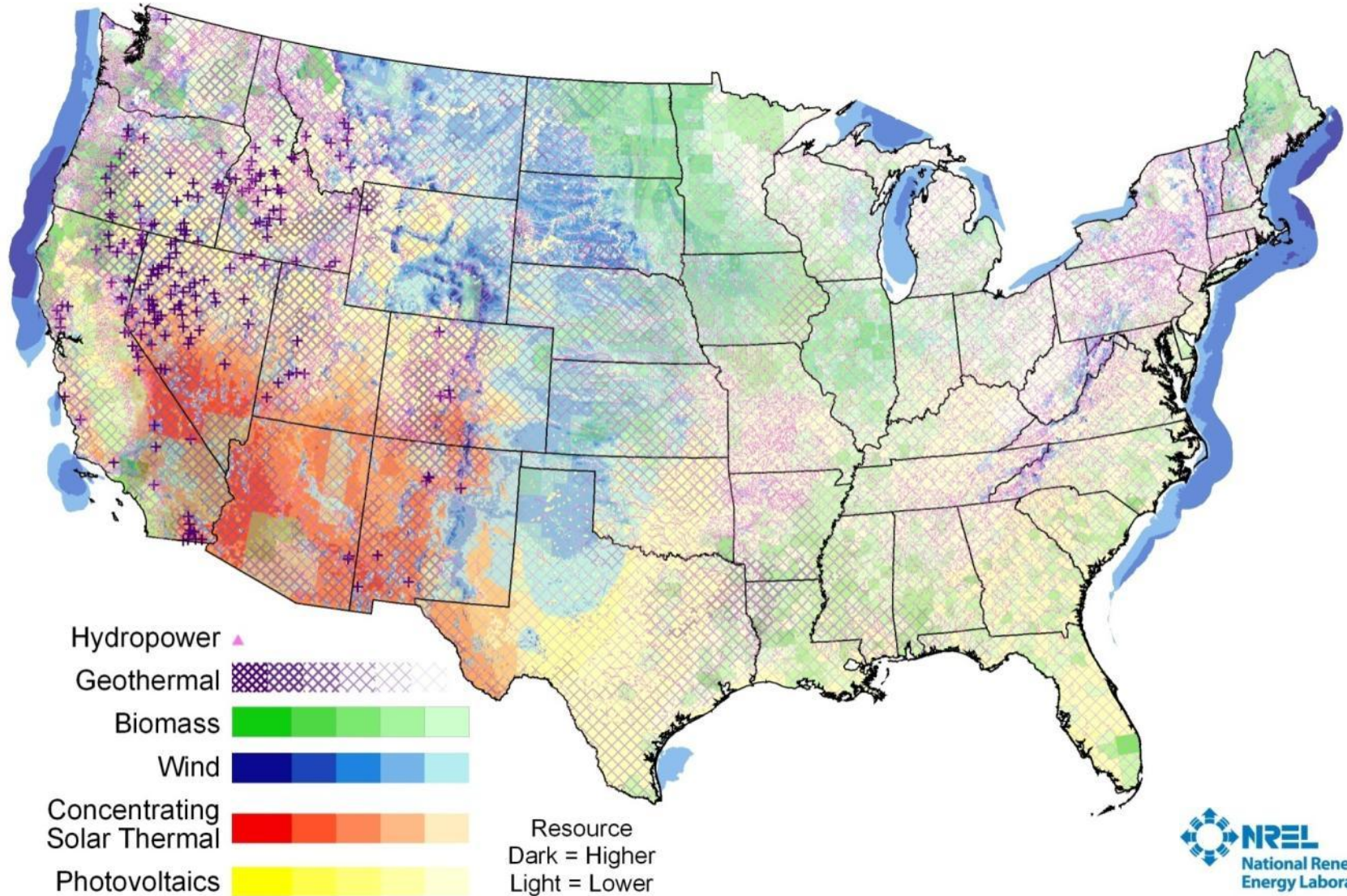


# U.S. Renewable Potential





# U.S. Renewable Potential



# U.S. Federal Renewable Incentives

## Renewable Electricity Production Tax Credit

Developers choose from 3 options:

- 1) Production tax credit of 2.2 cents per kWh for wind, geothermal, biomass, and 1.1 cents for landfill gas, solid waste, hydro; or,
- 2) Investment tax credit for up to 30% of cost; or,
- 3) Grant for up to 30% of cost

# U.S. Federal Renewable Incentives

## Modified Accelerated Cost-Recovery + Bonus Depreciation

- Corporate depreciation deductions for property investments in renewable energy systems
- Expires 2011 and 2012



# U.S. Federal Renewable Incentives

## Federal Rural Energy for America

- Competitive grants and loan guarantees for energy efficiency and renewable energy systems for farms or rural small businesses
- Grants for energy audits and renewable energy development assistance
- Energy project limits of 25% of costs (\$500,000)
- Loan guarantee maximum of \$25 million

# State Renewable Incentives

## Financial Incentives

- Personal, Corporate, Sales, Property Tax Credits
- Rebates, Grants, Loans, Bonds
- Manufacturing Industry Recruitment
  - May target specific industries
  - Sometimes tied to # of jobs created
- Performance-Based Incentive (\$/kWh produced)
- Public Benefits Funds – surcharge on electric bill

# State Renewable Incentives


## Policies & Standards - Regulation

- Green Power Choice / Fuel Disclosure
- Interconnection Standards
- Net Metering
- Renewable Portfolio Standards
- Construction Permitting Standards



# State Renewable Incentives

## Green Power Choice / Fuel Disclosure

- Customers may choose to buy a certain % of electricity from renewable sources
- Utilities may offer a voluntary “green price” to customers who choose to support renewable energy
- Facilities are certified as renewable by an independent party 
- Goal is to create market demand for renewables

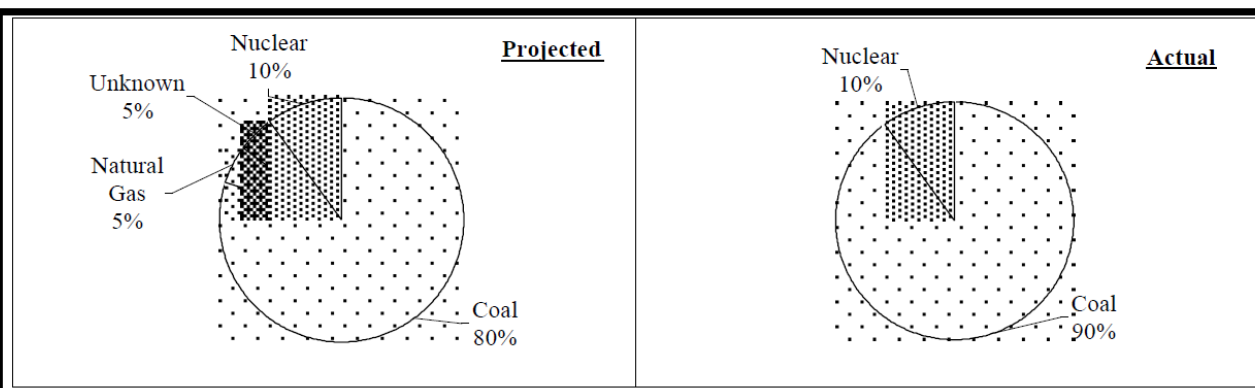
# Role of the Regulator in Ohio

## Ohio Electric Choice / Fuel Mix Disclosure

- Ohio has an open market for generation resources, giving consumers the choice of provider
  - PUCO certifies electric providers, including:
    - Aggregators (including government)
    - Brokers
    - Generation Providers and Marketers
- PUCO requires retail providers to disclose annual projection and quarterly report of fuel mix

### Generation Resource Mix -

A comparison between the sources of generation projected to be used to generate this product and the actual resources used during this period.



### Environmental Characteristics -

A description of the characteristics associated with each possible generation resource.

Biomass Power	Air Emissions and Solid Waste
Coal Power	Air Emissions and Solid Waste
Hydro Power	Wildlife Impacts
Natural Gas Power	Air Emissions and Solid Waste
Nuclear Power	Radioactive Waste
Oil Power	Air Emissions and Solid Waste
Other Sources	Unknown Impacts
Solar Power	No Significant Impacts
Unknown Purchased Resources	Unknown Impacts
Wind Power	Wildlife Impacts

### Air Emissions -

Product-specific projected and actual air emissions for this period compared to the regional average air emissions.



### Radioactive Waste -

Product-specific projected and actual radioactive waste for this period.

Type:	Projected Quantity	Actual Quantity	
High-Level Radioactive Waste			Lbs./1,000 kWh
Low-Level Radioactive Waste			Ft <sup>3</sup> /1,000 kWh

Note: The generation of this product used x% of Unknown Purchased Resources. The air emissions and radioactive waste associated with these unknown resources are not included in these charts.



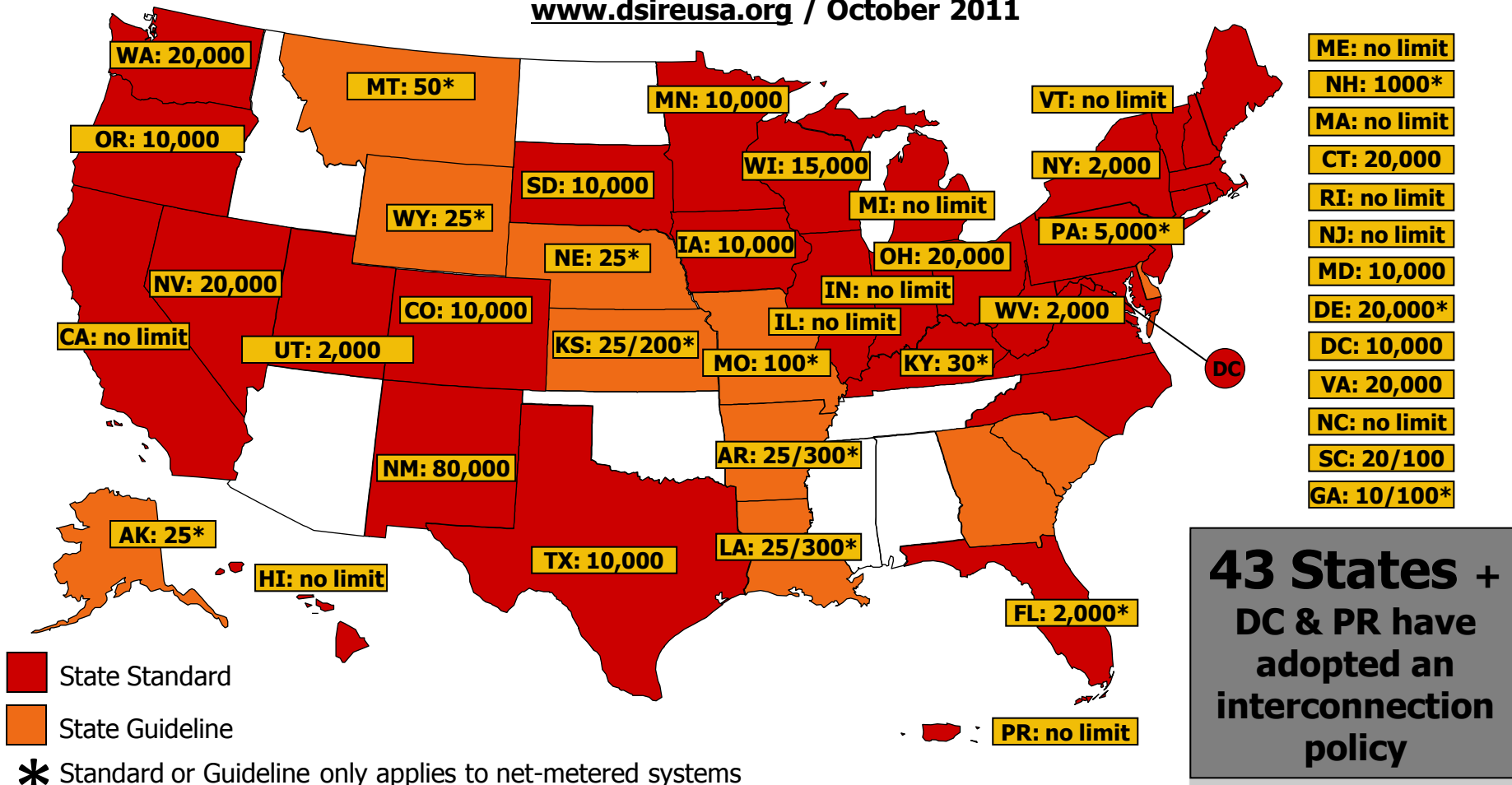
# State Renewable Incentives

## Interconnection Standards

- Technical & procedural process for connecting generation to the grid
  - States: connection to distribution
  - Federal: connection to transmission (FERC)
- Standards designed to create incentives, or at least a level playing field, for renewables and distributed generation

## Interconnection Policies

[www.dsireusa.org](http://www.dsireusa.org) / October 2011



**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.

# Role of the Regulator in Ohio

## Ohio Interconnection Standards

- Uniform, non-discriminatory process for generation up to 20 MW
- Level of review based on facility output
- PUCO provides guidance throughout interconnection application process
- Based on Institute of Electrical and Electronics Engineers (IEEE) Standard 1547

<http://www.puco.ohio.gov/puco/index.cfm/consumer-information/consumer-topics/generating-your-own-electricity-advice-for-getting-started/>

# Role of the Regulator in Ohio

## Ohio Interconnection Standards

- Reduce costs of equipment – standardized equipment is pre-approved
- Encourage development of distributed generation and renewables
- Support net metering, selling excess back to grid
- Streamlined, standardized process reduces costs of interconnection

# State Renewable Incentives

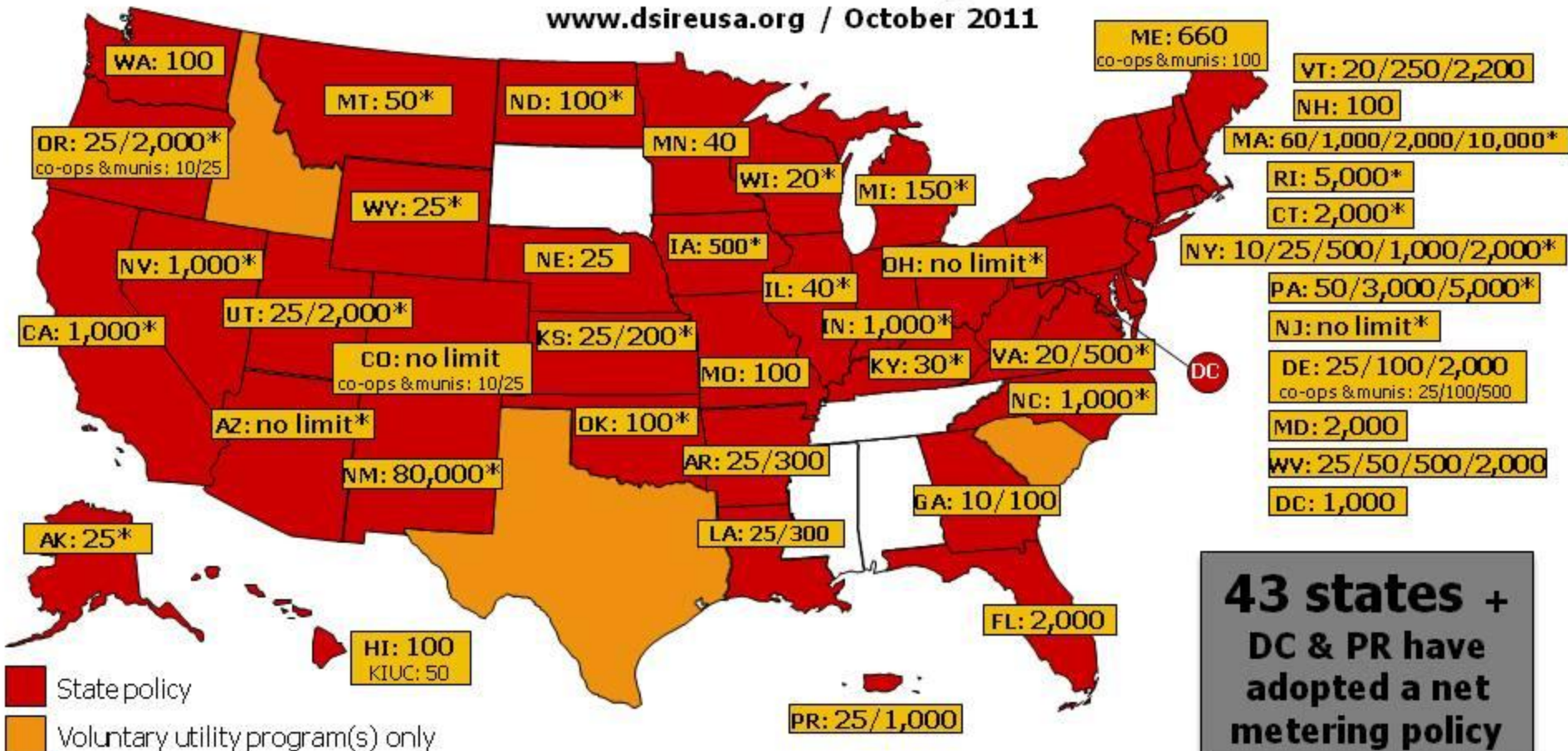
## Net Metering Standards

- Allows flow of electricity TO and FROM the customer / self-generator
- When generation exceeds consumption, the customer's bill is credited the difference
- Usually a single, bi-directional meter



## Net Metering

www.dsireusa.org / October 2011



**43 states +  
DC & PR have  
adopted a net  
metering policy**

\* State policy applies to certain utility types only (e.g., investor-owned utilities)

Note: Numbers indicate individual system capacity limit in kW. Some limits vary by customer type, technology and/or application. Other limits might also apply.

This map generally does not address statutory changes until administrative rules have been adopted to implement such changes.

# Role of the Regulator in Ohio

## Ohio Net Metering Standards

- Customers who generate power from renewable sources may return excess to the grid
- Receive a credit on their bill for electricity that flows back into utility system, based on unbundled generation cost/kWh
- System must be sized to customer requirements
- Must first sign an agreement with the utility for interconnection service

<http://www.puco.ohio.gov/puco/index.cfm/consumer-information/consumer-topics/generating-your-own-electricity-net-metering/>

# State Renewable Incentives

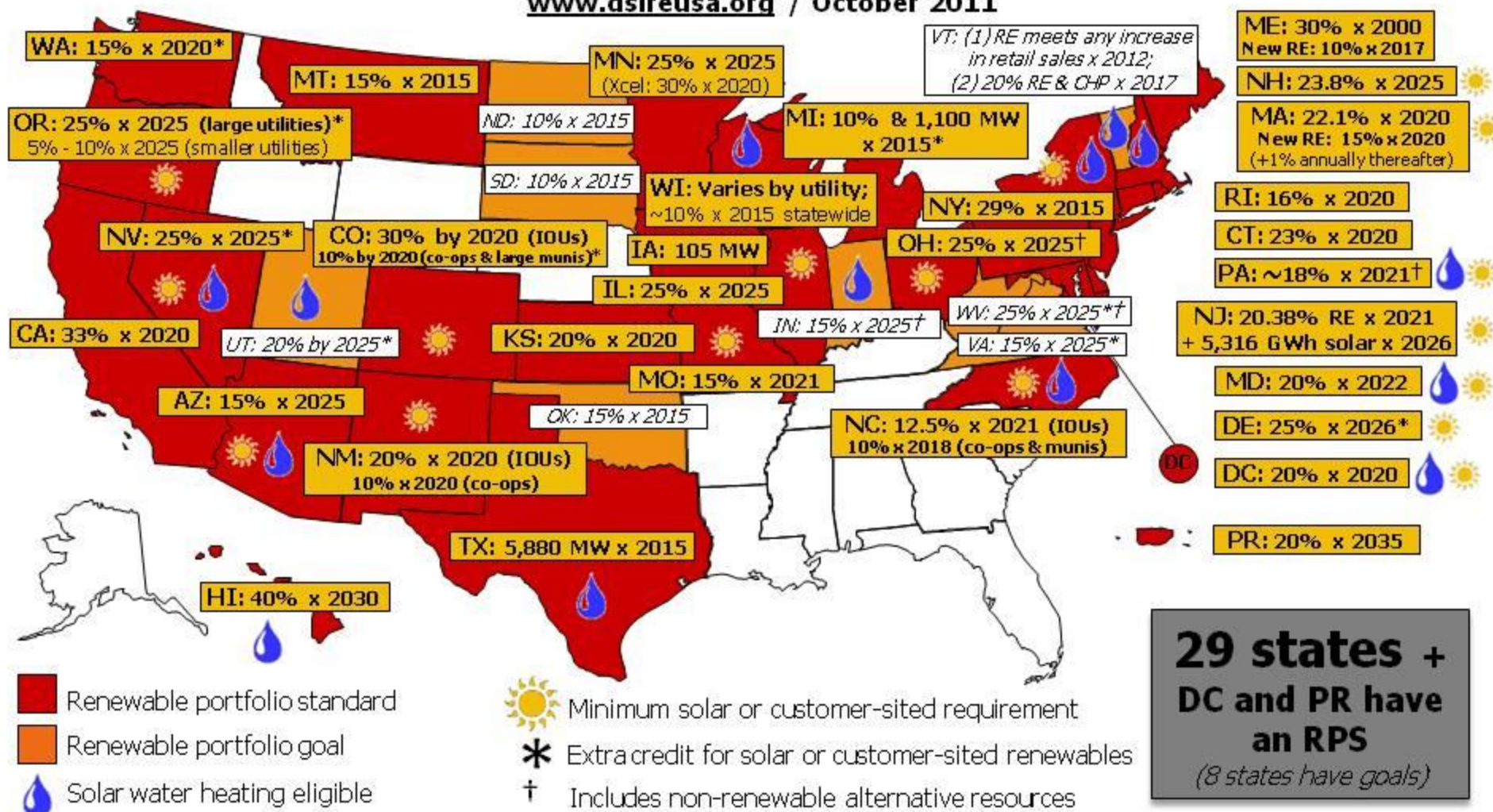
## Renewable Portfolio Standards

- Require utilities to use renewable energy
- Based on % of generating capacity or sales
- Often include a special requirement for specific technologies, usually solar
- Requirement increases gradually



## RPS Policies

[www.dsireusa.org](http://www.dsireusa.org) / October 2011



# Role of the Regulator in Ohio

## Alternative Energy Portfolio Standard (AEPS)

- Established by Legislature in 2008
- Applies to Ohio electric distribution utilities and competitive electric service companies
- PUCO established rules and implementation of the standard

<http://www.puco.ohio.gov/puco/index.cfm/industry-information/industry-topics/ohioe28099s-renewable-and-advanced-energy-portfolio-standard/>



# Ohio AEPS

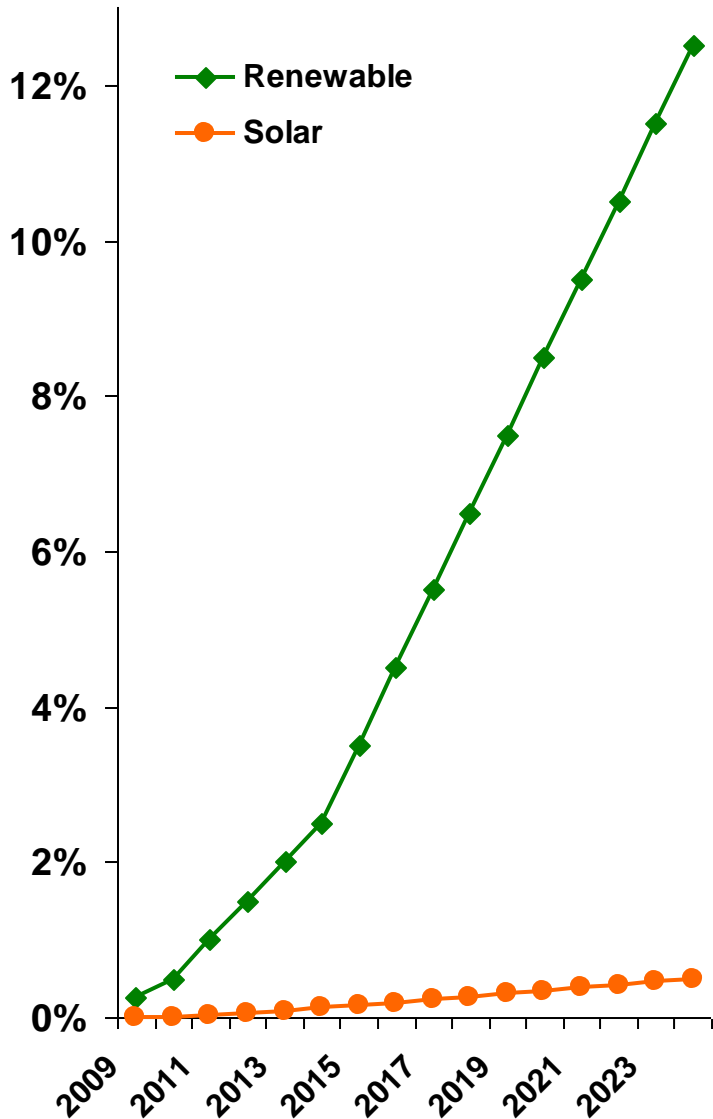
## 25% by 2025

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

# Ohio AEPS

- A minimum of  $\frac{1}{2}$  of the energy must come from **renewable** sources (12.5%)
- At least  $\frac{1}{2}$  of **renewable** sources must be located in Ohio (6.25%)
- A minimum of 0.5% from **solar** resources
- Out of state resources must be from contiguous states or shown to be deliverable to Ohio
- Facilities placed in service on 1/1/98 or later

# 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%

# Qualified Renewable Resources



Solar



Wind



Abandoned  
Coal Mine  
Methane



Storage



Hydro



Geothermal



Fuel Cells



Fuel Derived  
from Solid Waste



Biomass

# Ohio AEPS

## Compliance Procedures

- Utilities file annual compliance report
- Previous 3 years of sales used as baseline for calculating renewable energy requirement
- PUCO reviews compliance report and imposes penalties for non-compliance



# Ohio AEPS

## Penalties

- Alternative Compliance Payments (ACPs)
  - Assigned in the event of non-compliance
  - Cannot be recovered from ratepayers
  - Separate ACP for solar and non-solar
    - Solar: \$450/MWh, declines by \$50 annually
    - Other: \$45/MWh + Consumer Price Index adjustment
- Force Majeure excuses compliance
  - Good faith effort to acquire renewable generation has been unsuccessful

# Ohio AEPS

## Costs

- Costs are passed on to ratepayers
- Utilities must seek least cost alternative
- Price and purchase agreement may be disputed in rate proceedings
- 3% cost cap designed to limit the rate impacts

# Ohio AEPS

## Renewable Energy Credits (RECs)

- The environmental benefits associated with 1 MWh of electricity generated by a renewable energy resource
- RECs can be bought, sold, traded, banked
- May be purchased by utilities to comply with the renewable requirement of the AEPS
- PUCO certifies the facility that generates the REC as eligible for compliance with the AEPS

# Ohio AEPS

## Renewable Energy Credits (RECs)

- Can only be used once
- Good for 5 years from the transaction/sale date
- RECs are tracked by the Regional Transmission Operator in an online database

# Ohio AEPS

## Facility Certification

- Online application, no cost
- 60-day auto approval process
- Transparency: all applications can be viewed on PUCO website
- Required in order to be eligible for compliance with AEPS



# Ohio AEPS

## Facility Certification

- Requirements
  - (a) the resource or technology used at the facility must meet the definition of “renewable”
  - (b) the facility’s in-service date (1998 or later)
  - (c) electrical output is deliverable to Ohio
- For facilities above 6 kW, a utility-grade meter is required (2001 ANSI C12.1 standards)

# Ohio AEPS

## Facility Certification

- 3,603 certified facilities since 2009
- 3,508 of the facilities are solar
  - Small residential installations
- 3,053 MW total certified capacity
- 2,140 MW of the capacity is from wind
- Most facilities are outside of Ohio

# CERTIFIED RENEWABLE TOTALS

RESOURCE	CERTIFIED FACILITIES			CERTIFIED CAPACITY (MW)		
	TOTALS	Ohio	Other	TOTALS	Ohio	Other
BIOGAS - ANAEROBIC DIGESTION	6	3	3	6.3	3.5	2.8
BIOGAS - FOOD PROCESSING	3	3	0	2.5	2.5	0
BIOGAS - LANDFILL GAS	32	9	23	342.6	107.8	234.8
BIOMASS - WASTEWATER TREATMENT	1	1	0	0.3	0.34	0
BIOMASS - WOOD WASTE	1	1	0	177	177	0
BIOMASS - PAPER MANUFACTURING	4	3	1	**COFIRING**		
BIOMASS - UTILITY SCALE COFIRING	6	6	0			
COAL MINE METHANE	1	1	0	49	49	0
HYDROELECTRIC	3	1	2	123	1.1	122
SOLAR PHOTOVOLTAIC	3,508	441	3,067	114.3	38.0	76.3
SOLID WASTE	3	2	1	98	42.8	55
WIND	35	18	17	2,140	112.9	2,027.2
TOTALS:	3,603	489	3,114	3,053.0	534.9	2,518.2

# State Renewable Incentives

## Construction Permitting Standards

- State-level permitting of renewables
- Model ordinance for use by local government
- Caps on fees charged by local governments for permitting renewables

# Role of the Regulator in Ohio

## Ohio Power Siting Board

- Standard permitting process for
  - Any generation project of 50 MW or more
  - Electric transmission lines of 125 kV or more
  - Gas pipelines of 125 psig or more
- Ohio Power Siting Board has approved 17,000 MW of generation capacity since 1998

# Ohio Power Siting Board

- One-stop permitting process
- Timely action: approximately 6 to 12 months for applications, with statutory deadlines
  - Expedited schedules for smaller facilities
- Regulatory certainty: process is known and well practiced
- Sole jurisdiction: local and public participation welcome in the process, but sole decision rests with the Board

# Ohio Power Siting Board

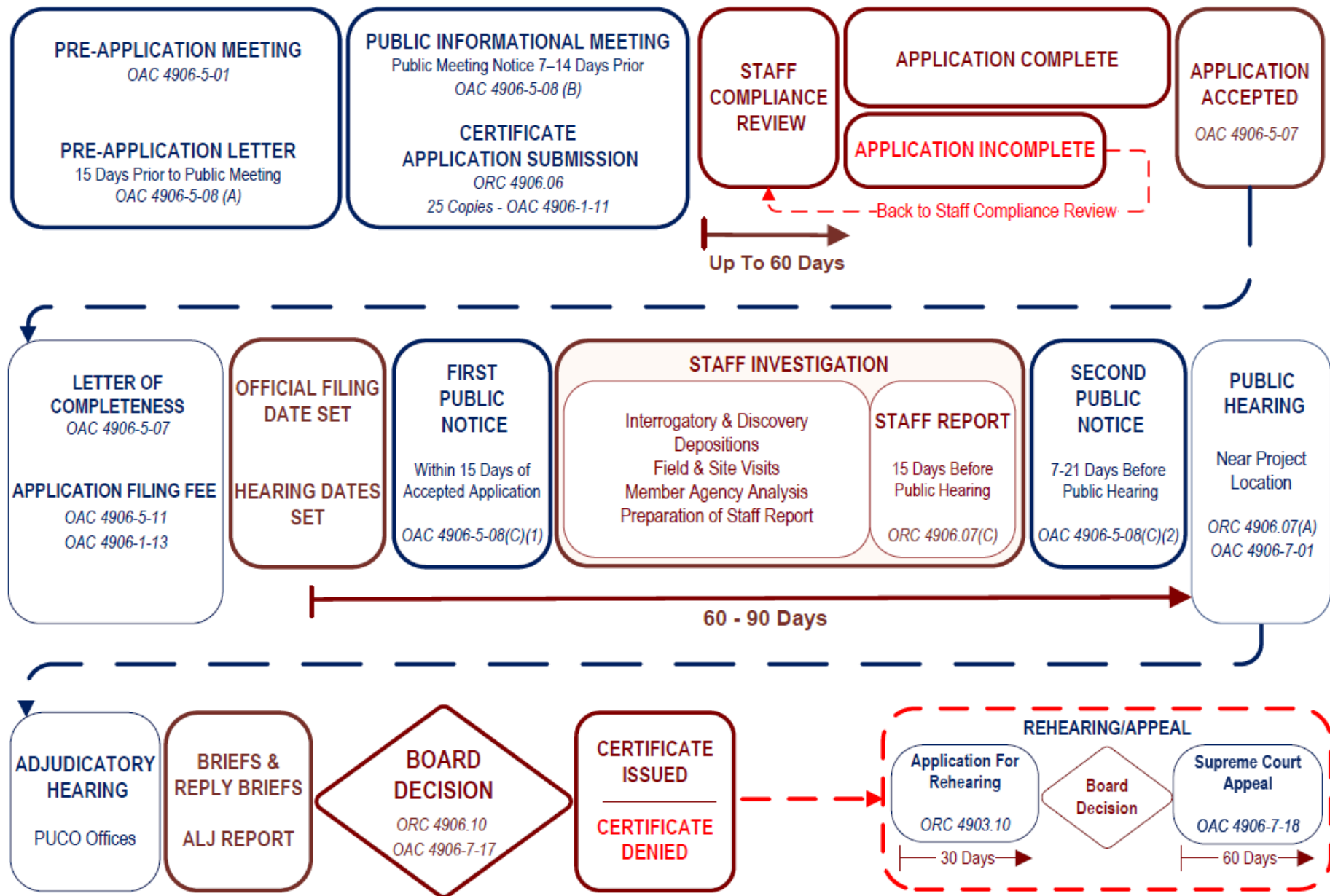
## Member Agencies

- Public Utilities Commission of Ohio - Chairman
- Ohio Environmental Protection Agency
- Ohio Department of Development
- Ohio Department of Health
- Ohio Department of Natural Resources
- Ohio Department of Agriculture
- Public Member
- Four Legislative Members



# OHIO POWER SITING PROCESS FLOWCHART

(Statute/Rule References and Select Blocks are Clickable Internet Links)



# Ohio Power Siting Board

## Decision Criteria

- The need for the (transmission) facility
- The probable environmental impact
- Whether the facility represents the minimum adverse environmental impact considering the available technology and the nature and economics of the various alternatives
- Compliance with all air and water pollution control, solid waste disposal, and aviation laws and regulations of the State

# Ohio Power Siting Board

## Decision Criteria

- Consistent with regional plans for expansion of the electric power grid, and the interests of electric system economy and reliability
- The facility meets the public interest, convenience, and necessity
- Minimal impact on agricultural lands
- Maximum water conservation practices

# Ohio Power Siting Board

## Wind Farm Permitting

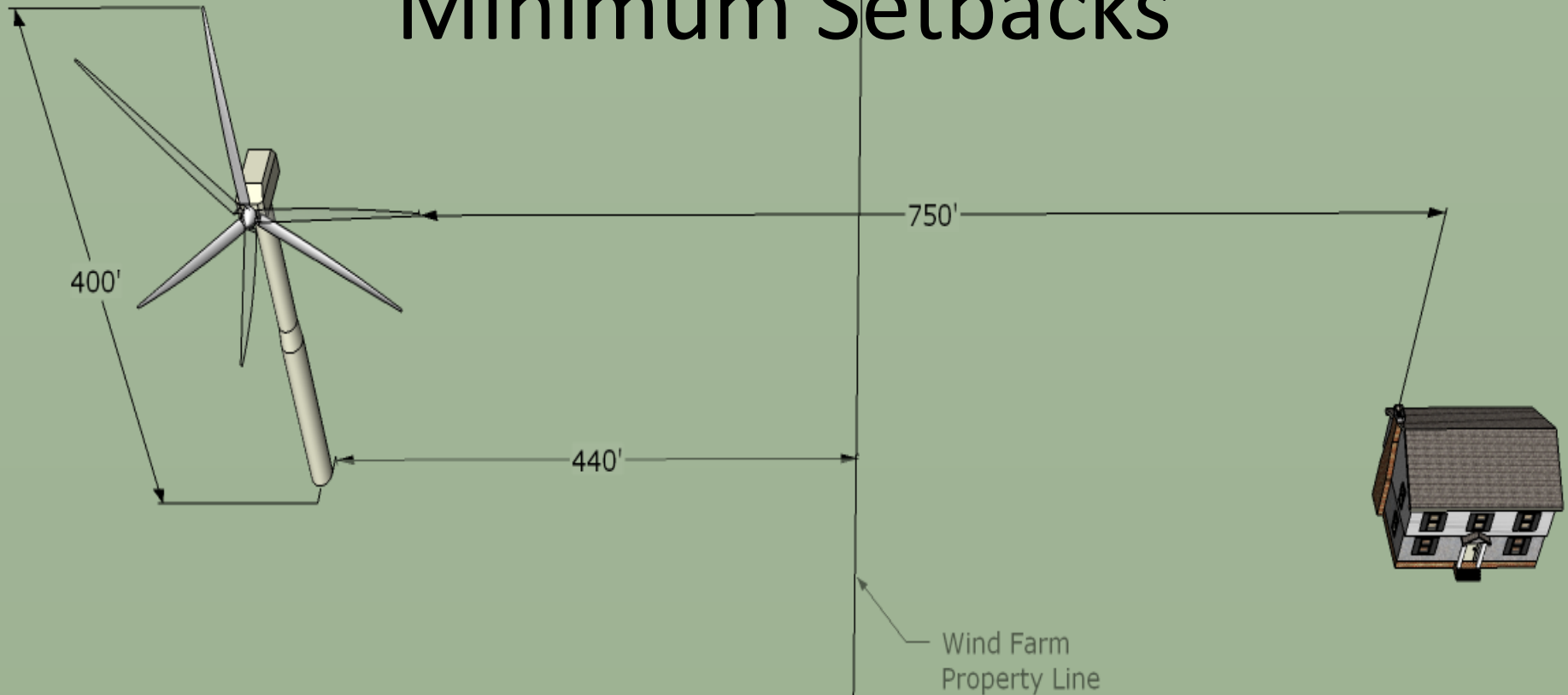
- After the AEPS was established, Ohio Power Siting Board jurisdiction was expanded to 5 MW and above for wind farms
  - Wind farm is defined by a single interconnection point to the grid
  - New permit rules were developed for wind farms to address specific issues
- Ohio Power Siting Board has approved over 1,000 MW of wind generation capacity since 2009

# Ohio Power Siting Board

## Wind Farm Permitting

- Specific requirements for
  - Wildlife protection
  - Ice throw
  - Blade shear
  - Shadow flicker
  - Noise
  - Communication and radar interference
  - Decommissioning
  - Setbacks (established by law)

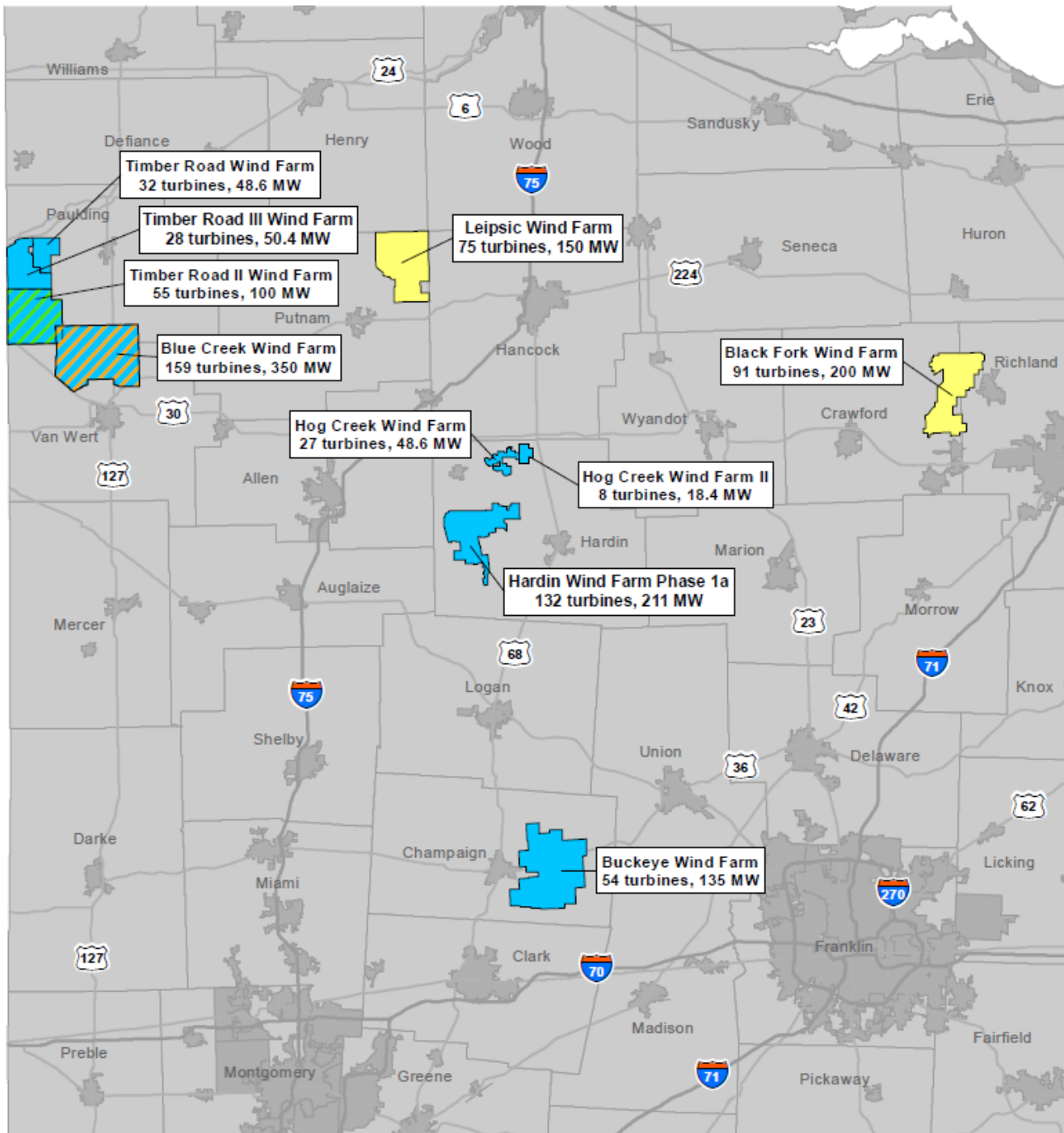
# Minimum Setbacks



1.1 times tip height  
from property line



750 feet from tip of  
horizontal blade to  
edge of residence

# Wind Power OPSB Cases






## Wind Project Areas

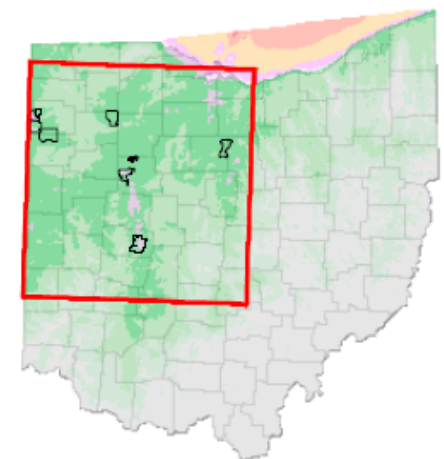
### Application Status

-  Pending
-  Approved

### Construction Status

-  Under construction
-  Operational

-  Populated Places



Wind Speed at 70 meters





