

West Virginia  
*Energy*

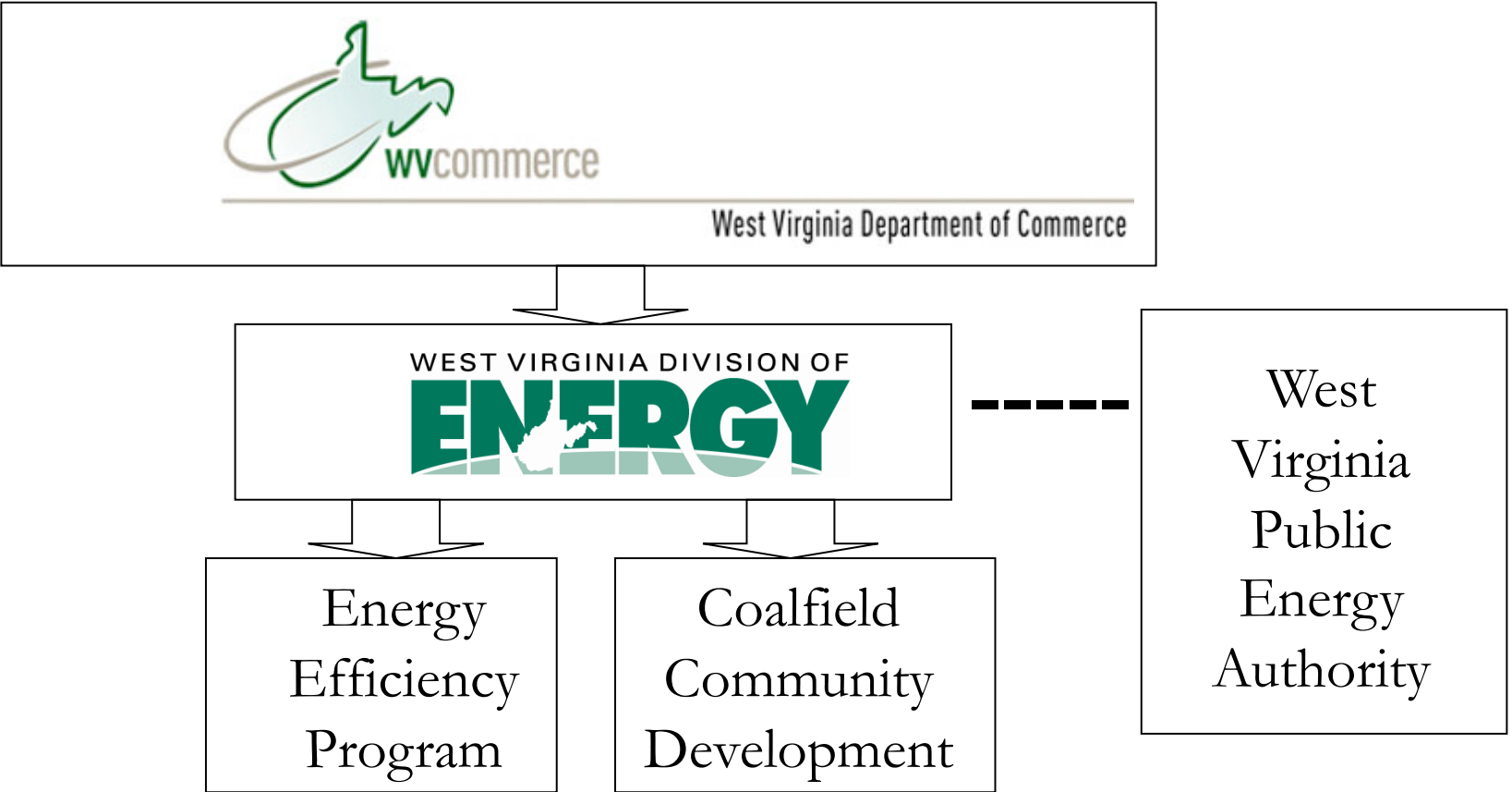


DIVISION OF ENERGY

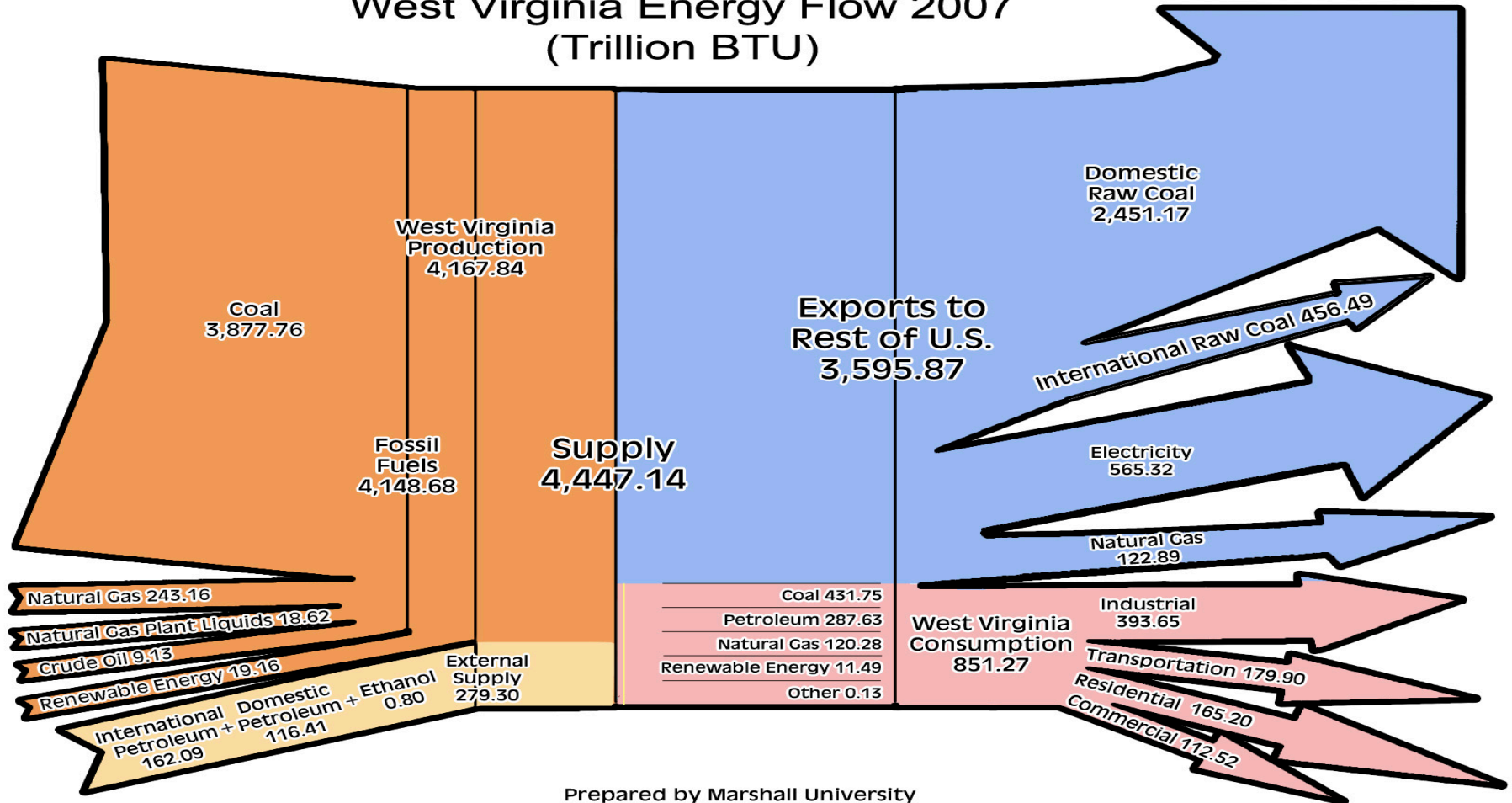


*West Virginia*  
WEST VIRGINIA

# Who We Are...



West Virginia Energy Flow 2007  
(Trillion BTU)



Prepared by Marshall University  
under contract to WV Division of Energy

WEST VIRGINIA INNOVATIVE  
ENERGY SUMMIT

October 19, 2006

Charleston, WV

Center for Business and Economic Research  
Marshall University

**Final report:**

Innovative Energy Opportunities in West Virginia  
(October 2006)

## West Virginia Energy Opportunities Document

### West Virginia Energy Opportunities

A Blueprint for the Future

Resources for Economic Growth and Energy Security



- The overall goal is to displace 1.3 billion gallons of oil by 2030. That figure represents 60% of our state oil use, our nation's current level of oil imports. Our savings are reflected in oil use reductions as well as enhanced resource development.
- Online at [www.energywv.org](http://www.energywv.org)

WVDOE developed with Gov. Manchin; public hearings Fall 2007

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Energy Opportunities

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“Our policy will include all forms of feasible energy technologies, from clean coal, to coal liquefaction, natural gas, biomass, hydrogen, hydro, wind and solar power. We can’t say at this time what the appropriate mix might be but we are committed to achieving a comprehensive energy policy and plan that is technically feasible, environmentally responsible & financially sound...”

## West Virginia's coal production and reserves

- 148 million tons produced annually; 87% exported
- 3<sup>rd</sup> in the United States in production
- Reserves at 32 billions tons
- Estimated 1.4 trillion cubic feet of recoverable coalbed methane

## Advanced coal technology announcements

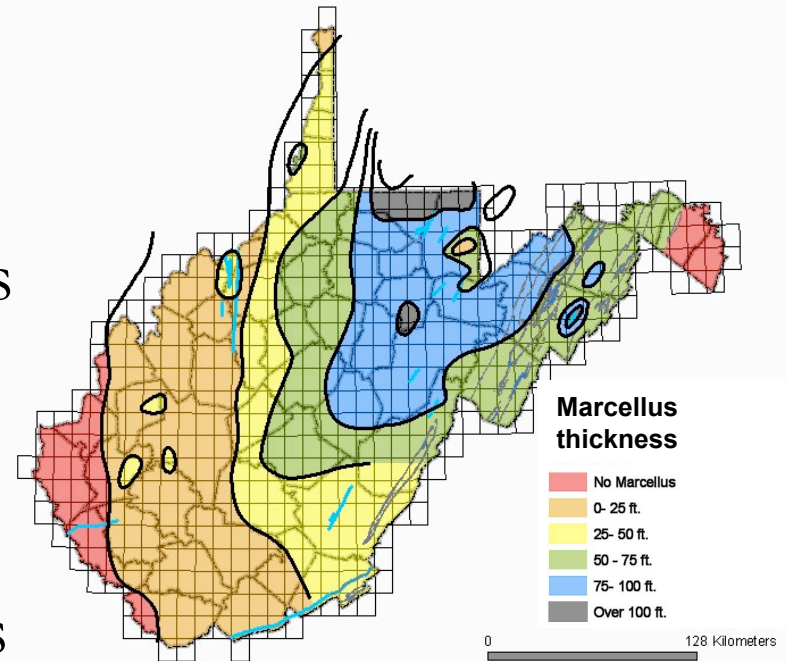
- WVDEP issues first carbon dioxide sequestration permit at Mountaineer Plant (Mason County)
- IGCC project at Mountaineer Plant
- TransGas Development Systems LLC (Mingo County): \$3 billion coal-to-liquids plant operational by 2013; 3 million tons of coal annually; more than 6.5 million barrels of gasoline
- CONSOL project (Marshall County): Coal converted to synthetic gas for 720,000 metric tons (annual) of methanol or converted to gasoline

## West Virginia's natural gas production and storage

- 197 billion cubic feet annual production
- 15<sup>th</sup> in the nation/4<sup>th</sup> in the east
- 50% of natural gas produced is exported
- 7<sup>th</sup> in the nation in underground storage capacity at 512 billion cubic feet (6% of U.S. total)

## Marcellus Shale

- Variable depth and thickness
- Technology-driven: horizontal drilling
- Steep learning curve accomplished when gas prices were high
- Technologies optimized now when gas prices are lower so per/well costs are decreasing
- Economics drive development: Wells cost millions but yield high volumes
- Large companies now drawn to state's existing infrastructure and great location

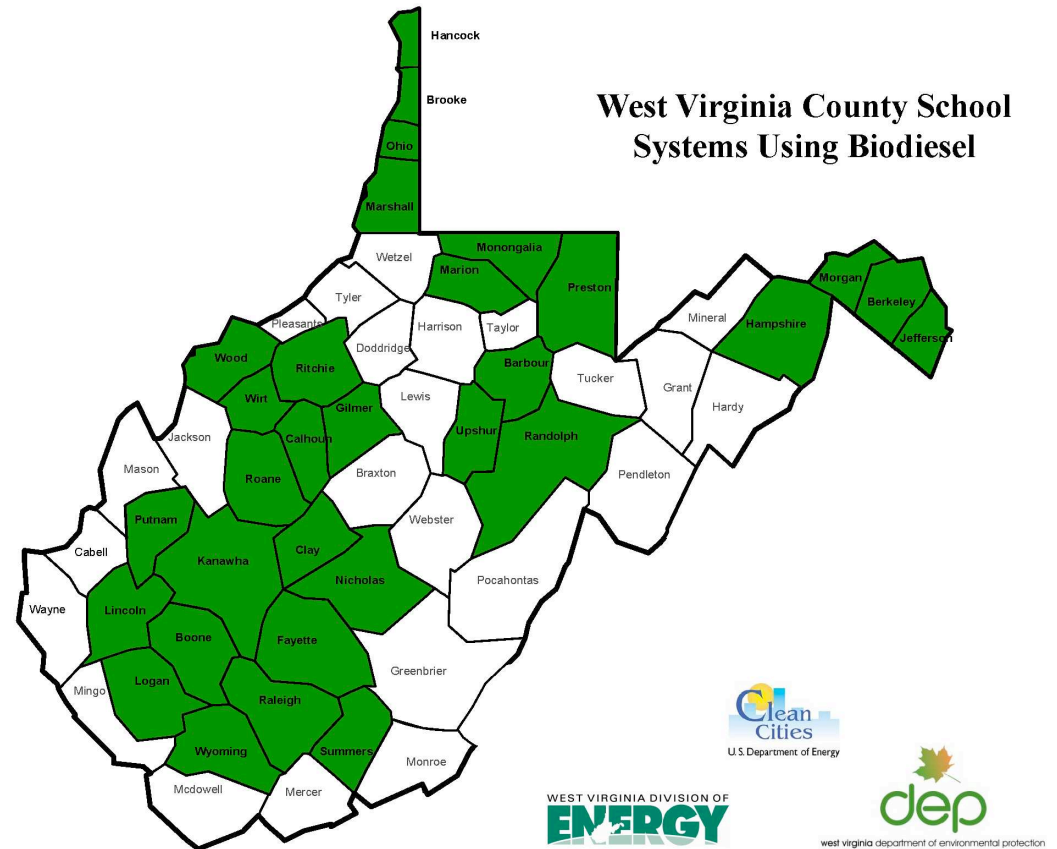


## Woody biomass

- West Virginia second most forested state in lower 48 states
- Annual Wood Residue Production in WV (2006)
  - 1.34 million dry tons of logging residue (55%).
  - 941,888 dry tons of mill residue (39%).
  - Urban tree and pallet residues (6%)
  - Total - 2.41 million dry tons
- Potential energy markets include chemical, fuel and electrical generation

## Alternative fuels

- AC&S of Nitro is a state biodiesel refiner
- 31 county school systems use biodiesel in their fleets
- 6 public retail stations: 2 biodiesel; 2 E85; 1 propane; 1 hydrogen



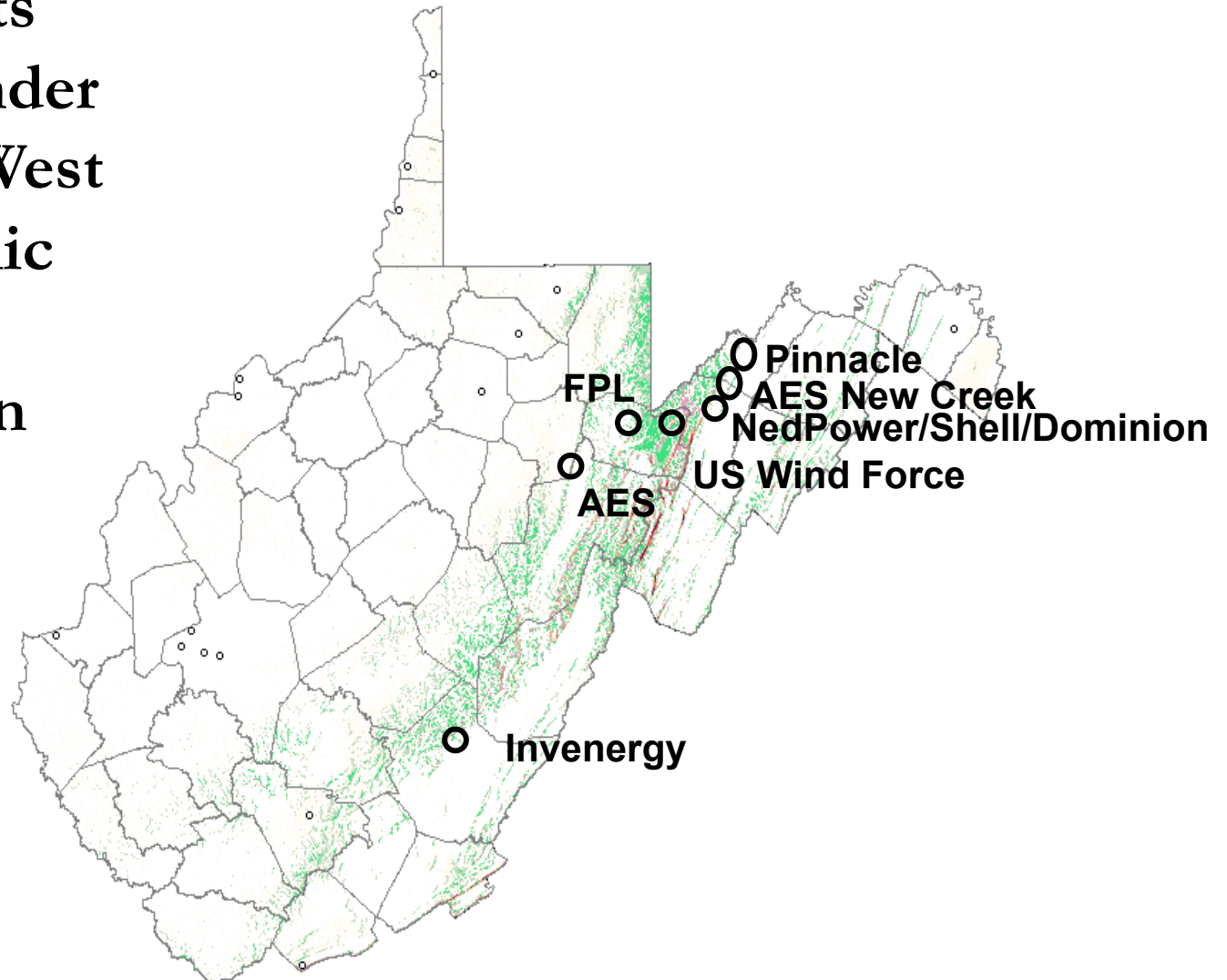
## Ethanol mandate

- Energy Independence and Security Act (EISA) expands the Renewable Fuel Standard to 36 billion gal/yr of renewable fuel by 2022
- Corn ethanol limited to 15 billion of 36 billion gallons in 2022
- Remaining 21 billion gallons is advanced biofuels such as cellulosic ethanol from switchgrass, wood
- Biodiesel must be at least 1 billion gallons in 2022
- 1/3 of current U.S. corn crop now goes for 8 billion gallons of ethanol

## Hydroelectric energy

- 264 MW of hydroelectric power operating
  - London/Marmet, Kanawha River
  - Winfield, Kanawha River
  - Millville, Shenandoah River
  - Lake Lynn, Monongahela River
  - Hawks Nest & Glen Ferris, New River
  - Dam No. 4 Hydro Station, Potomac River
  - Dam No. 5 Hydro Station, Potomac River
  - Racine L & D, Ohio River
  - New Martinsville, Ohio River
  - Belleville, Ohio River
  - Summersville, Gauley River
- FERC has preliminarily licensed 127 MW more
- Additional projects in planning stages

Wind projects  
approved or under  
review by the West  
Virginia Public  
Service  
Commission

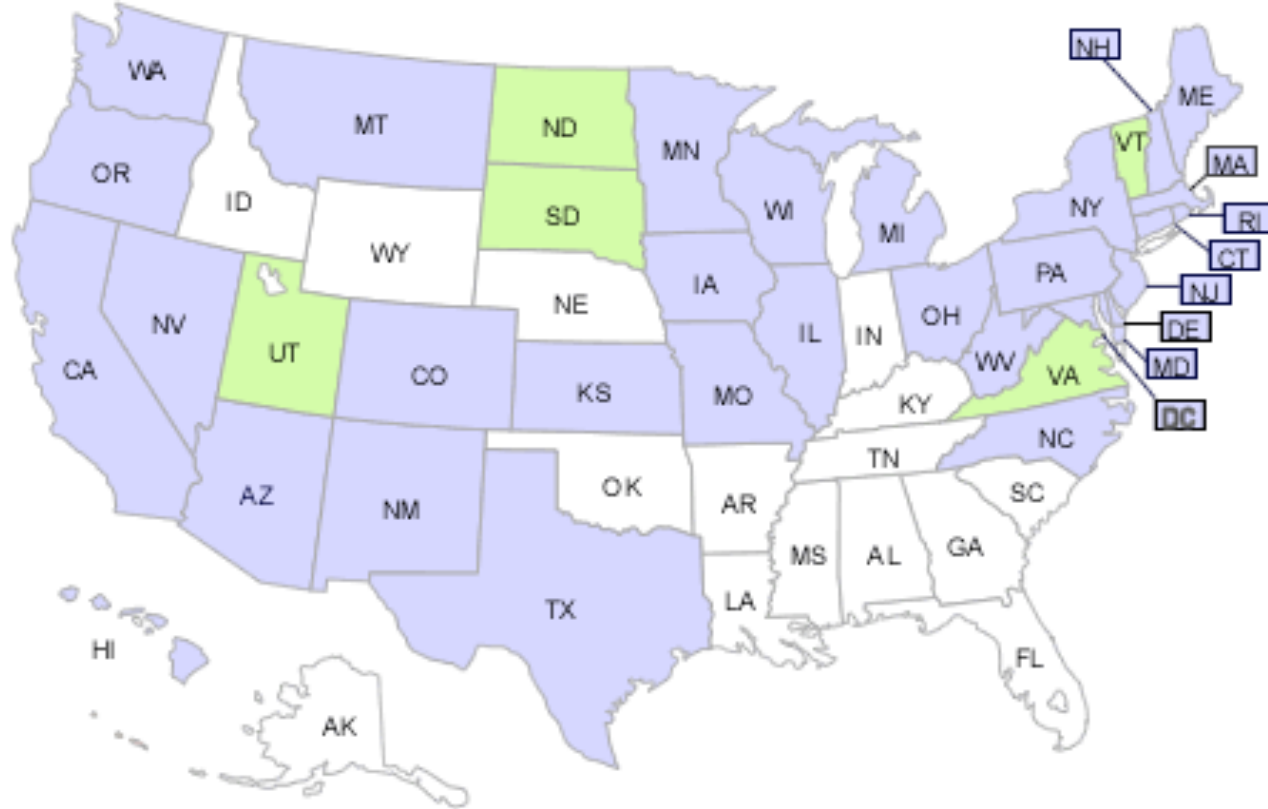


## Wind project development in West Virginia, 2009

- **Operational wind projects (330 MW)**
  - Shell Wind Energy/Dominion/Nedpower (Mount Storm) 264 MW
  - Florida Power and Light (WV Wind Energy Center) 66 MW
- **Permitted wind projects (461 MW):**
  - Invenergy ( Beech Ridge) 186 MW
  - US Wind Force (Mt. Storm) 150 MW
  - AES Corp. (Laurel Mountain) 125 MW
- **Projects before the WVPSC**
  - AES (New Creek) 165 MW
  - US Wind Force – (Pinnacle) 55 MW

**Policy Impacts:  
West Virginia's Alternative and  
Renewable Portfolio (ARPS)**

# States with Renewable/Alternative Portfolio Standards



West Virginia has nearly 1,100 mw in renewable energy generation certified in the PJM Grid for states with RPS programs

WV Plant	Fuel types	Nameplate
London L&D	Water	13.2
Marmet L&D	Water	14.4
Winfield L&D	Water	14.7
Summersville Lake	Water	80
Albright	Bit, Wd	140
Lake Lynn	Water	51.2
Willow Island	Bit, TDF, Wd	163
Mountaineer Wind	Wind	66
Nedpower	Wind	264
AP Hydro	Water	6
Grant Town	W. Coal	96
New Martinsville	Water	34
Morgantown Energy Associates	W. Coal, Bit	69
North Branch	W. Coal	80
<b>TOTAL</b>		<b>1091.5 mw</b>

## West Virginia Alternative and Renewable Portfolio (ARPS)

- Supports new electricity fuels for W.Va. utilities
  - Advanced coal: reduced emissions
  - Renewable energy: wind, solar, geothermal, etc.
  - Energy efficiency: waste heat recovery, demand response, on-site generation, etc.
- Targets
  - 10 percent by 2015
  - 15 percent by 2020
  - 25 percent by 2025

## West Virginia ARPS definitions

- **Utilities** - any electric distribution or electric generation supplier that sells electricity to retail customers in this state. Excludes:
  - Electric cooperatives
  - Municipally-owned electric
  - Utilities serving less than 30,000 residential customers.
- **Credits** - system of tradeable units to establish, verify and monitor the generation and sale of alternative and renewable electric. Operated by WV PSC

## ARPS fuel definitions

Alternative energy resources :

- (A) Advanced coal technology;
- (B) Coal bed methane;
- (C) Natural gas;
- (D) Fuel produced by a coal gasification or liquefaction facility;
- (E) Synthetic gas;
- (F) Integrated gasification combined cycle technologies;
- (G) Waste coal;
- (H) Tire-derived fuel;
- (I) Pumped storage hydroelectric projects;
- (J) Recycled energy
- (k) Any other resource, method, project or technology certified by the commission

## ARPS fuel definitions

Renewable energy resources:

- (A) Solar photovoltaic or other solar electric energy;
- (B) Solar thermal energy;
- (C) Wind power;
- (D) Run of river hydropower;
- (E) Geothermal energy,;
- (F) Biomass energy
- (G) Biologically derived fuel including methane gas, ethanol not produced from corn, or biodiesel fuel;
- (H) Fuel cell technology;
- (I) Any other resource, method, project or technology certified by the commission.



## American Recovery and Reinvestment Act/ State Energy Program

**West Virginia funding: \$32,746,000**

- Energy-efficiency in state buildings
- Green-collar job training
- Program administration



## American Recovery and Reinvestment Act/ Energy Efficiency and Conservation Block Grant

**West Virginia funding: \$9,593,500**

- **Local Government Grant Program: \$8,962,769**
- **Building Energy Collaborative: \$240,570**
- **WVU Industrial Assessment Center: \$200,000**
- **Program administration: \$190,161**

## QUESTIONS?

West Virginia Division of Energy

(304) 558-2234

[www.energywv.org](http://www.energywv.org)