

West Virginia *Energy*



DIVISION OF ENERGY



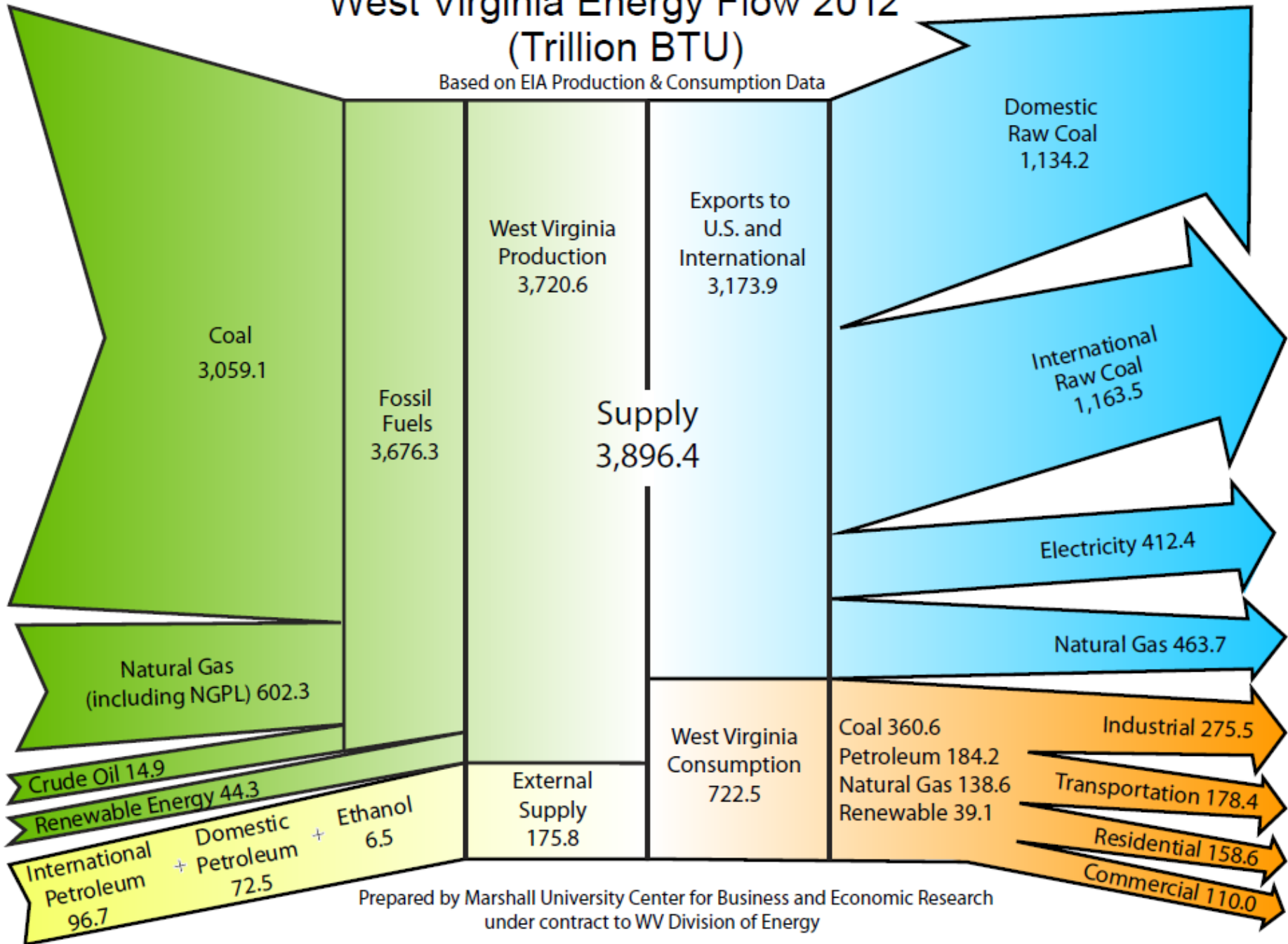
West Virginia
WEST VIRGINIA

Energy Production in West Virginia

November 5, 2014

West Virginia Energy Flow 2012 (Trillion BTU)

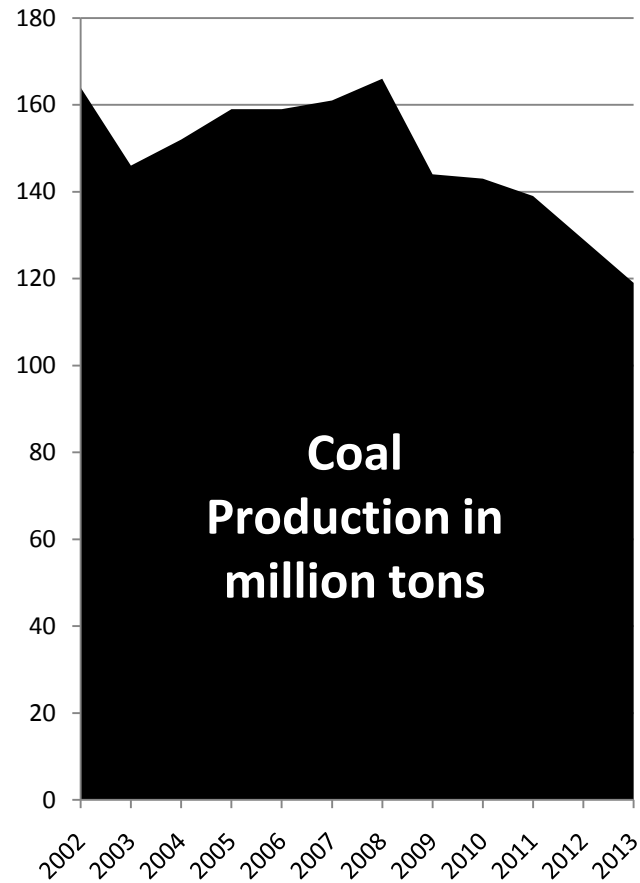
Based on EIA Production & Consumption Data



Prepared by Marshall University Center for Business and Economic Research
under contract to WV Division of Energy
Numbers may not sum to total due to rounding.

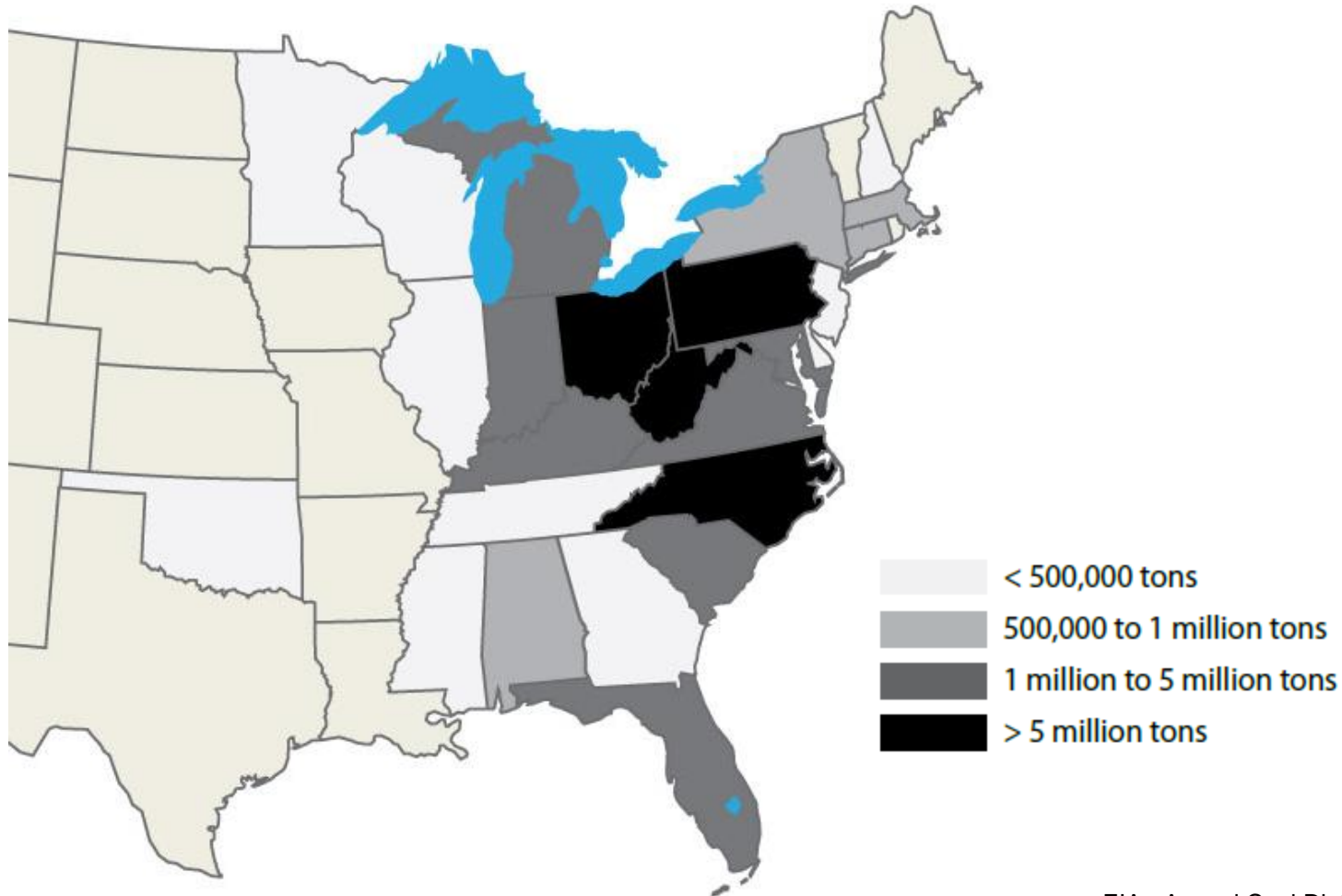
West Virginia Coal Production

Year	Coal Production (tons)
2002	163,896,890
2003	145,899,599
2004	151,683,473
2005	159,498,069
2006	158,835,584
2007	161,237,538
2008	165,750,817
2009	144,017,758
2010	142,944,106
2011	139,424,080
2012	129,538,515
2013	119,546,757

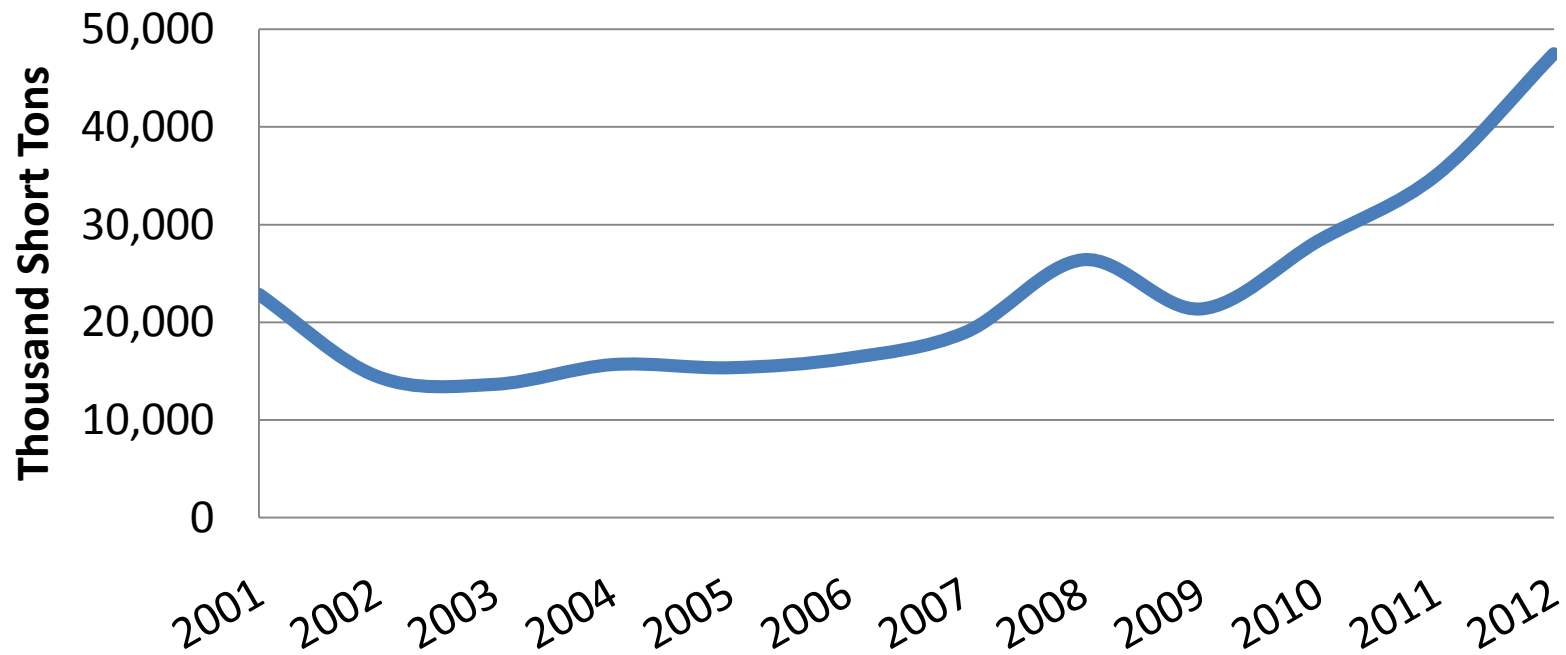


Data from WV Office of Miner's Health Safety and Training

Domestic Distribution of West Virginia Coal, 2012

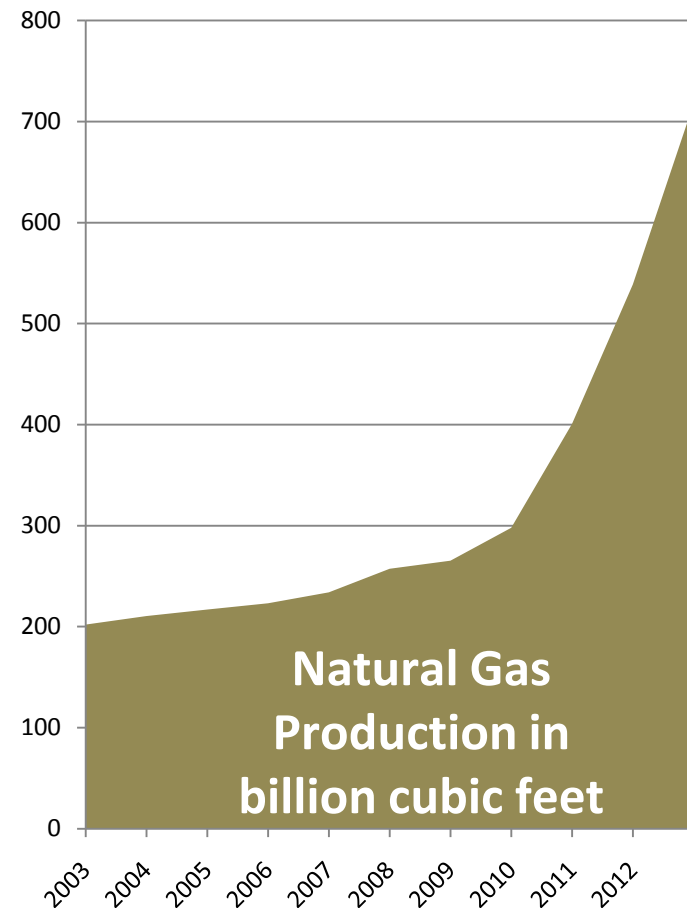


West Virginia Coal Foreign Distribution, 2001-2012



West Virginia Natural Gas Production

Year	Natural Gas Production (in Mcf)	From Marcellus Shale (in Mcf)
2003	202,061,508	0
2004	210,513,371	0
2005	216,934,506	853,565
2006	223,149,384	4,555,266
2007	233,970,534	10,065,002
2008	257,301,632	19,325,834
2009	265,315,404	33,640,837
2010	297,876,644	74,439,147
2011	400,791,090	149,915,861
2012	538,759,150	301,700,000
2013	717,900,000	541,300,000



West Virginia did not independently record Marcellus production before 2005.

Data from WV Geological and Economic Survey

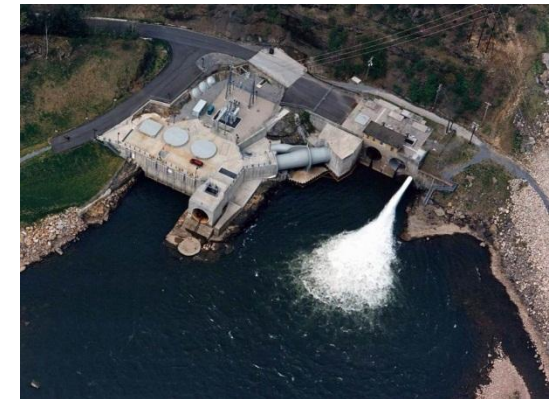
Natural Gas Net Exports 2012



Hydro

Licensed West Virginia Hydro Facilities

<i>Name</i>	<i>Capacity (MW)</i>	<i>Licensee</i>	<i>River</i>
London	14.4	Appalachian Power	Kanawha
Marmet	14.4	Appalachian Power	Kanawha
Winfield	14.76	Appalachian Power	Kanawha
Millville	2.84	Allegheny Energy Supply	Shenandoah
Lake Lynn	51.2	Allegheny Energy Supply	Monongahela
Hawks Nest	102	Hawks Nest Hydro	New
Glen Ferris	5.45	Hawks Nest Hydro	New
Dam No. 4	1.9	Allegheny Energy Supply	Potomac
Dam No. 5	1.21	Allegheny Energy Supply	Potomac
Racine	47.5	Ohio Power	Ohio
New Martinsville	35.72	City of New Martinsville	Ohio
Willow Island	35	American Municipal Power	Ohio
Belleville	42	Omega JV5	Ohio
Summersville	80	City of Summersville	Gauley
Jennings Randolph	14	Fairlawn Hydroelectric	Potomac



Hawks Nest Hydro Facility

**Total Capacity:
462.38 MW**

Wind

West Virginia Wind Farms

Currently Operating

<i>Name</i>	<i>Capacity (MW)</i>	<i>Operator</i>	<i>County</i>
Beech Ridge	100.5	Invenergy Services	Greenbrier
Laurel Mountain	97.6	AES Wind Generation	Randolph
Mountaineer Wind Energy	66	FPL Energy	Tucker
NedPower Mount Storm	264	Shell Wind Energy	Grant
Pinnacle	55	Edison Mission Energy	Mineral

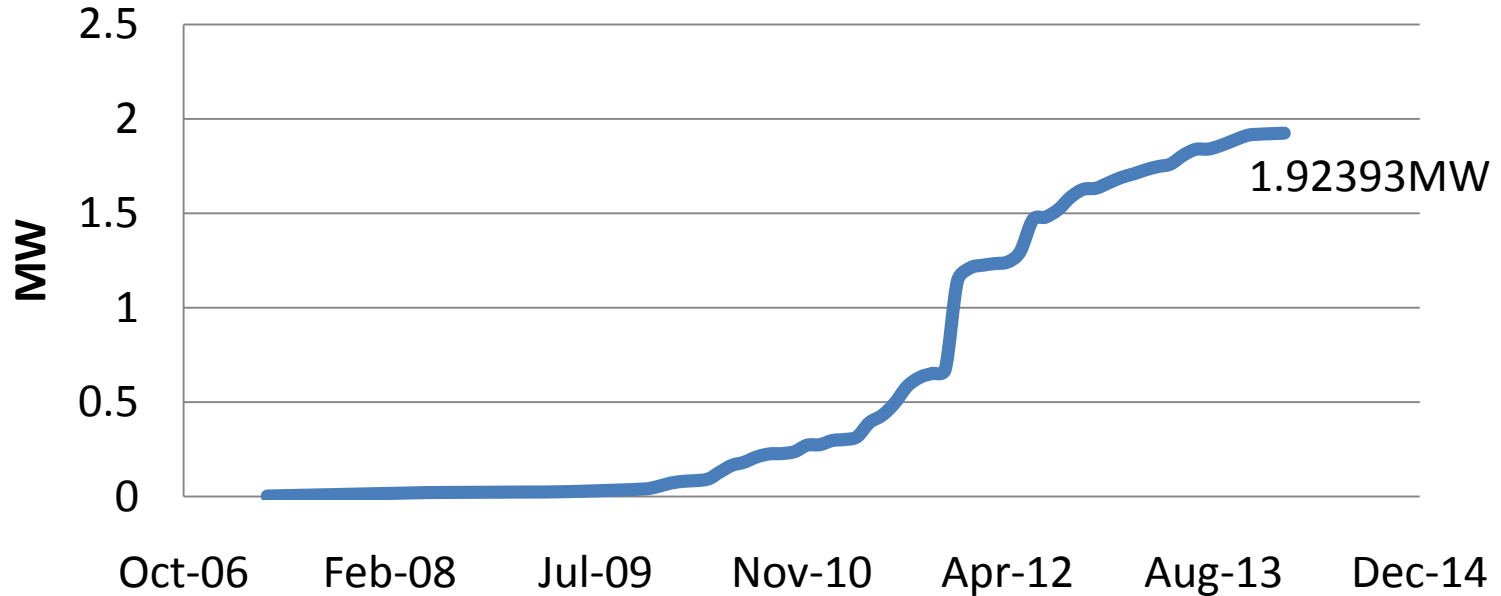


NedPower Mount Storm

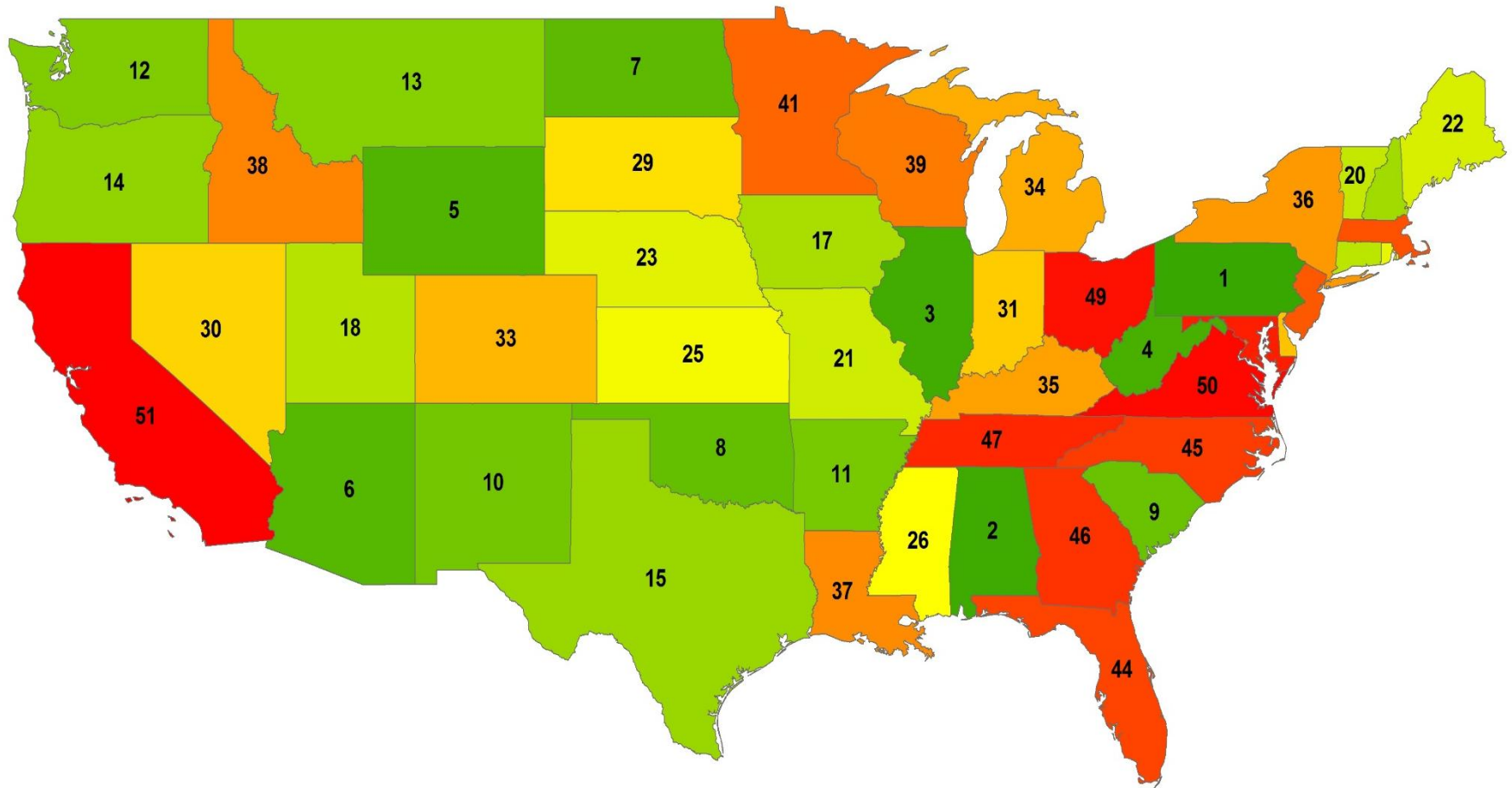
Operating Capacity:
583.1 MW

Solar Capacity

**West Virginia Solar Capacity Growth
(May 2007 - February 2014)**
Source: PJM GATS Database



State Rankings by Volume of Net Interstate Electricity Trade



* Estimated based on current and historical EIA data.

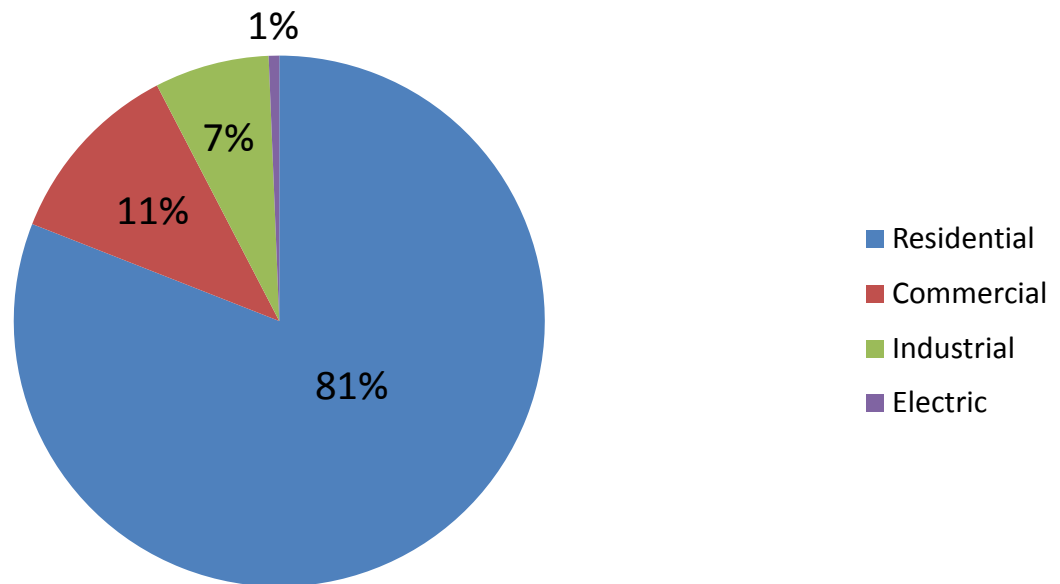
Created by Marshall University: CBER

WV Wood and Waste 2012

WV Wood and Waste* Distribution by Sector, 2012

Billion Btu

	2012
Residential	14,926
Commercial	2,106
Industrial	1,287
Electric	118
Total	18,437

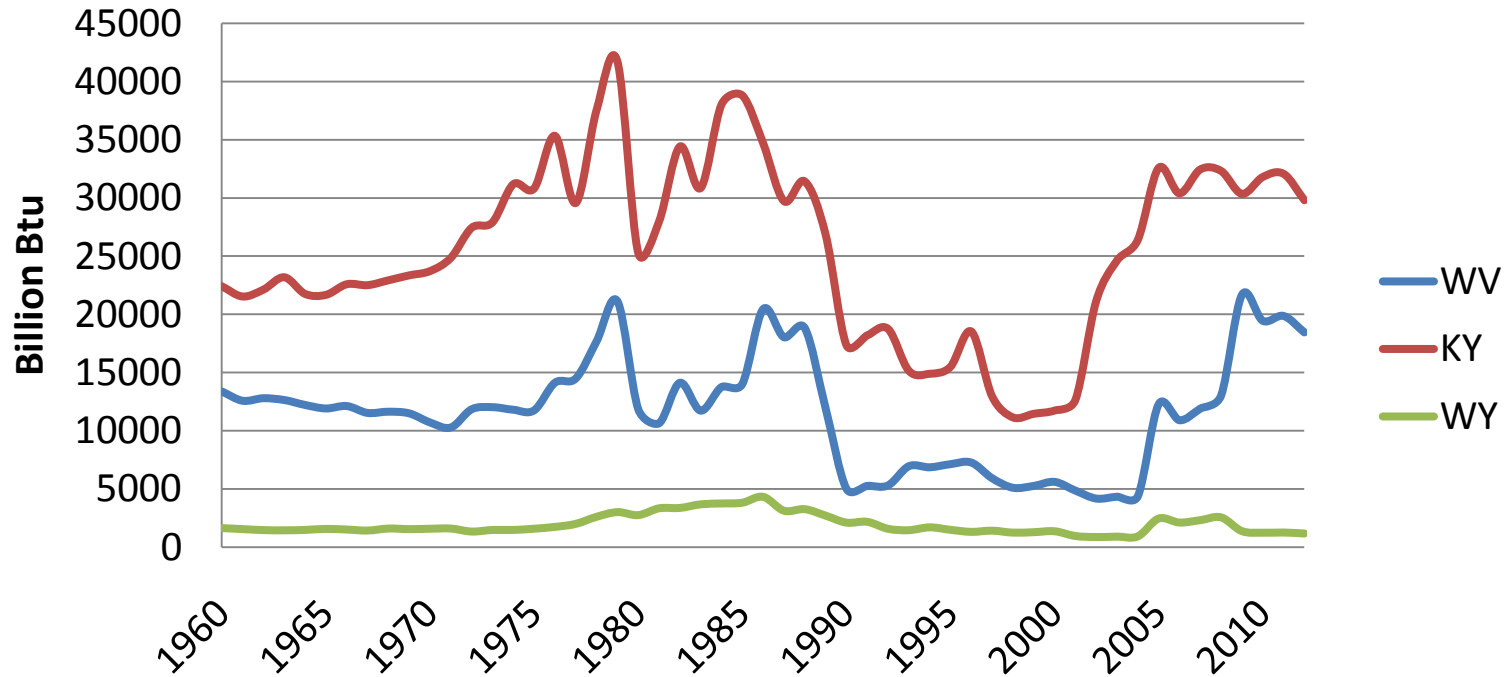


*Waste is biomass waste which includes municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, etc.

EIA Data

Wood and Waste Top Coal Producing States, 2012

Wood and Waste* Energy Production
(1960-2012)

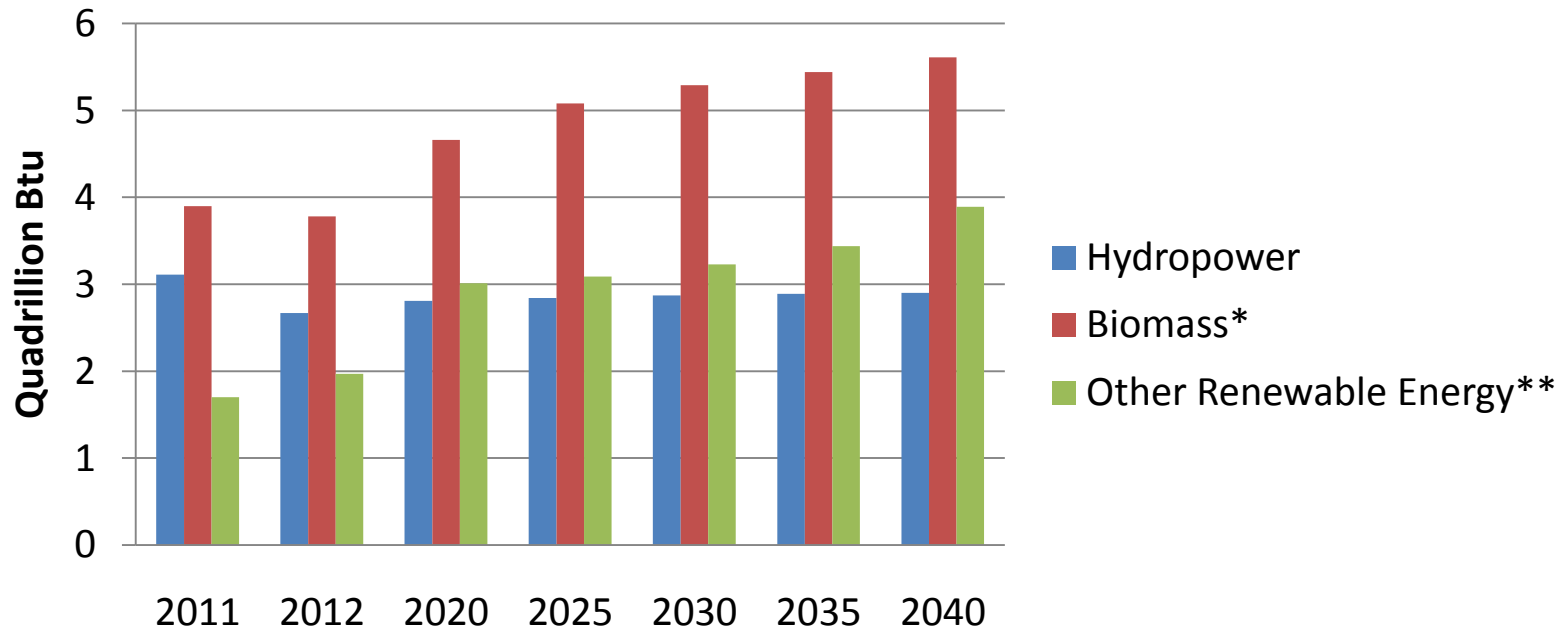


*Waste is biomass waste which includes municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, etc.

EIA Data

EIA Annual Energy Outlook 2014

U.S. Renewable Energy Production



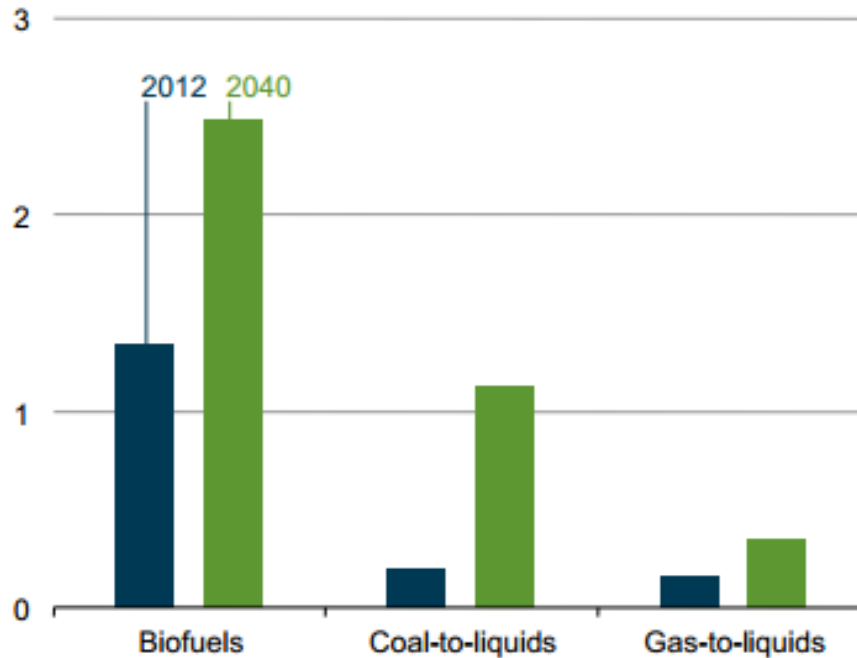
*Includes grid-connected electricity from wood and wood waste; biomass, such as corn, used for liquid fuels production; and non-electric energy demand from wood.

**Includes grid-connected electricity from landfill gas; biogenic municipal waste; wind; photovoltaic and solar thermal sources; and non-electric energy from renewable sources, such as active and passive solar systems. Excludes electricity imports using renewable sources and nonmarketed renewable energy.

EIA

Annual Energy Outlook 2014

Figure MT-6. World production of nonpetroleum liquids by type in the Reference case, 2012 and 2040 (million barrels per day)



EIA Annual Energy Outlook 2014

U.S. Wood and Other Biomass Electric Power Sector Outlook

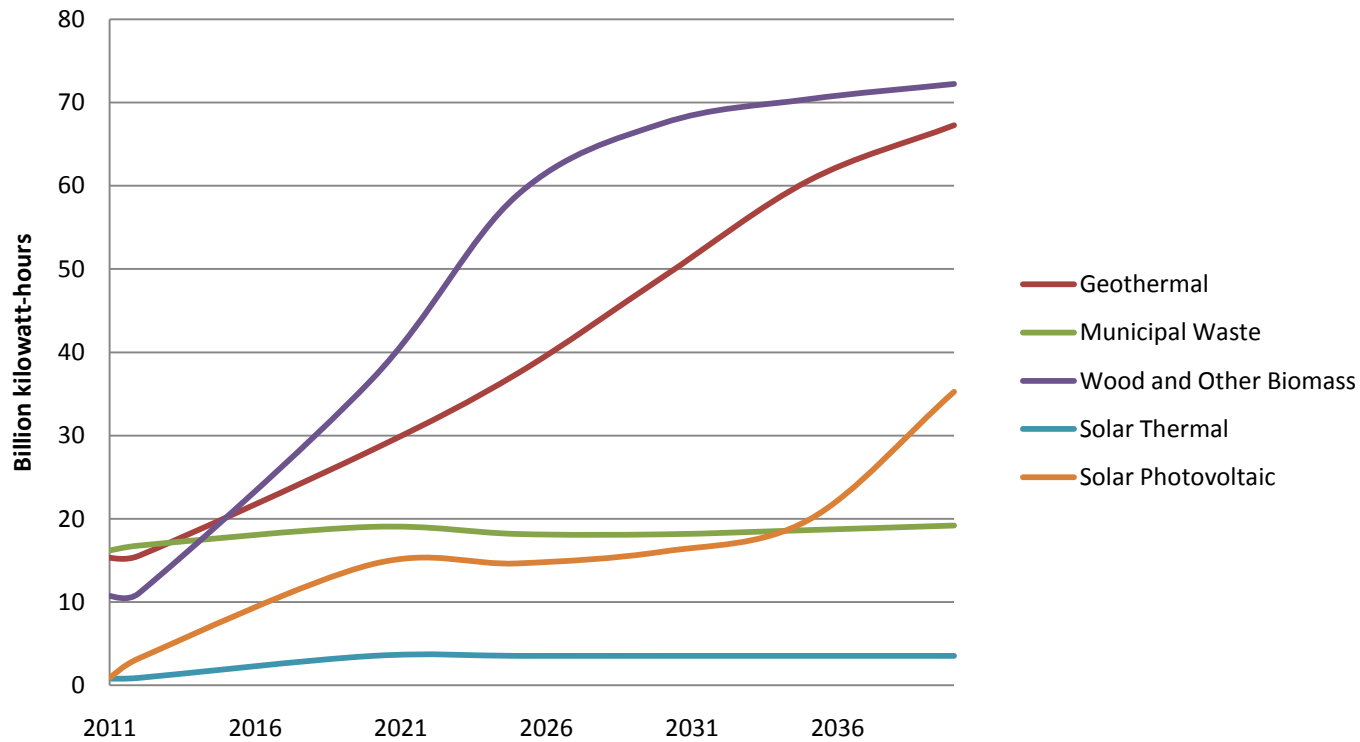
(billion kilowatt-hours)

	2011	2012	2020	2025	2030	2035	2040	Annual Growth (2012-2040)
Wood and Other Biomass	10.73	11.04	36.71	58.87	67.5	70.39	72.22	6.9%
Dedicated Plants	9.55	9.84	15.31	15.95	16.17	16.8	18.99	2.4%
Co-firing	1.19	1.2	21.4	42.92	51.33	53.59	53.23	14.5%

EIA

Annual Energy Outlook 2014

U.S. Other Renewable Electric Generation Outlook*



*Does not include hydro or wind electric generation.

EPA

Clean Power Plan Proposed Rule

- Tasks state environmental agencies to develop a plan that will reduce carbon emissions from existing power plants.
- Emissions reduction goals set by EPA.
- Emissions reduction targets to be met by 4 “building blocks.”
 - Electric Generating Unit (EGU) heat rate improvement
 - Re-dispatch coal-fired generation to natural gas combined cycle Generation
 - Expand low- or zero-carbon (renewable) generating capacity
 - Expand use of demand side-efficiency

EPA Clean Power Plan Proposed Rule

West Virginia Proposed Goals

EGU Heat Rate Improvement: 6%
Redispatch Coal Generation: 0 MWh (No NGCC)

Environmental Protection Agency Clean Power Plan: West Virginia Goals

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
	<i>MWh</i>									
Existing and Incremental Renewable Net Electric Generation	2,451,206	2,874,262	3,370,334	3,952,023	4,634,107	5,433,912	6,371,756	7,471,464	8,760,972	10,273,036
	<i>% of Avoided MWh Sales</i>									
Demand Side Energy Efficiency	1.77%	2.62%	3.60%	4.70%	5.83%	6.86%	7.81%	8.66%	9.43%	10.11%

Thank you