West Virginia Energy Inventory

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Energy Overview: Total Electric Industry Generation

- In 2020, WV generated 56,482,899 MWh:
 - Coal Fired 88.9%
 - GasFired 4.9%
 - Hydroelectric-2.8%
 - Wind 3.4%
 - U.S. Energy Information Administration, State Historical Tables (2020)
- Not included:
 - Biomass-6,457 MWh
 - Petroleum 142,408 MWh
 - Other Gases-46,561 MWh
 - Battery Storage -- 16,791 MWh





Energy Overview: Total Electric Industry Generation

Plant Name	Power Source(s)	Sector	Net Summer Capacity (MW)
John E Amos	Coal	Regulated Utility	2,900
Harrison	Coal	Regulated Utility	1,954
Mt. Storm	Coal	Regulated Utility	1,640
Pleasants	Coal	Independent Power Producer	1,368
Mitchell	Coal	Regulated Utility	1,560
Mountaineer	Coal	Regulated Utility	1,299
Fort Martin	Coal	Regulated Utility	1,098
Longview	Coal	Independent Power Producer	710
Ceredo	Natural Gas	Regulated Utility	450
Pleasants Energy	Natural Gas	Independent Power Producer	344
Big Sandy	Natural Gas	Independent Power Producer	300
NedPower Mt. Storm	Wind	Independent Power Producer	264
Laurel Mountain	Wind, Batteries	Independent Power Producer	114
New Creek Wind	Wind	Independent Power Producer	103
Beech Ridge	Wind	Independent Power Producer	101

Table 1: West Virginia Power Plants with Capacity Greater than 100 MW

- West Virginia University Bureau of Business and Economic Research



Source: US Energy Information Administration

Energy Overview: Industrial/Commercial Generation

- In 2020, independent power producersgenerated 15,878,340 MWh:
 - Coal Fired 65.4%
 - GæFired 16.7%
 - Hydrodectric-5.9%
 - Wind 12.0%
 - U.S. Energy Information Administration, State Historical Tables (2020)





Energy Overview: Electric Utility Generation

- In 2020, electric utilities generated 40,783,193 MWh:
 - Coal Fired 98.1%
 - GæFired 1.6%
 - Hydroelectric-0.3%
 - U.S. Energy Information Administration, State Historical Tables (2020)

• Electric Utility is a power company, regulated by the PSC, servicing customers with end use dectrical power





Energy Overview: Electric Utility Generation

Electric Utilities

- 7 Private
 - Appalachian Power Co. / AEP
 - Monongahela Power Co. / Allegheny Power
 - Potomac Edison Co. / Allegheny Power
 - Wheeling Power Company / AEP
 - Black Diamond Power Co.
 - Craig-Botetourt Electric Cooperative
 - Harrison Rural Electrictrification Association, Inc.
- 2 Public
 - New Martinsville
 - Philippi



Total ultimate consumption MWh available in 2020: 32,093,201



Electric Generation Efficiency: Capacity v. Production

Net Capacity Factor (NCF)

Total MWh produced ÷ Total MWh producible at full capacity

U.S. Capacity Factor by Energy Source - 2021



Source: U.S. Energy Information Administration

Energy Overview - Capacity & Production

Power Plants

- H ydro (12)
- Coal (9)
- Wind (6)
- Gæ(5)





Energy Overview - COAL



Energy Overview - COAL

Coal Impact

- Largest energy employer
- Cheaper than PJM prices
- 2022 projected to mine 81.6 M tons
- Opportunities to increæe exports

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e	GRID2020_Emissions: 2,93	\$2.60 ^	\times			
	eGRID2020 Plant file sequence number	12,560	*			
	Data Year	2,020				
	Plant state abbreviation	WV				
	Plant name	John E Amos				
	DOE/EIA ORIS plant or facility code	3,935				
	Plant transmission or distribution system owner name	Appalachian Power Co				
	Plant transmission or distribution system owner ID	733				
	Utility name	Appalachian Power Co				
	Utility ID	733				
	Plant-level sector	Electric Utility				
	Balancing Authority Name	PJM Interconnection, LLC				
	Balancing Authority Code	PJM				
	NERC region acronym	RFC				
	eGRID subregion acronym	RFCW				
	eGRID subregion name	RFC West				
	Plant associated ISO/RTO	PJM	•			

⊕ Zoom to		
eGRID2020_Emissions: 2,932.60 ^ ×		
eGRID subregion name	RFC West	
Plant associated ISO/RTO Territory	PJM	
Plant FIPS state code	54	
Plant FIPS county code	79	
Plant county name	Putnam	
Plant latitude	38.47	
Plant longitude	-81.82	
Number of units	5	
Number of generators	3	
Plant primary fuel	BIT	
Plant primary fuel category	COAL	
Flag indicating if the plant burned or generated any amount of coal	Yes	
Plant capacity factor	0.41	
Plant nameplate capacity (MW)	2,932.60	
Nonbaseload Factor	0.66	
Biogas/ biomass plant adjustment flag		

⊕ Zoom to		
eGRID2020_Emissions: 2,93	32.60 ^	\times
riani pumpeo storage liag		
Plant annual heat input from combustion (MMBtu)	109,028,029	
Plant ozone season heat input from combustion (MMBtu)	56,320,243	L
Plant total annual heat input (MMBtu)	109,028,029	ł
Plant annual net generation (MWh)	10,450,839.00	
Plant ozone season net generation (MWh)	5,377,961.00	
Plant annual NOx emissions (tons)	4,875	
Plant ozone season NOx emissions (tons)	2,473	
Plant annual SO2 emissions (tons)	4,381	
Plant annual CO2 emissions (tons)	11,185,350	
Plant annual CH4 emissions (lbs)	2,559,659	
Plant annual N2O emissions (Ibs)	372,511	
Plant annual CO2 equivalent emissions (tons)	11,272,850	•

Energy Overview - COAL

West Virginia Energy Industry Employment First Quarter 2022

			Average
			Monthly
NAICS	NAICS Title	Establishments	Employment
21112	Crude Petroleum Extraction	24	72
21113	Natural Gas Extraction	114	1,666
21211	Coal Mining	172	11,902
21231	Stone Mining and Quarrying	29	628
21232	Sand, Gravel, Clay, and Ceramic and Refractory Minerals Mining and Quarrying	6	149
21311	Support Activities for Mining	321	3,871
22111	Electric Power Generation	77	2,503
221112	Fossil Fuel Electric Power Generation	51	2,299
	Non Fossil Fuel Electric Power Generation		
	(Summary of Wind, Solar, Geothermal, Hydroelectric)	26	204
22112	Electric Power Transmission, Control, and Distribution	72	1,219
22121	Natural Gas Distribution	63	828
Source: Workfo	orce West Virginia		



Average

Energy Overview - GAS







Energy Overview - GAS

- WV has47,934 producing wells, 10% of nation's total
- Reframe proximity to feedstock as more important than access to cheep labor to attract dependent businesses
 - Central Appalachia is the most profitable place in the world for a petrochemical plant





Energy Overview - GAS

Profitability: Plastics Converter Cost Advantage

Ohio vs. China Cost of Manufacturing & Transportation MID TO LARGE SIZED PRODUCTS



Monthly dry shale gas production

billion cubic feet per day



Note: Improvements to play identification methods have altered production volumes of various plays.



Energy Overview - HYDRO



Energy Overview - WIND



Dashboard ID: 12230 Laurel Mountain Hybrid Utility: AES Wind Generation Inc Distributor: Monongahela Power Co WIND: 113.60 MW

Dashboard ID: 12241 Mountaineer Wind Energy Center Utility: GlidePath Power Operations LLC Distributor: Monongahela Power Co WIND: 66.00 MW

Dashboard ID: 12242 NedPower Mount Storm

Utility: NedPower Mt Storm LLC Distributor: Virginia Electric & Power Co WIND: 264.00 MW

Dashboard ID: 12243 New Creek Wind Utility: New Creek Wind, LLC Distributor: Virginia Electric & Power Co WIND: 103.00 MW

Dashboard ID: 12249 Pinnacle Wind Force LLC

Utility: NRG Energy Gas & Wind Holdings Inc Distributor: The Potomac Edison Company WIND: 55.20 MW

Dashboard ID: 12433 Beech Ridge Energy LLC Utility: Invenergy Services LLC Distributor: Monongahela Power Co WIND: 100.50 MW

Dashboard ID: 12435 Beech Ridge II Wind Energy Center Utility: Southern Power Co Distributor: Monongahela Power Co WIND: 56.20 MW

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Energy Overview: The Grid - Transmission Lines & Substations







Un-Tapped Energy Sources & Uses

- Hydrogen Hub
 - Proposal submitted, waiting for comments
- Nudear (NCF 92.7%)
 - End to nuclear ban, small modular reactors of interest during interim committee meetings, IIJA incentives
- Geothermal (NCF 71%)
 - Clean energy available on-demand, low production cost, difficult to find supply and proper locations for plants
- Biomass (NCF 63.5%)
 - Abundant resource, reduces waste, produces emissions, rural economic development

