West Virginia
Energy

DIVISION OF ENERGY

West Virginia

WEST VIRGINIA

West Virginia Coal - Its Importance and Its Challenges

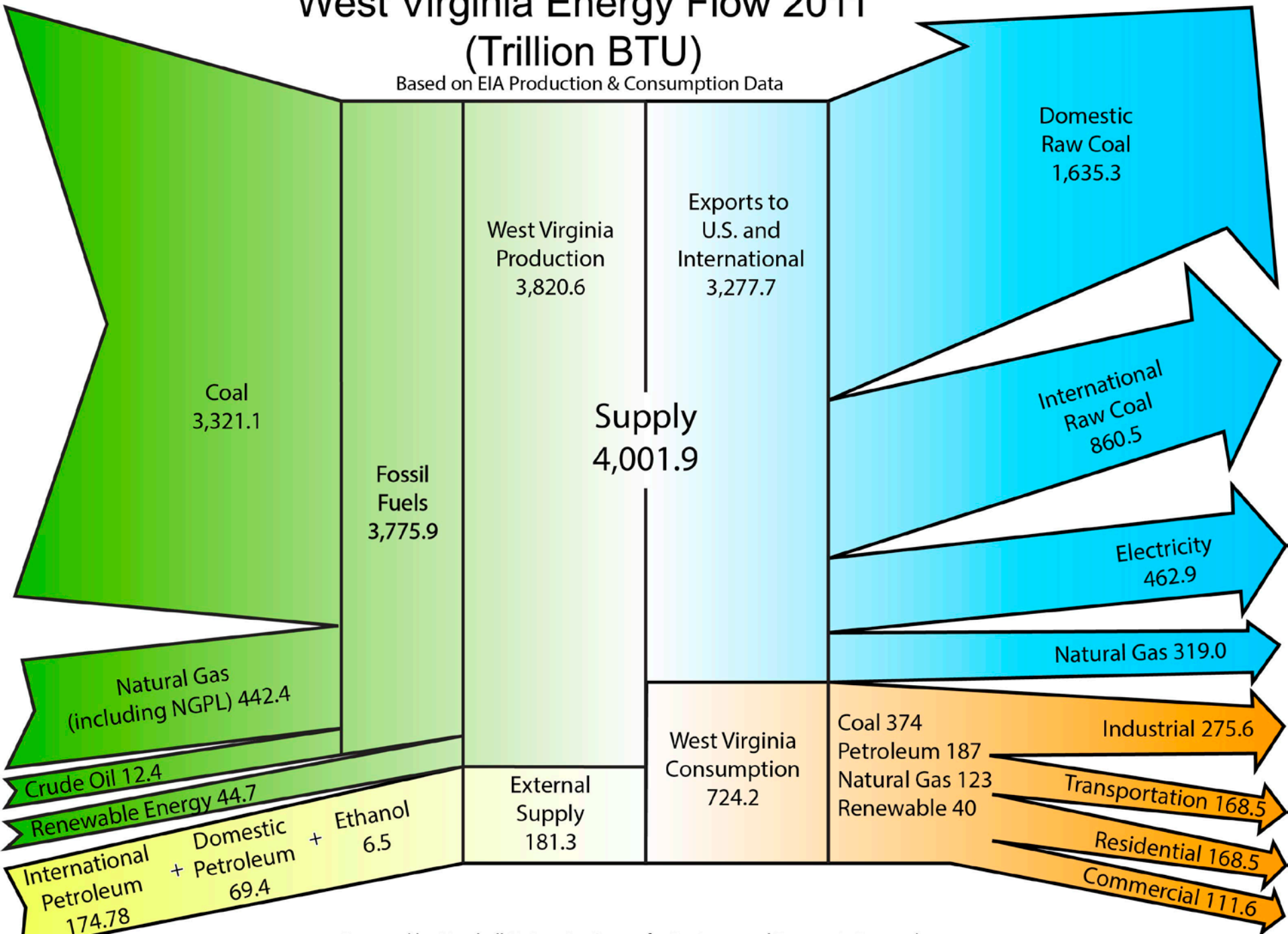
February 24th, 2014

West Virginia
Division of Energy Programs

- Alternate Transportation fuels uses/development
- Building energy code training and adoption
- Portfolio Manager Services
- Industrial Energy Assessments
- Energy Assistance to Industry
- Recycling Services Database
- Local Energy Efficiency Grants
- Green Collar Job Training
- Promote Reuse of Surface Mined Land
- E3 Services for manufacturers, cities and counties
- Energy development – fossil and renewable
- Solar and Wind Conferences

West Virginia Energy Flow 2011
(Trillion BTU)

Based on EIA Production & Consumption Data



Prepared by Marshall University Center for Business and Economic Research

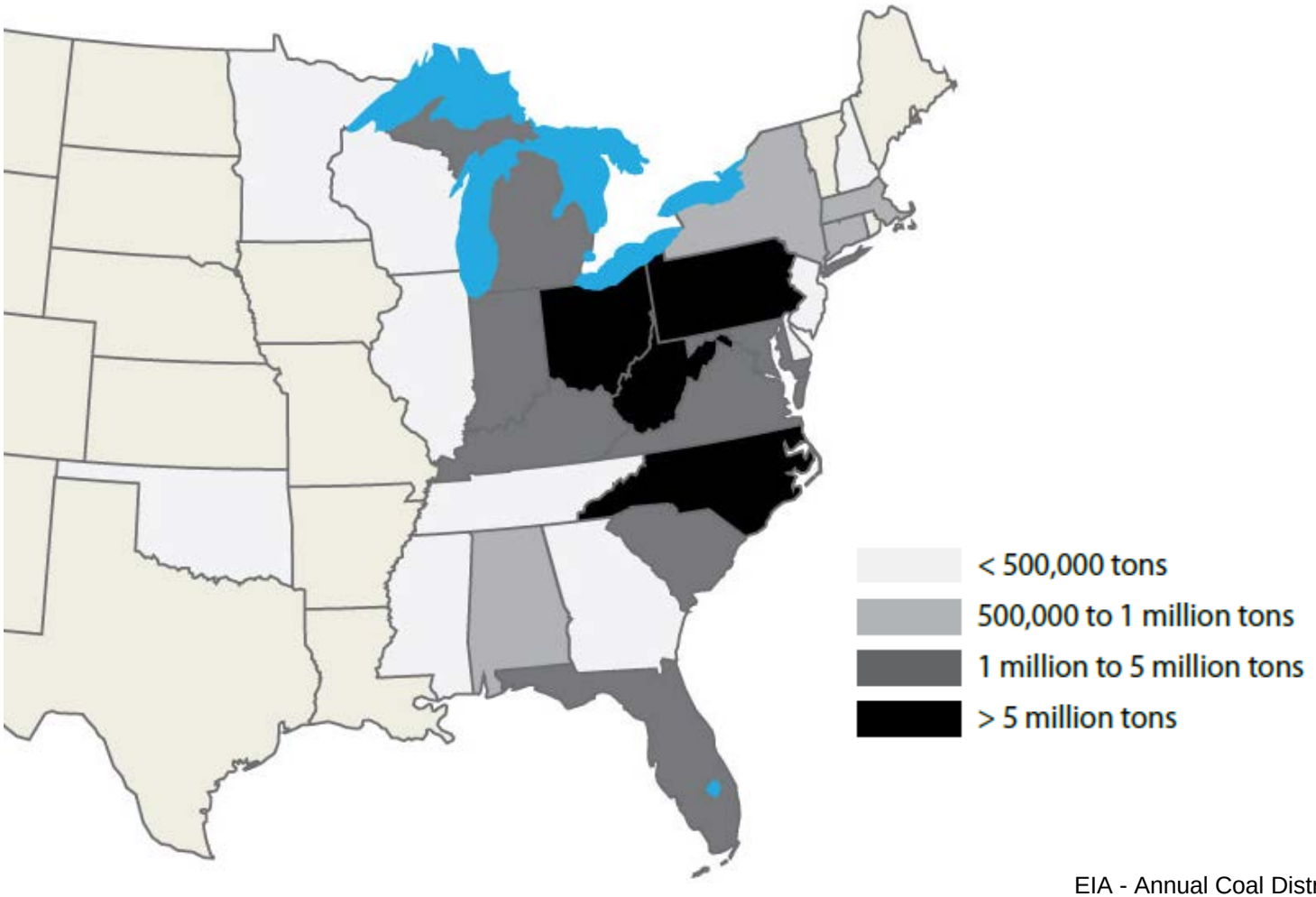
West Virginia Coal Industry Impacts, 2012*

Employment	
63,896 Employees	11.3 % of private industry
Value Added	
$8.8 billion	12.7% of Gross State Product
Labor Income	
$3.9 billion	17.5% of private industry
Taxes	
Coal Mining Industry and Employees	*Share of State Budget*
$638 million	15.3%

*Includes the coal industry, associated transportation and power industries

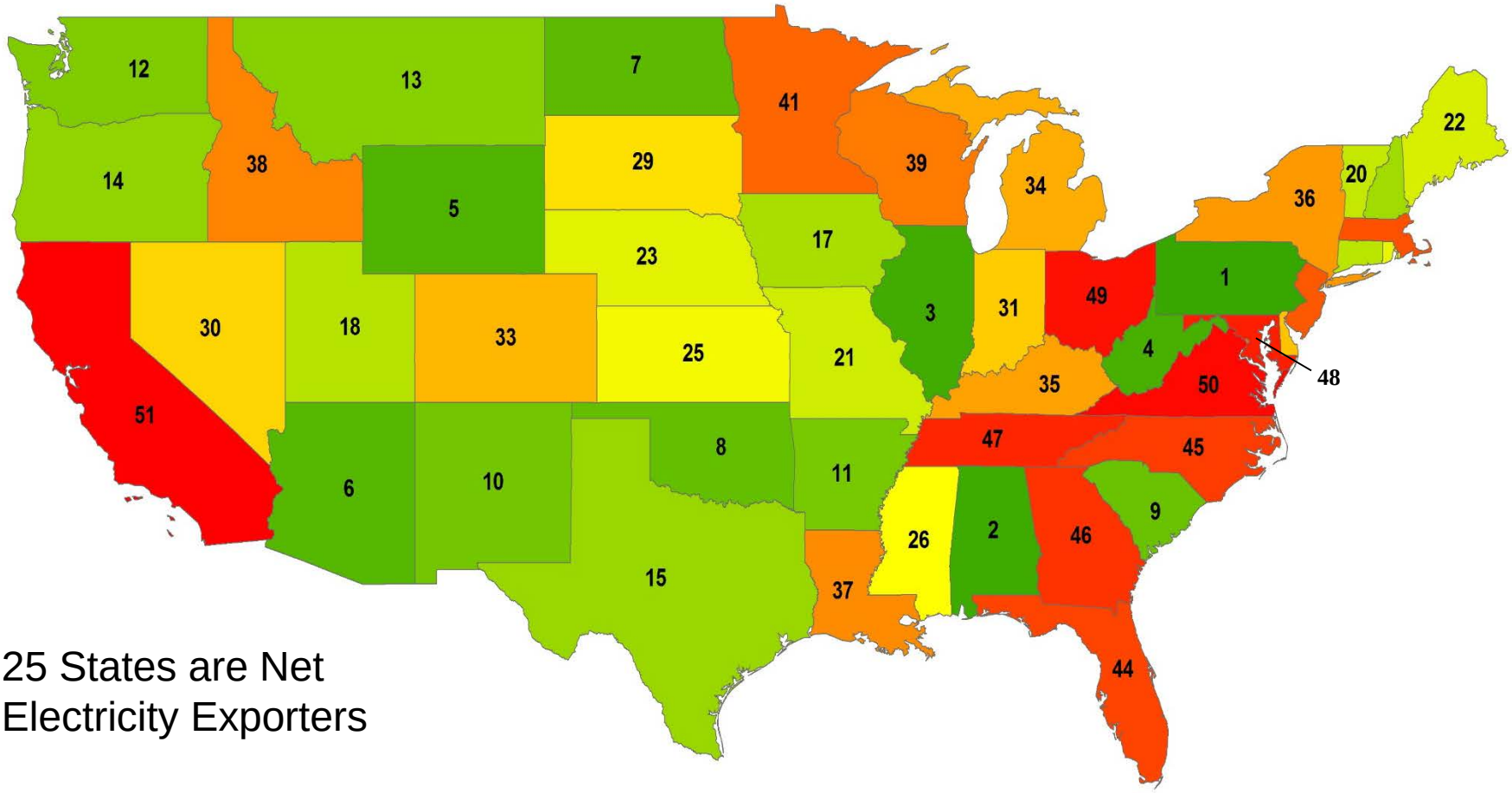
Marshall University: Center for Business and Economic Research

Domestic Distribution of West Virginia Coal, 2012



EIA - Annual Coal Distribution Report 2012

State Ranking - Net Interstate Electricity Trade, 2012

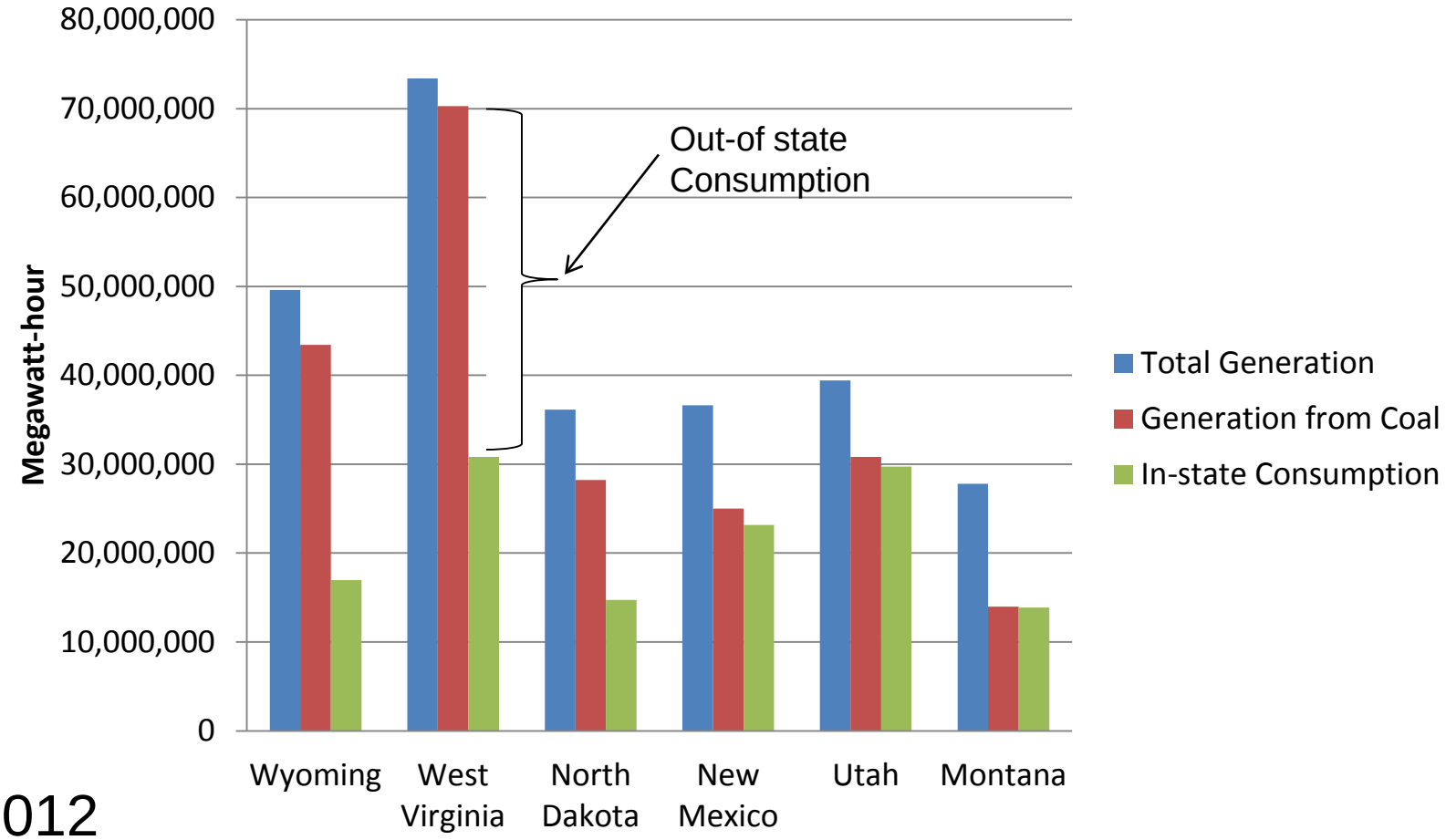


25 States are Net Electricity Exporters

* Estimated based on current and historical EIA data.

Created by Marshall University: CBER

Coal-based Electric Export States –Who Claims the Emissions?



2012

EIA-923 & EIA-826

Utility MACT- Mercury and Air Toxic Standards via NOx and SOx Controls

WV Plant Shutdowns		
Summer Capacity (MW)		
Appalachian Power (AEP)		Total
Kanawha River	400	1,580
Philip Sporn	580	
Kammer	600	
Monongahela Power (FirstEnergy)		Total
Rivesville	125	643
Willow Island	235	
Albright	283	
•14% of WV Generating Capacity	Combined	2,223 MW

Closed

- EIA estimates 60 GW of electric generation will be lost due to Utility MACT by 2020.

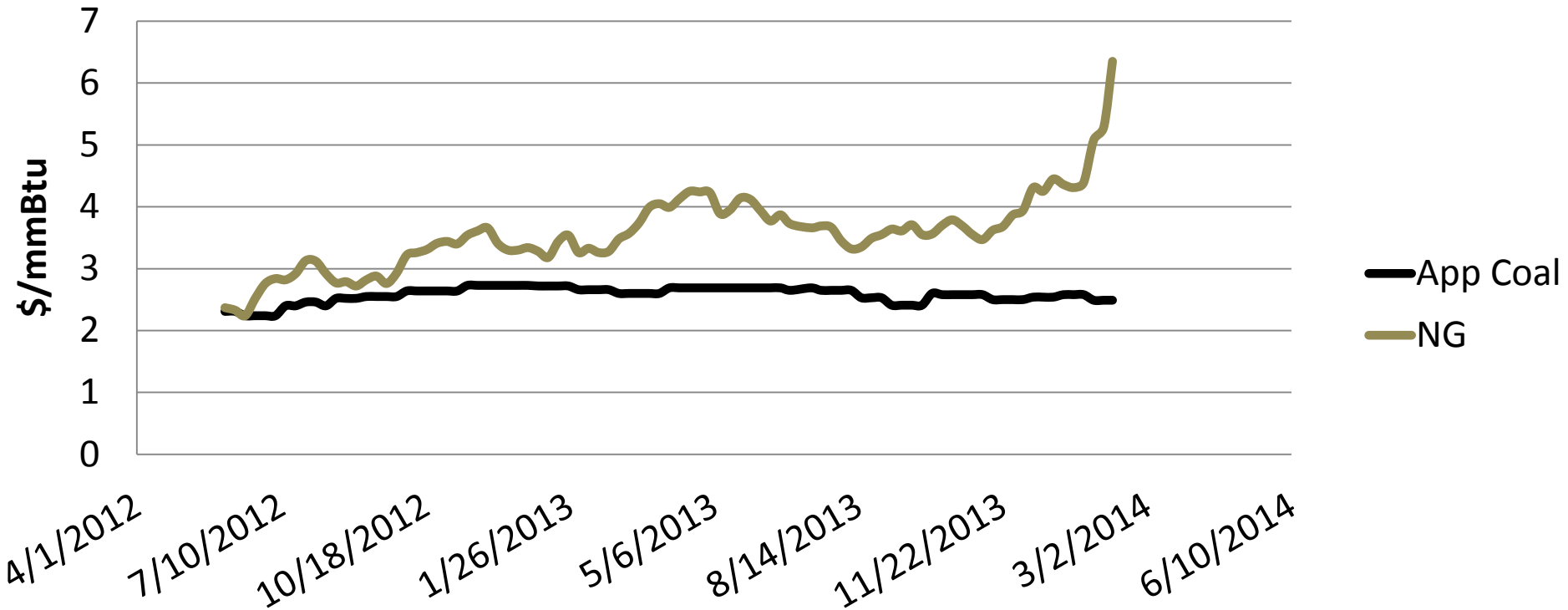
EIA

Boiler MACT

- Requires SOx and NOx compliance for industrial boilers.
- West Virginia industrial use of coal to be reduced by 1 million tons. Nationally, 17 million tons impacted.
- Plants that can, will convert to natural gas.
- Examples of West Virginia Industrial Coal Users:
  - Dupont Washington Works
  - Ox Board Paper
  - Bayer Crop Sciences
  - PPG Natrium, New Martinsville
  - ATK Rocket Center
  - Liming Unit, NewPage Paper

EIA - Annual Coal Distribution Report 2012

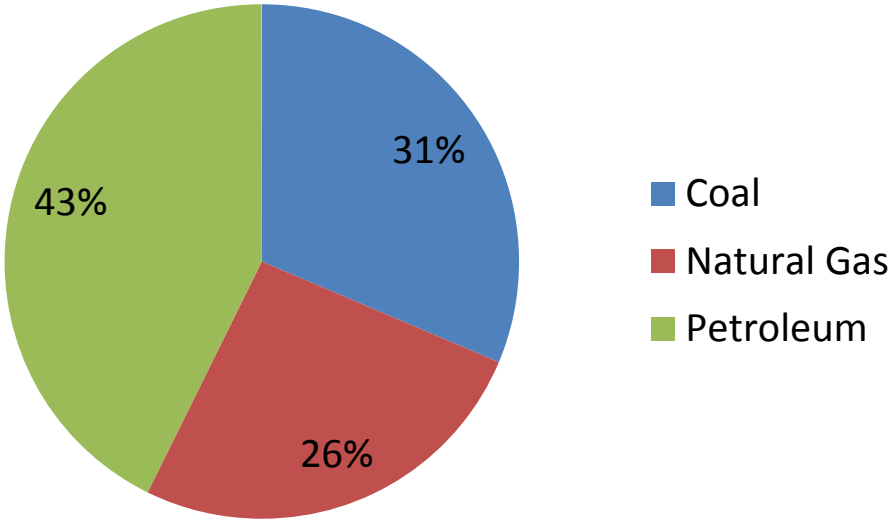
Average Weekly Fossil Fuel Spot Prices
Appalachian Coal vs Natural Gas



EIA Data

CO2 from US Energy Consumption, 2012

(Million Metric Tons of Co2)	
Coal	1,653
Natural Gas	1,366
Petroleum	2,248



EIA Monthly Energy Review – December 2013

CO2 from US Energy Consumption, by Sector, by Source, 2012

(Million Metric Tons of CO2)

2012	Coal	Natural Gas	Petroleum	Total	Total, 2005	Difference from 2005
Residential	-	226	69	295	364	**-19%**
Commercial	4	157	45	206	227	**-9%**
Industrial	137	449	343	929	1,000	**-7%**
Transportation	-	41	1,772	1,813	1,986	**-9%**
Electric Power	1,512	493	19	2,024	2,405	**-16%**
Total	1,653	1,366	2,248	5,267	5,982	**-12%**
Total, 2005	2,177	1,182	2,623	5,982		
Difference from 2005	**-24%**	**16%**	**-14%**	**-12%**		

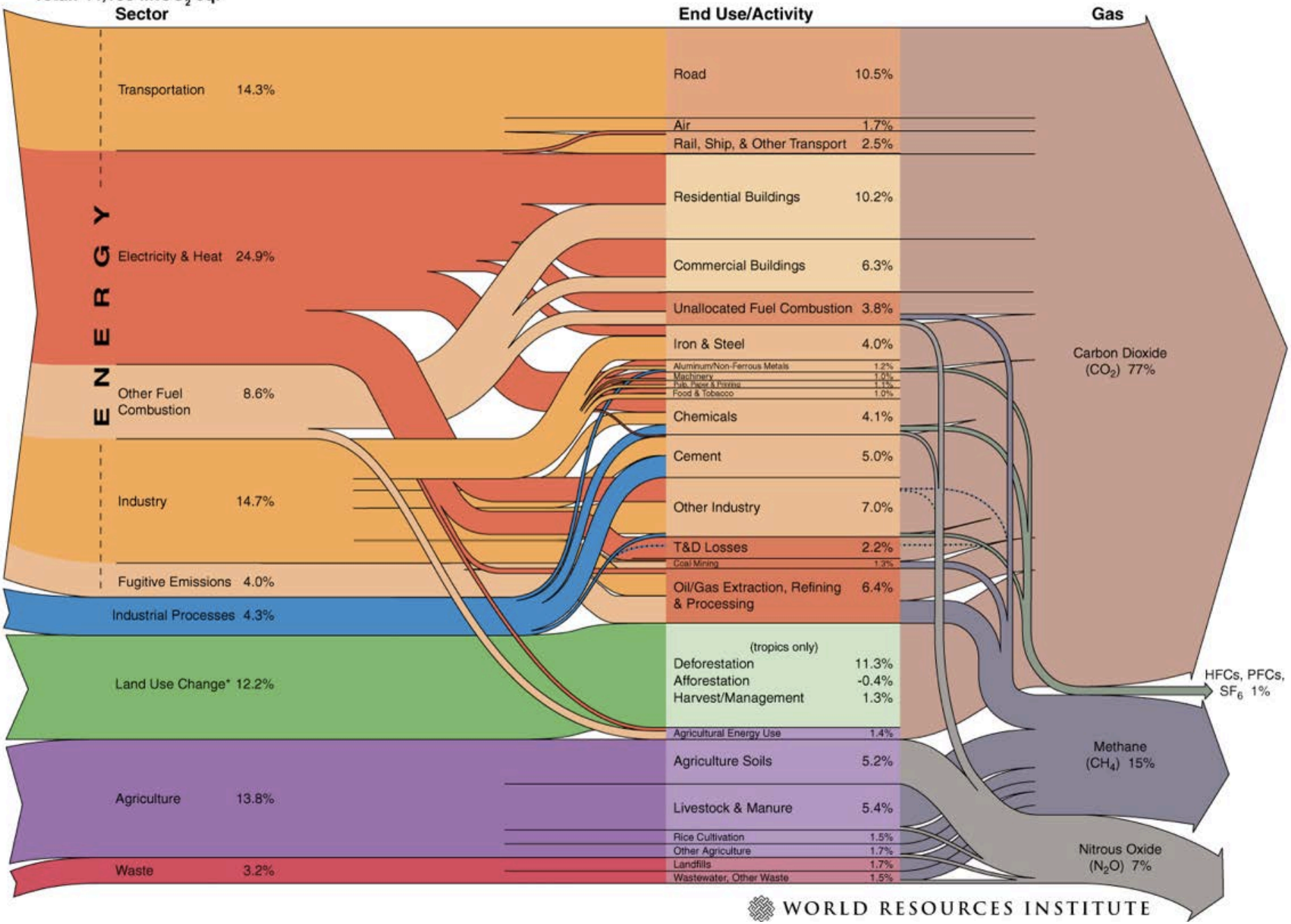
EIA Monthly Energy Review – December 2013

World CO2 Emissions

(Million Metric tons of CO2)

	2005	2012	Difference
China	5,892	9,864	**67.4%**
US	5,940	5,194	**-12.6%**
India	1,290	1,967	**52.5%**
Russia	1,720	1,774	**3.1%**
Japan	1,320	1,324	**0.3%**
Germany	850	807	**-5.1%**
South Korea	500	635	**27.0%**
Canada	570	559	**-1.9%**
Indonesia	360	494	**37.2%**
Mexico	420	488	**16.2%**

European Commission - Emission Database for Global Atmospheric Research


World Greenhouse Gas Emissions in 2005
Total: 44,153 MtCO2 eq.
Sector
End Use/Activity
Gas
ENERGY
Transportation 14.3%
Electricity & Heat 24.9%
Other Fuel Combustion 8.6%
Industry 14.7%
Fugitive Emissions 4.0%
Industrial Processes 4.3%
Land Use Change* 12.2%
Agriculture 13.8%
Waste 3.2%
Road 10.5%
Air 1.7%
Rail, Ship, & Other Transport 2.5%
Residential Buildings 10.2%
Commercial Buildings 6.3%
Unallocated Fuel Combustion 3.8%
Iron & Steel 4.0%
Aluminum/Non-Ferrous Metals 1.2%
Machinery 1.0%
Pulp, Paper & Printing 1.1%
Food & Tobacco 1.0%
Chemicals 4.1%
Cement 5.0%
Other Industry 7.0%
T&D Losses 2.2%
Coal Mining 1.3%
Oil/Gas Extraction, Refining & Processing 6.4%
(tropics only)
Deforestation 11.3%
Afforestation -0.4%
Harvest/Management 1.3%
Agricultural Energy Use 1.4%
Agriculture Soils 5.2%
Livestock & Manure 5.4%
Rice Cultivation 1.5%
Other Agriculture 1.7%
Landfills 1.7%
Wastewater, Other Waste 1.5%
Carbon Dioxide (CO2) 77%
HFCs, PFCs, SF6 1%
Methane (CH4) 15%
Nitrous Oxide (N2O) 7%
WORLD RESOURCES INSTITUTE

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Thank you