



Why Diversifying West Virginia's Energy Mix is Critical—and Not Optional

L. Jeremy Richardson

Union of Concerned Scientists

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Concerned Scientists**



Louie Scolish (1913-1988)

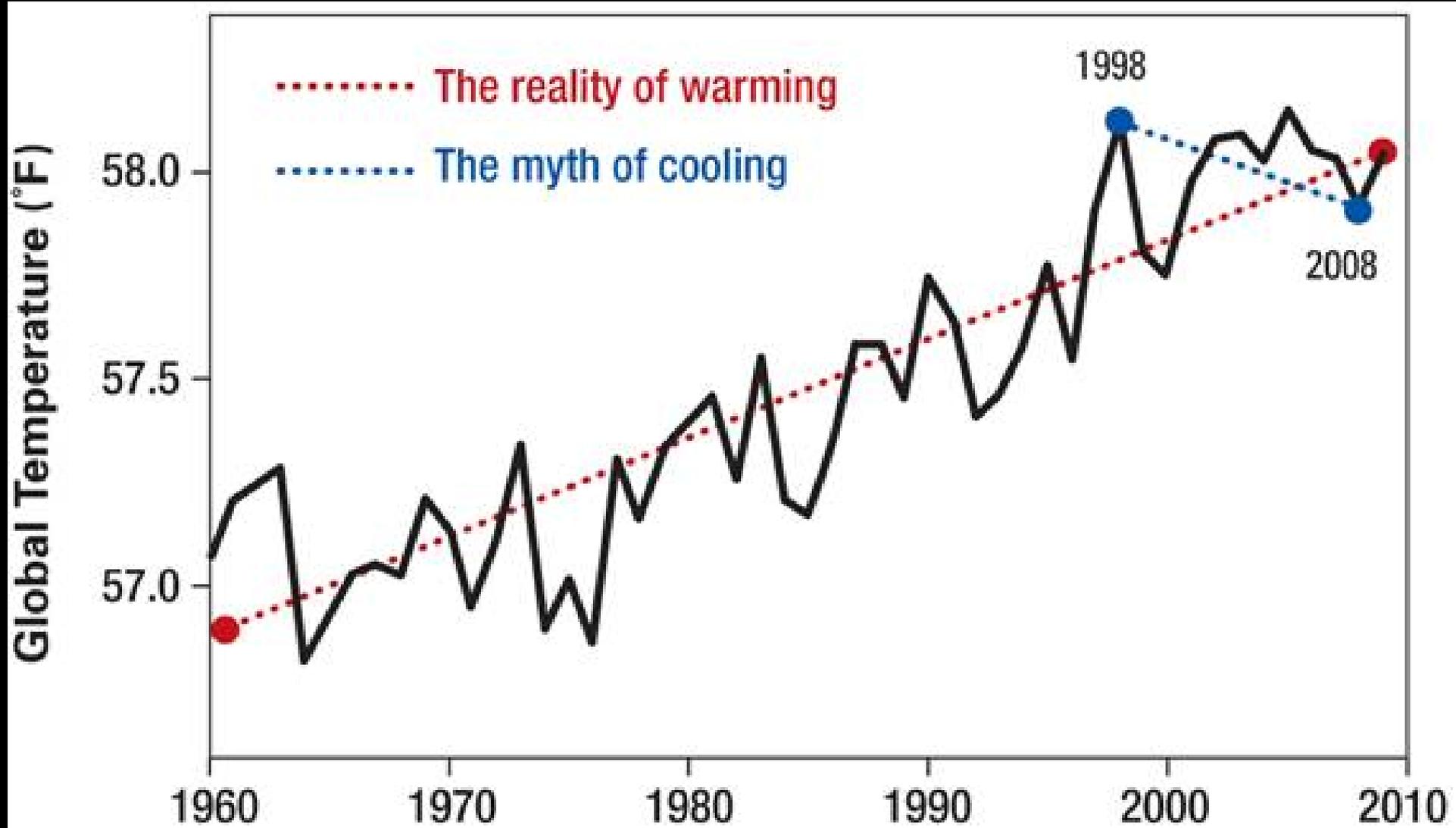
5 Key Takeaway Messages

- 1) Climate Change is Happening and Fossil Fuels are the Primary Culprit
- 2) Coal Power Becoming Economically Uncompetitive
- 3) Costs of Renewable Energy Falling Rapidly
- 4) Risk of Overreliance on Natural Gas
- 5) West Virginians Support Economic Diversification

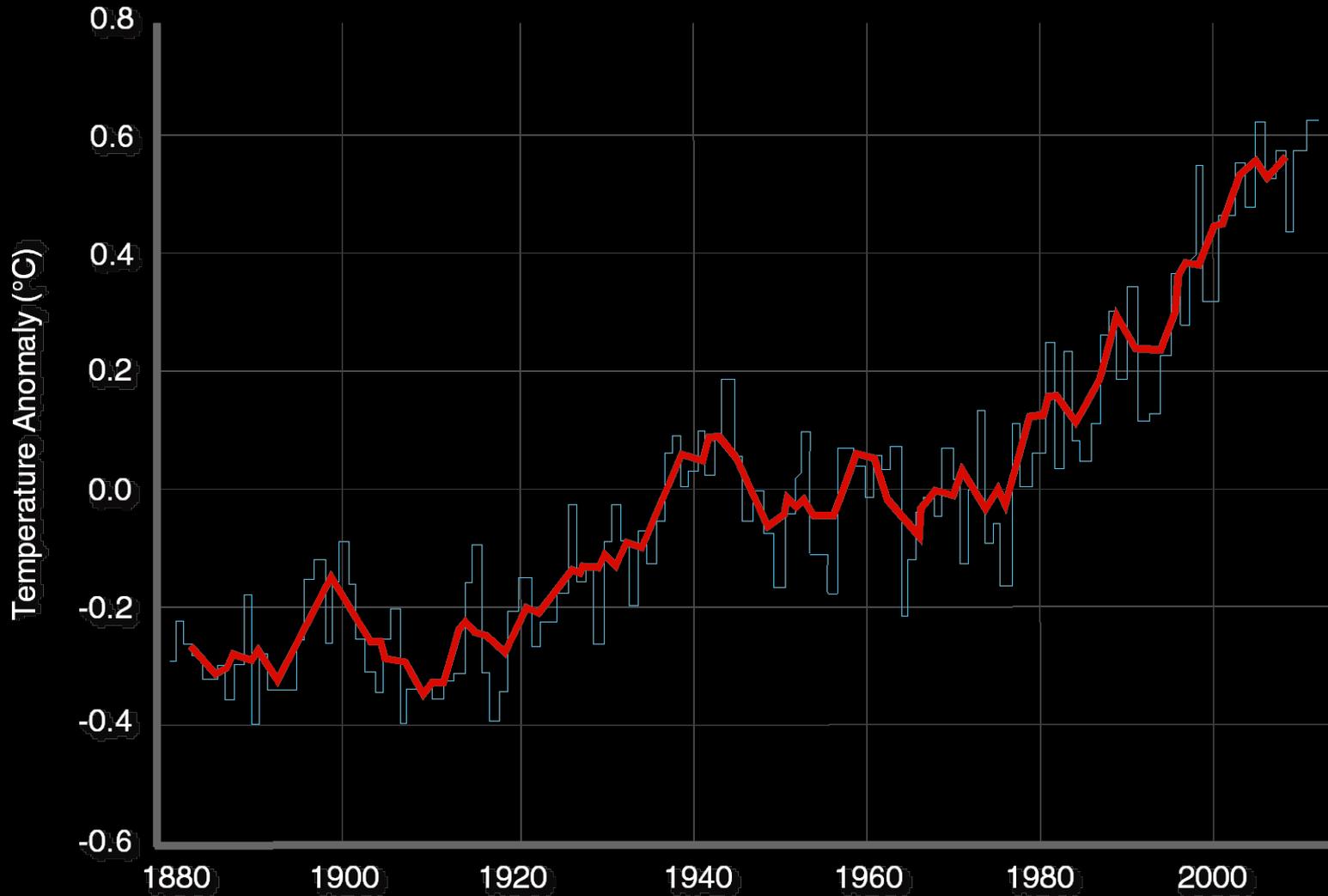
“Human influence on the climate system is clear...It is **extremely likely** that human influence has been the dominant cause of the observed warming since the mid-20th century.”

- *IPCC, 5th Assessment Report, 9/23/13*





Global Average Surface Temperature



Our Climate Is Changing

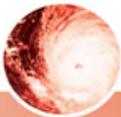
SCIENCE CONNECTIONS →

EXTREME WEATHER & CLIMATE CHANGE

→ Strongest Scientific Evidence Shows Human-Caused Climate Change Is Increasing Heat Waves and Coastal Flooding



TORNADOES



HURRICANES



SEVERE DROUGHTS



EXTREME PRECIPITATION EVENTS



COASTAL FLOODING



HEAT WAVES



Limited Evidence



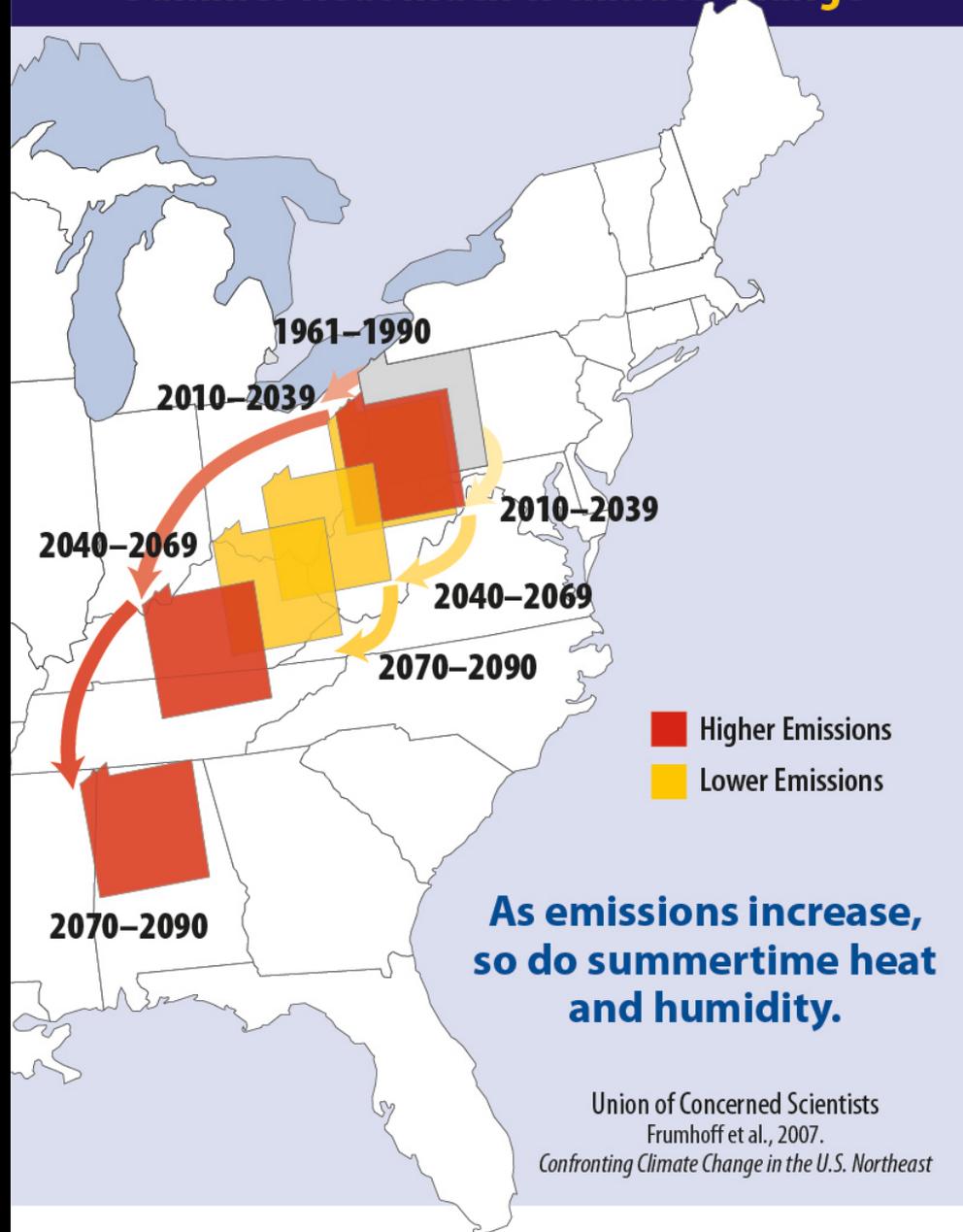
Strong Evidence

Strongest Evidence

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Source: Intergovernmental Panel on Climate Change SREX Report (2012)

ucsusa.org/extremeweather

Western Pennsylvania: Summer Heat Index & Climate Change



Cumulative GHG Emissions

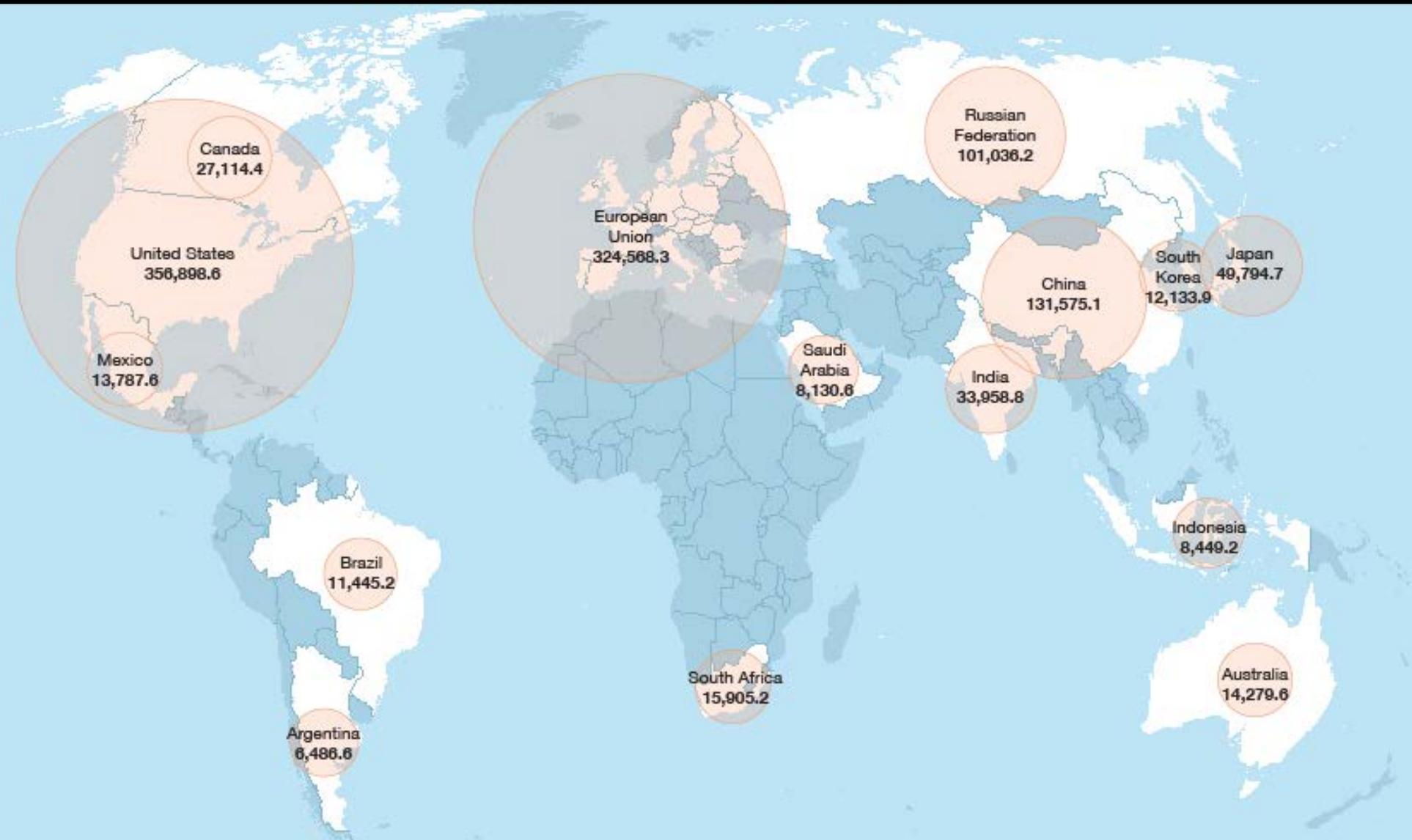
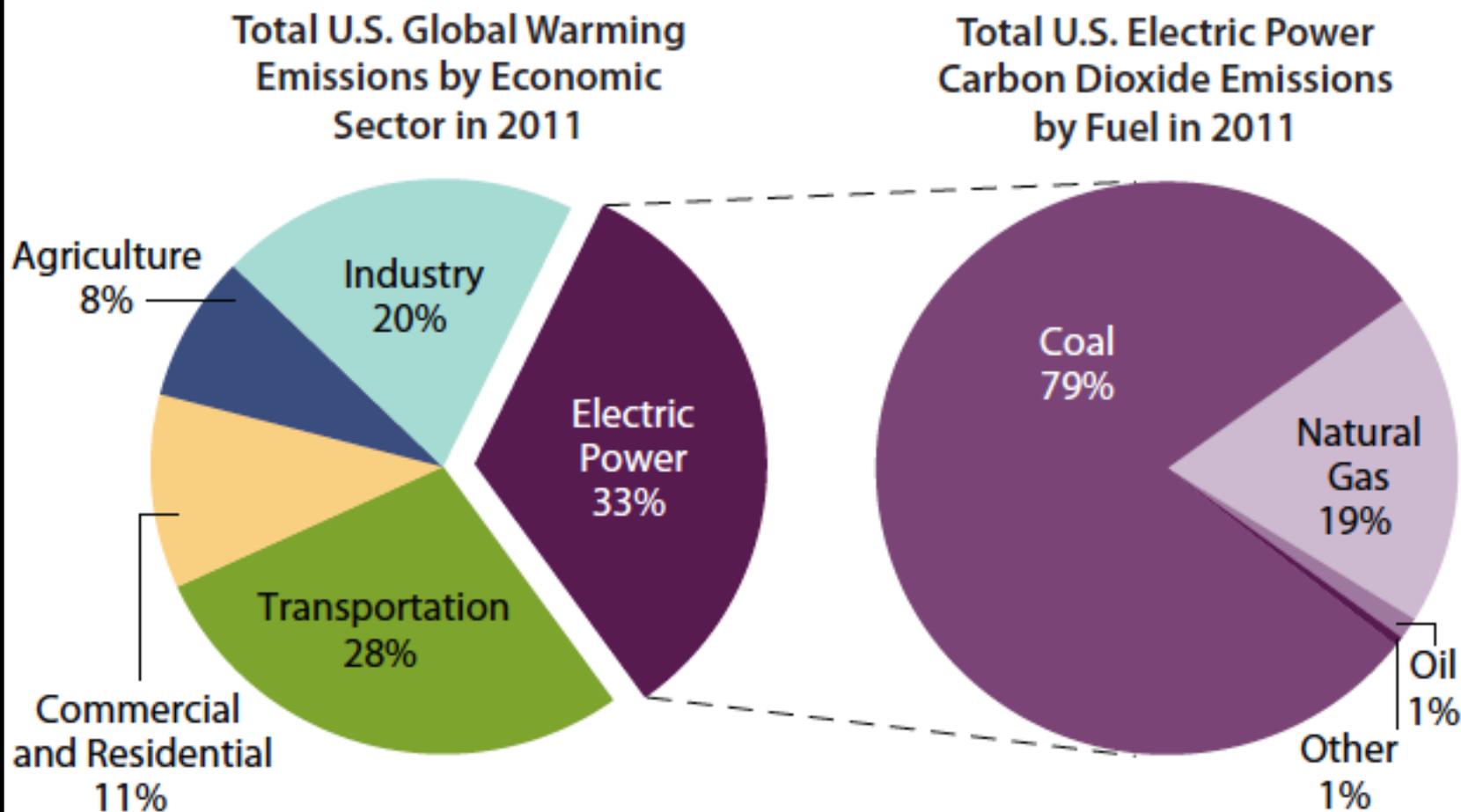


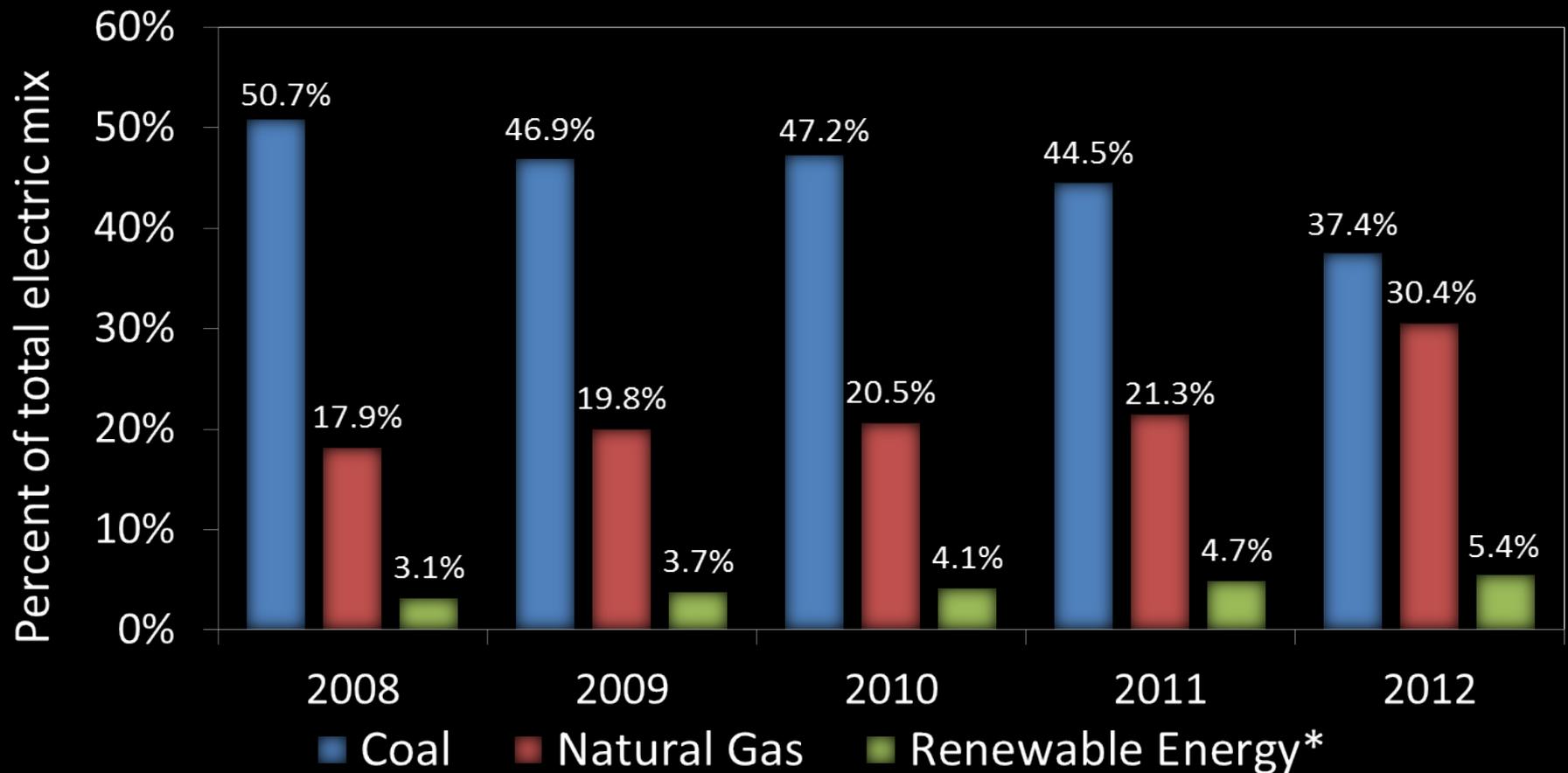
Figure 2. The Electric Power Sector Is the Largest Source of Global Warming Emissions, and Coal Accounts for Most of the Sector's Share



On the left, the electric power sector accounted for one-third of U.S. global warming emissions in 2011, according to the EPA. This does not include methane emissions from natural gas extraction and distribution, which accounted for 13 percent of industrial emissions in 2011, or 3 percent of total emissions. On the right, coal represented nearly 80 percent of combustion-related CO₂ emissions in the electric power sector in 2011 (EIA 2013c; EPA 2013).

Coal Facing Growing Competition from Cleaner Alternatives

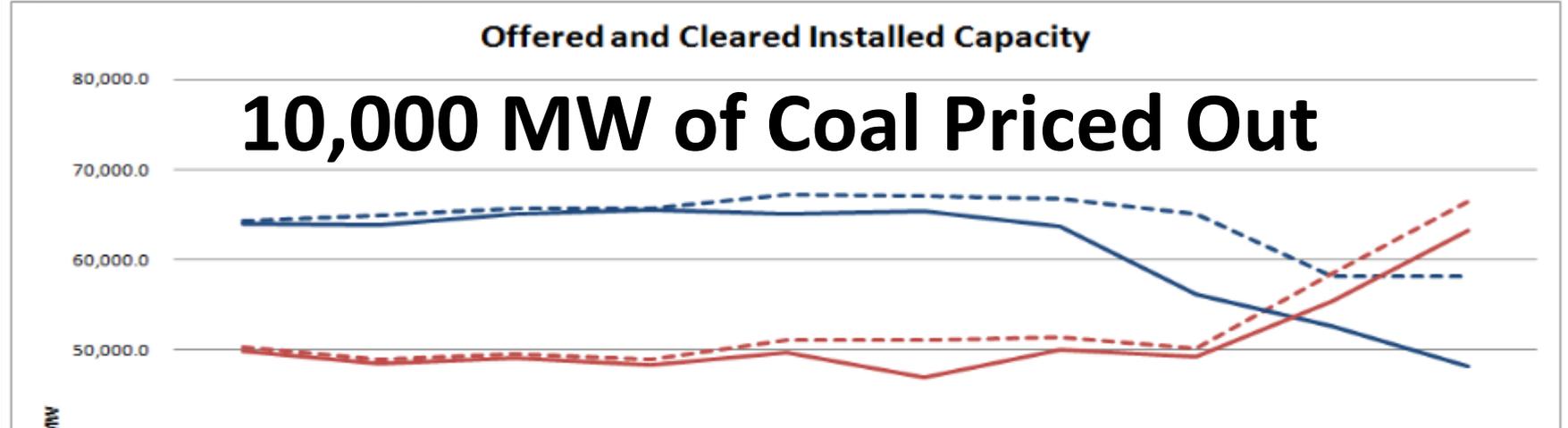
Share of total U.S. Electric Supply



*Non-hydro renewable energy sources. Source: EIA.

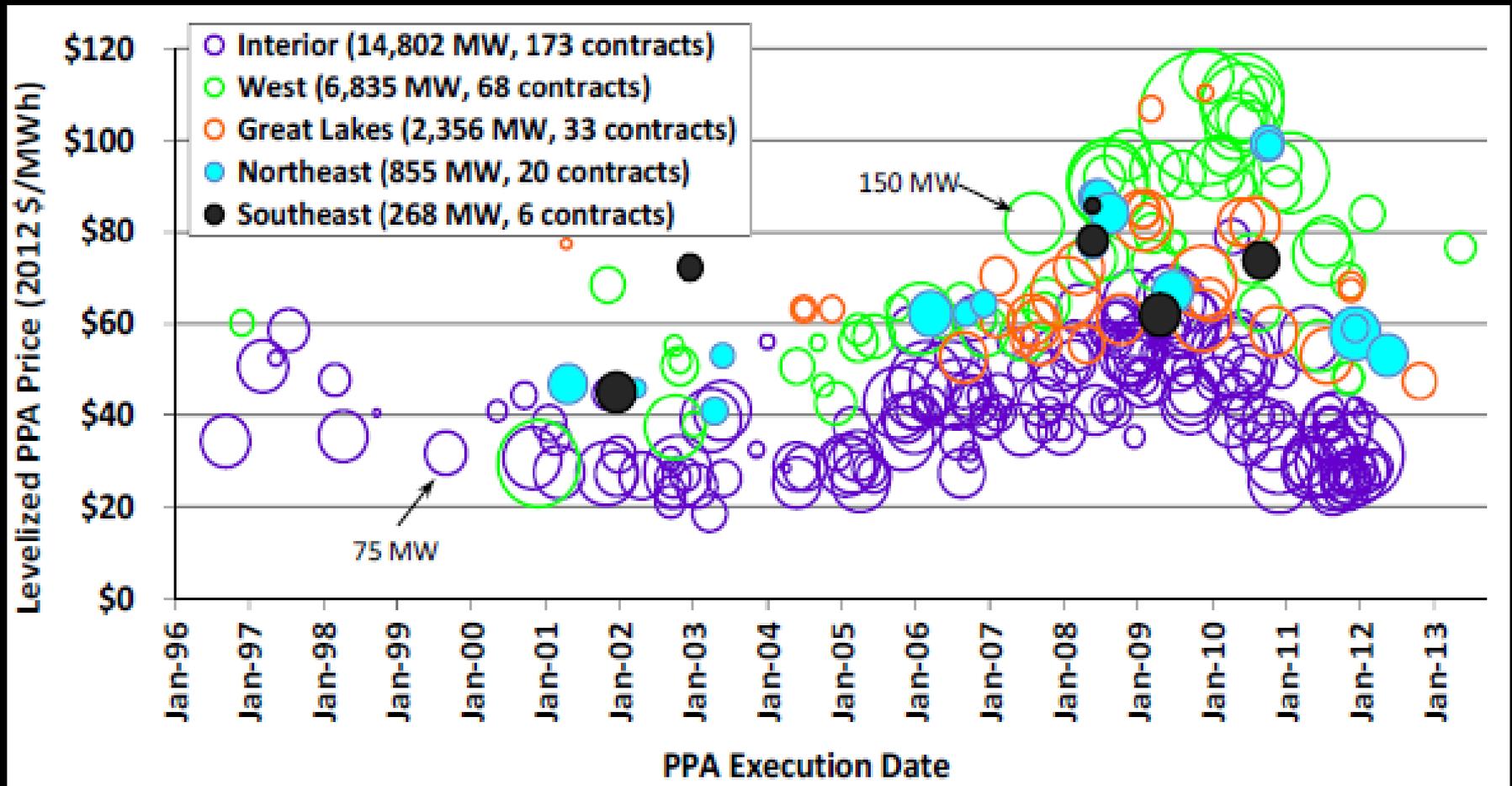
PJM 2016/2017 Capacity Market

Figure 3 – Offered and Cleared Quantities of Coal and Gas



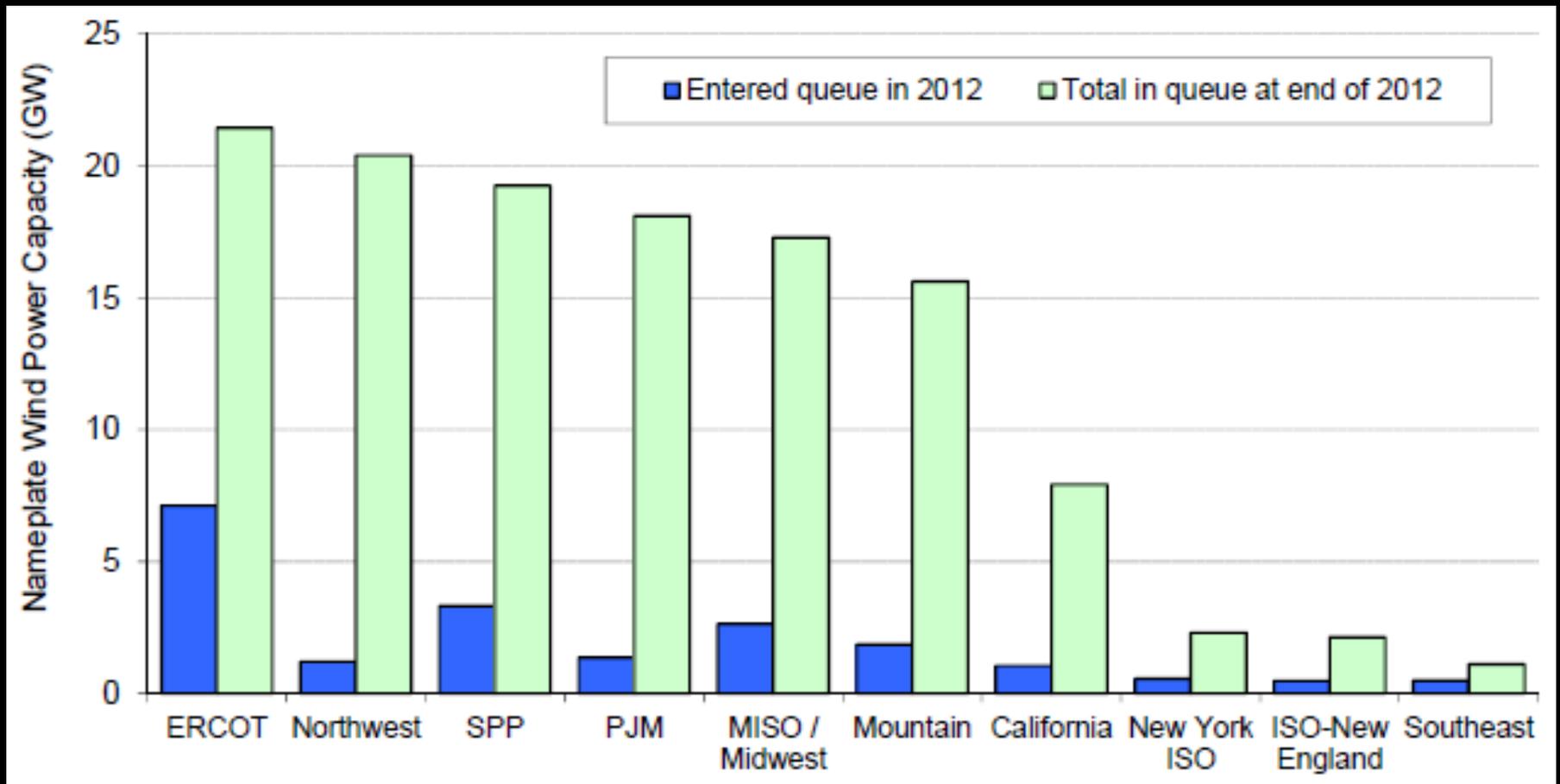
“Prices were generally lower than last year’s auction due to competition from new, gas-fired generation, low growth in demand because of the slow economy and increased imports from other regions, primarily to the west of PJM.” --Andrew L. Ott (Sr. VP, PJM)

Wind PPA Prices Falling

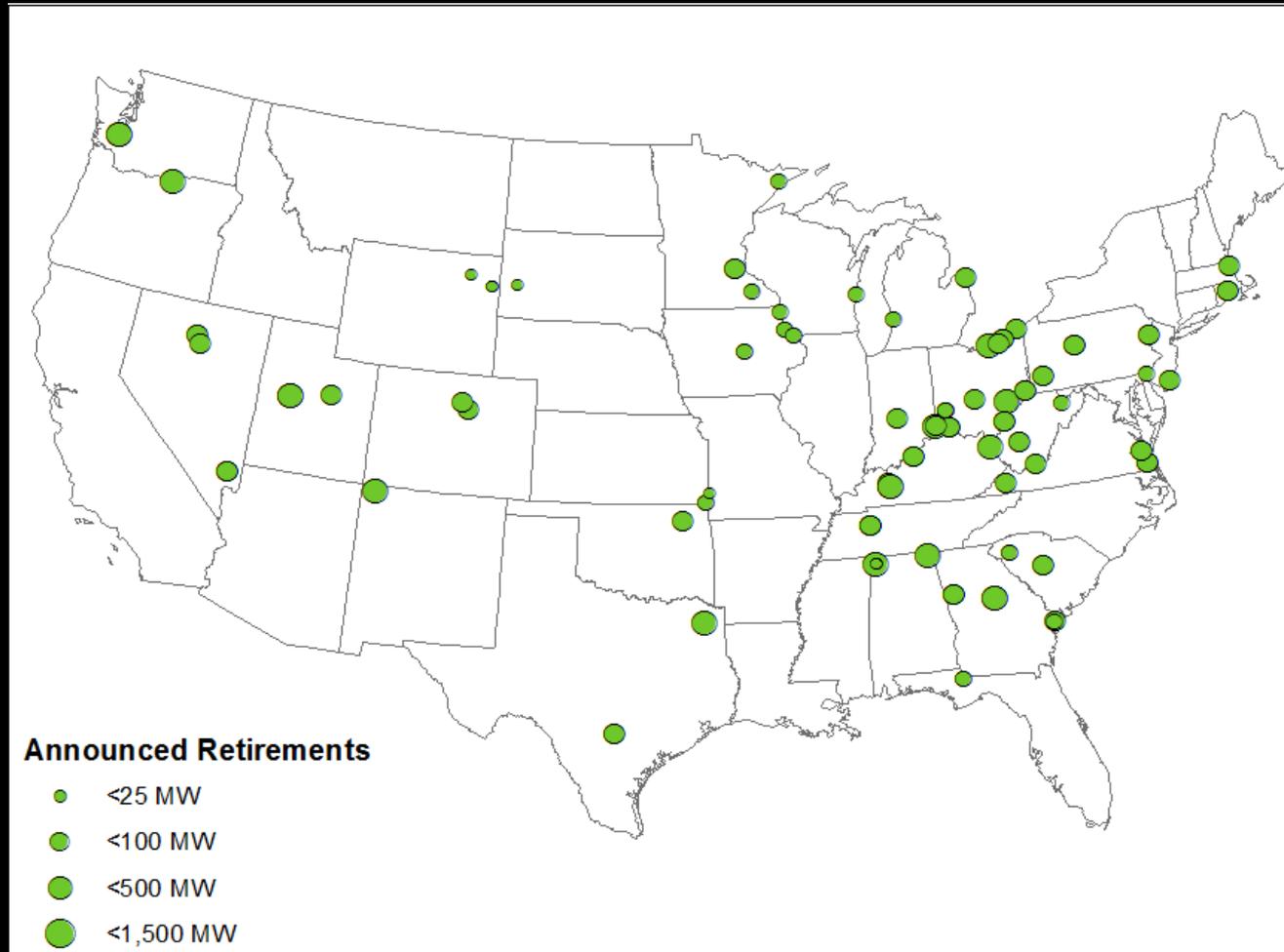


Source: 2012 Wind Technologies Market Report, DOE/LBNL

Eroding Economics of Existing Coal Plants



28.2 GW of Announced Coal Retirements* Concentrated in Midwest & Southeast



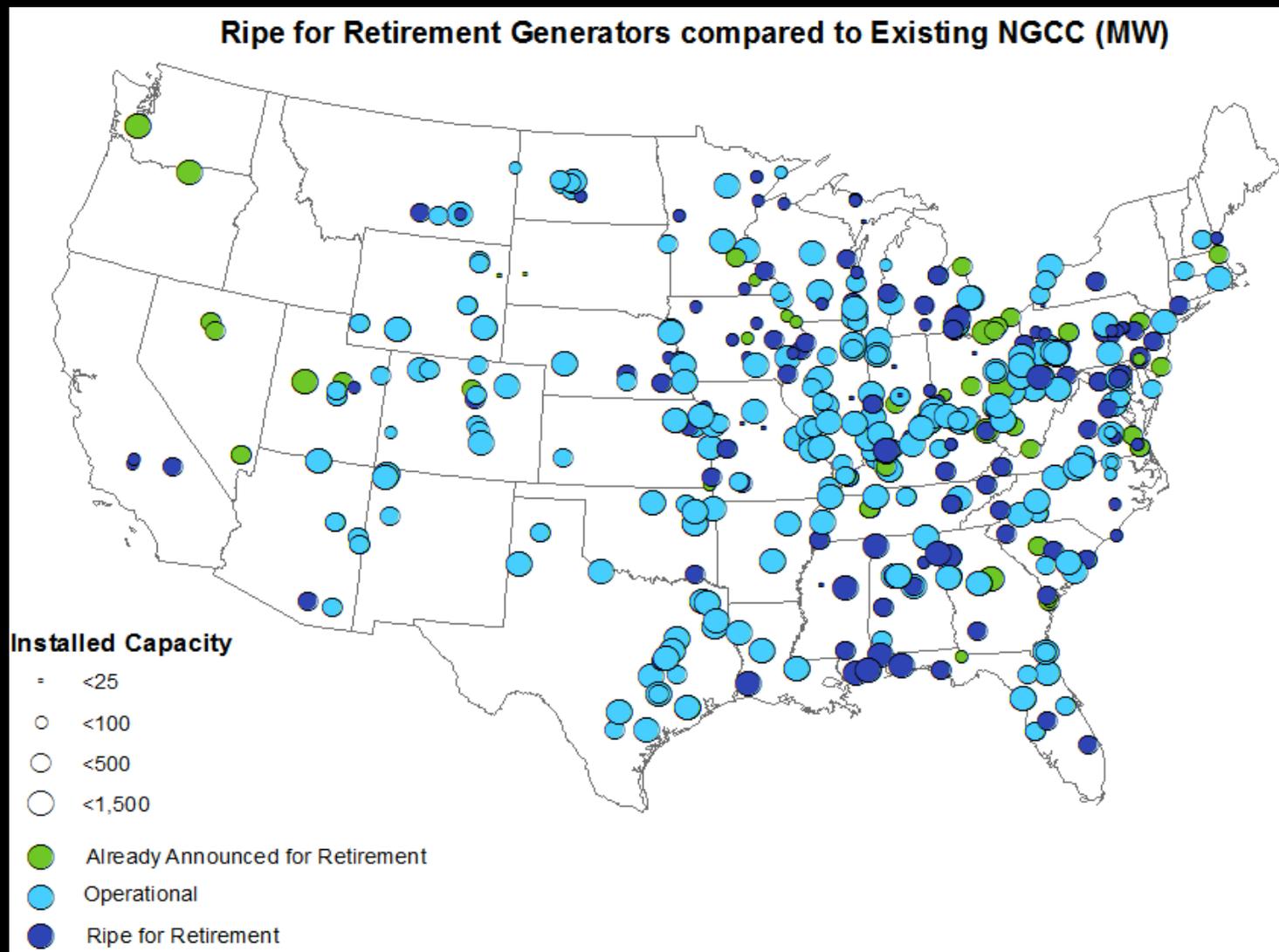
*As of November 2013. Source: SNL.

Main Findings of Our 2013 Analysis Update

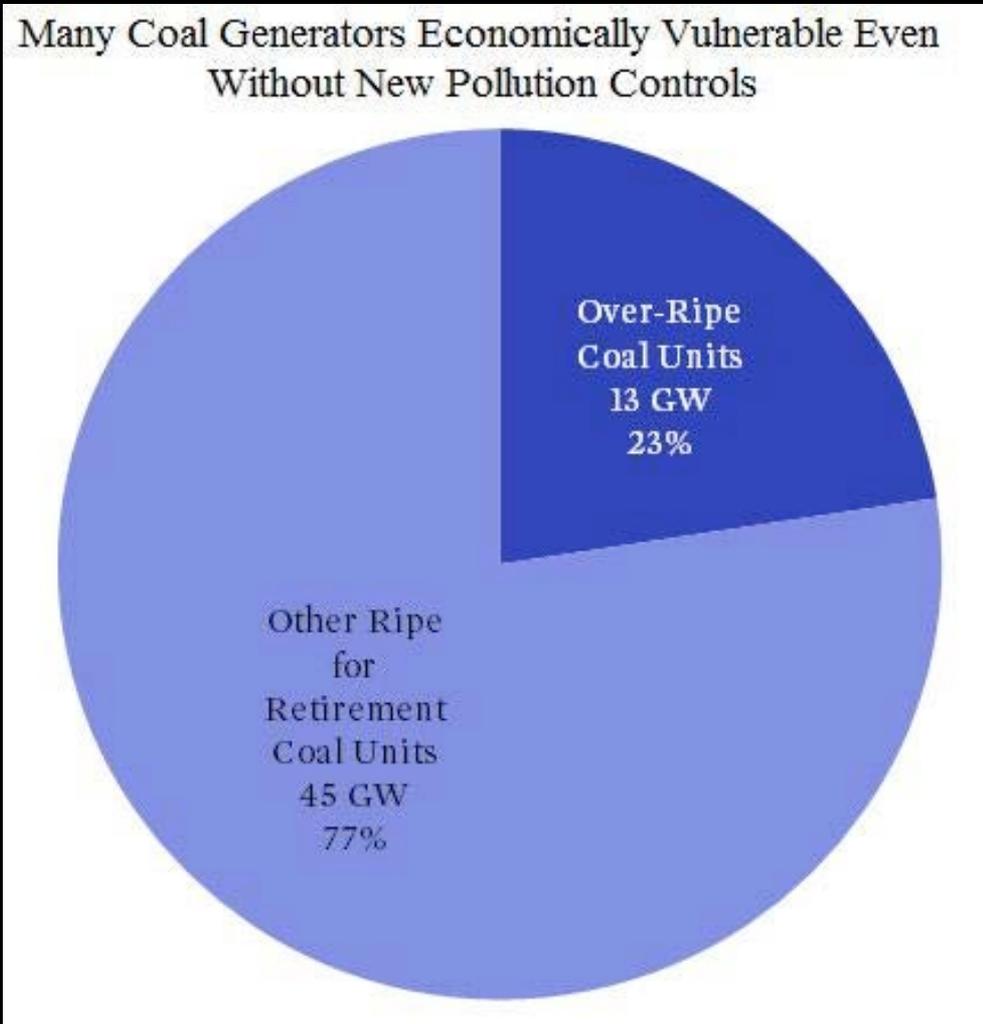
- 20.7 GW – 58.7 GW of coal generators are economically vulnerable compared with an average natural gas plant (new and existing NGCC)
- 21.9 – 71.1 GW of coal capacity are vulnerable compared with new wind facilities (with and without federal tax incentives)
- Regulators, investors and utilities should rethink costly retrofits, if coal plants can be retired and replaced with cleaner, more affordable alternatives



59 GW of Ripe for Retirement Coal Generators Concentrated in Midwest & Southeast



23 Percent of Ripe-for-Retirement Coal Generators Uneconomic Even Without Including Pollution Control Costs



West Virginia's Response?

In October, the WV PSC approved Mon Power's purchase of 80% of the Harrison power plant from their affiliate, Allegheny Energy Supply.

“... power prices have been weak for the last couple of quarters and we may be facing continued soft power prices for at least the next several years. As a result, we began to reposition our competitive business in 2012 and now through a series of even more aggressive actions have better positioned this business for the future. ... For example, we have reduced the size and mix of the fleet by closing and selling competitive units. In addition, we completed the Harrison and Pleasants transfer this quarter. ”

--FirstEnergy CEO Anthony Alexander

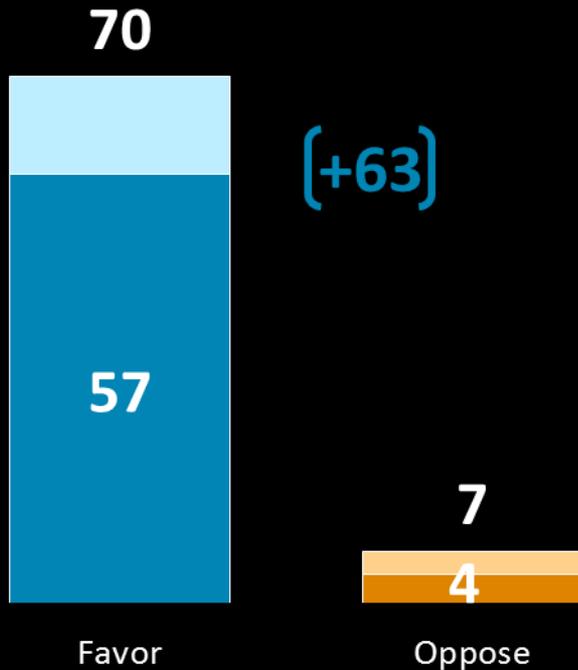
Risks of Overreliance on Natural Gas

- Climate change
- Fugitive emissions
- Price volatility
- Public health concerns
- Water use
- Environmental concerns

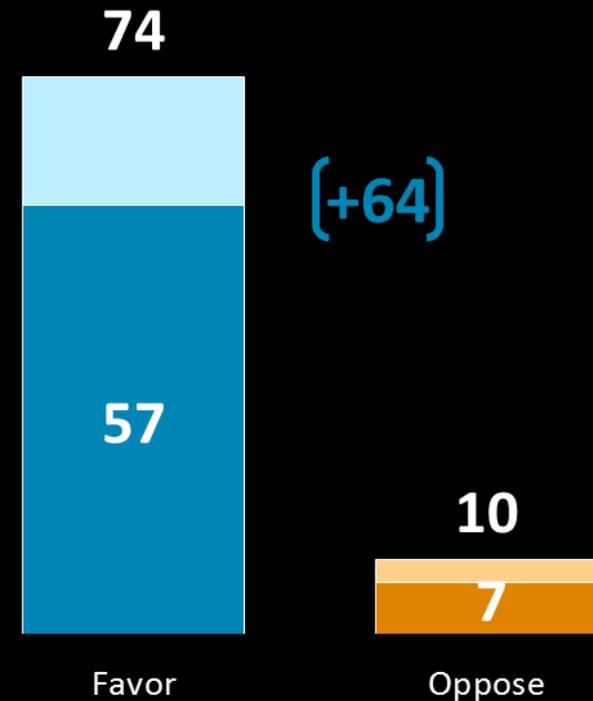


Fully Enforcing the Clean Water Act

To Safeguard Streams, Rivers, Lakes
from Coal Mining



To Safeguard Streams, Rivers, Lakes



*Asked of ½ the sample. Darker colors indicate intensity.



A Bright Economic Future for the Mountain State

September 3-4, 2013

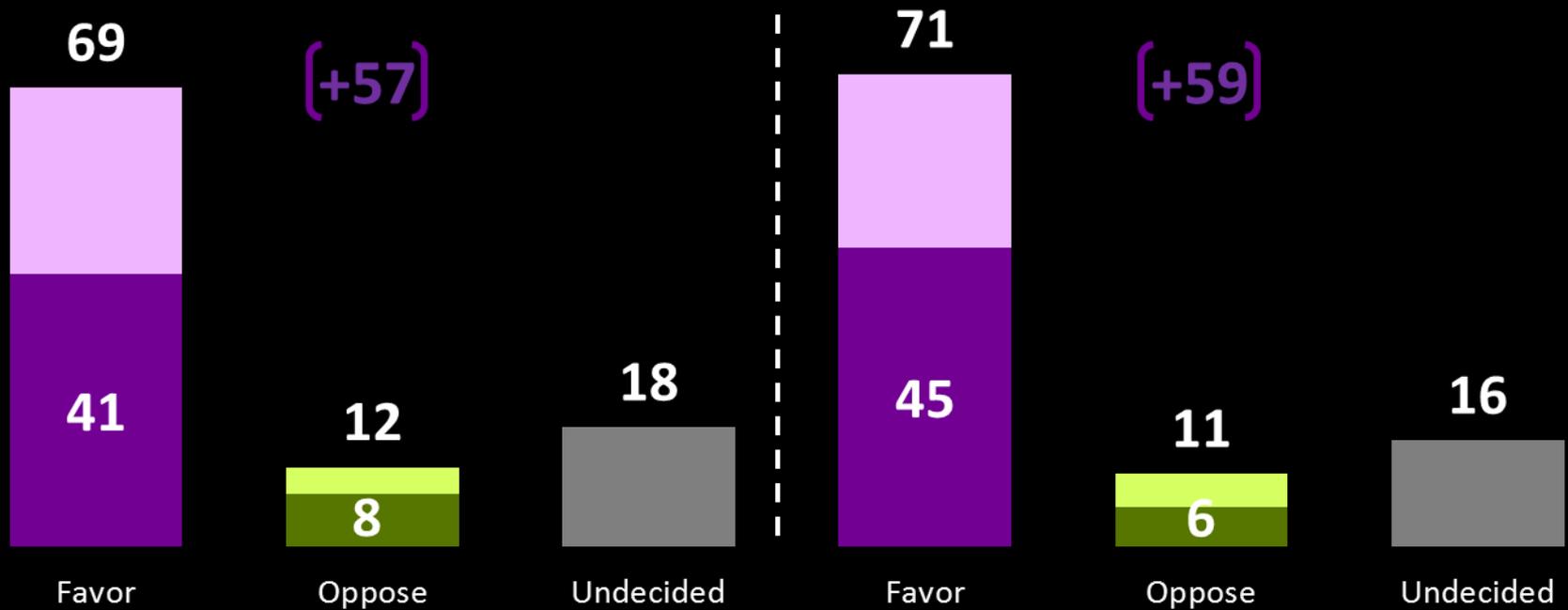
*Walker Theater, Clay Center for the Arts and Sciences
Charleston, West Virginia*

www.ucsusa.org/wvbrightfuture

West Virginia Future Fund

Infrastructure Projects*

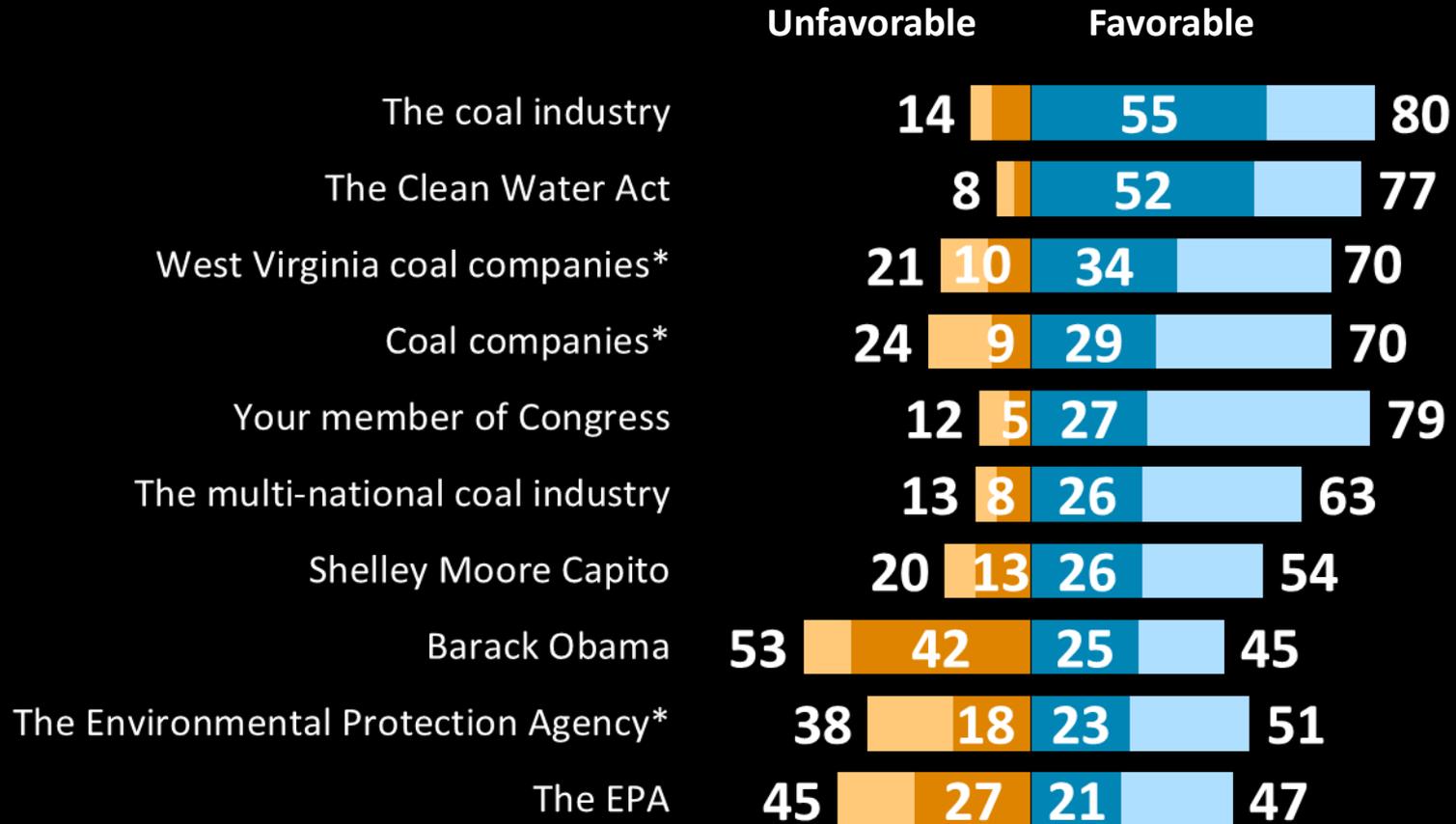
Education, Public Safety & Land Conservation*



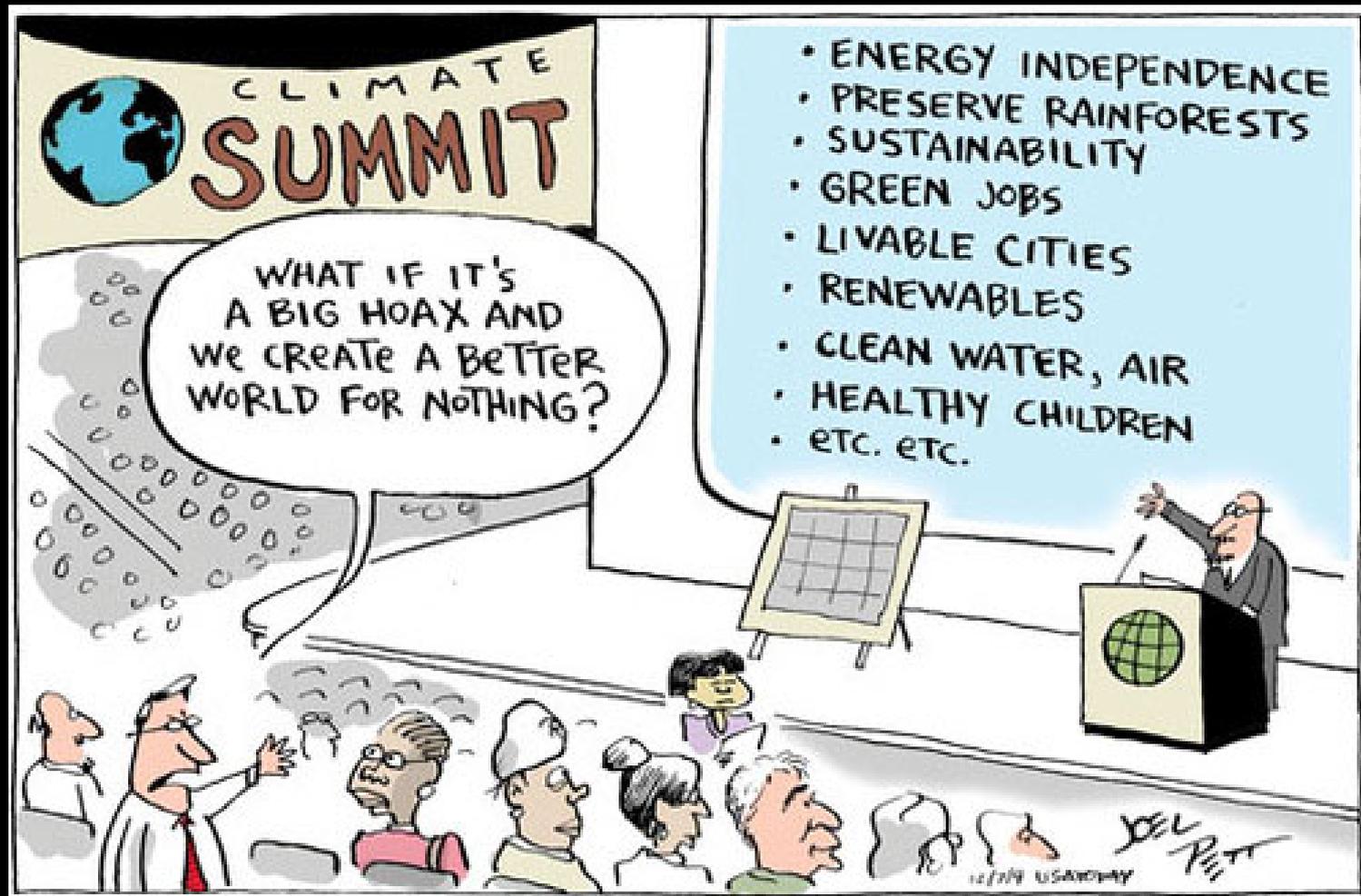
**Asked of ½ the sample. Darker colors indicate intensity.*

Initial Ballot: Raise Coal Tax by 1%

Favorability Ratings: Actors and Institutions



Darker colors indicate intensity.



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Our Methodology

- Step 1: Identified base running costs of each operating coal generators
- Step 2: Added costs for any of the four important pollution controls (SO₂, NO_x, Hg, PM) that were lacking
- Step 3: Compared costs of coal generators with pollution controls to average existing NGCC plant, new NGCC plant, and new wind projects
- Sensitivity Analysis: High/low natural gas prices, wind with/without PTC extension, \$20/ton CO₂ price
- Key Changes in 2013 Update: Coal fleet data updated from 2009 to 2011; updated cost and performance assumptions for wind and natural gas; vary wind capacity factor based on regional wind availability

Understanding the Focus of this Report

- Not an evaluation of compliance with federal clean air standards (new EPA rules)
- Only considers costs associated with a subset of air pollution controls; excludes cooling water and coal ash-related costs as well as any other criteria
- National analysis to identify coal generators that should be considered for closure; not a predictive tool
- Does not account for localized operating conditions, transmission constraints, reliability impacts, etc.

Key Findings

This research reveals broad-based and remarkably intense support for a proposal to increase the state's coal tax by 1% in order to fund economic development and infrastructure projects, as well as education and worker training programs. West Virginians also want to see the revenue derived from their natural resources dedicated to the benefit of their communities in a new "Future Fund" to promote economic development.

The Future Fund generates widespread enthusiasm and very little opposition from West Virginia voters (70% favor, 12% oppose, 17% undecided). More than four in ten voters (43%) strongly support this proposal. Majorities of voters from across the political spectrum, and from every region of the state, favor the Future Fund and by commanding margins.

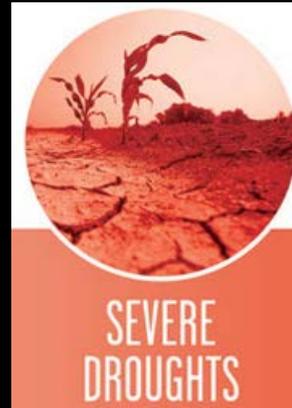
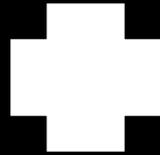
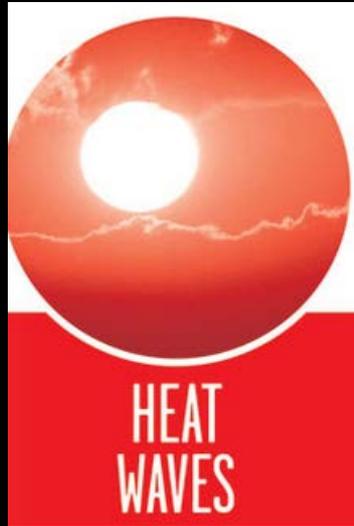
Similarly, voters favor raising the coal tax by an impressive 50-point margin (69% to 19%, with just 11% undecided). Half of all likely voters support the proposal strongly.

Voters in every region of the state, including the heart of Coal Country, support the proposal: 70% in Charleston/Huntington, 72% in southern WV, and 69% each in northern WV and central/eastern WV.

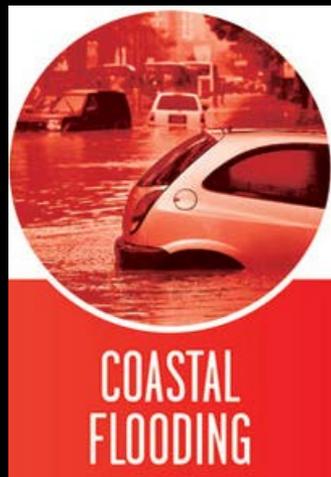
Support for this proposal not only broad and deep—it is remarkably resilient; voters rate the standard range of coal industry scare tactics with only lukewarm potency and, more important, overall support for increasing the coal tax never wavers. By the end of the survey, 69% of voters favor the proposal (including 52% who favor it strongly), while just 20% oppose it.

Given the industry's wherewithal, these attacks should still be taken seriously, but defining this debate on our terms can prohibit any real erosion in support.

Costliest U.S. extreme weather events in 2012

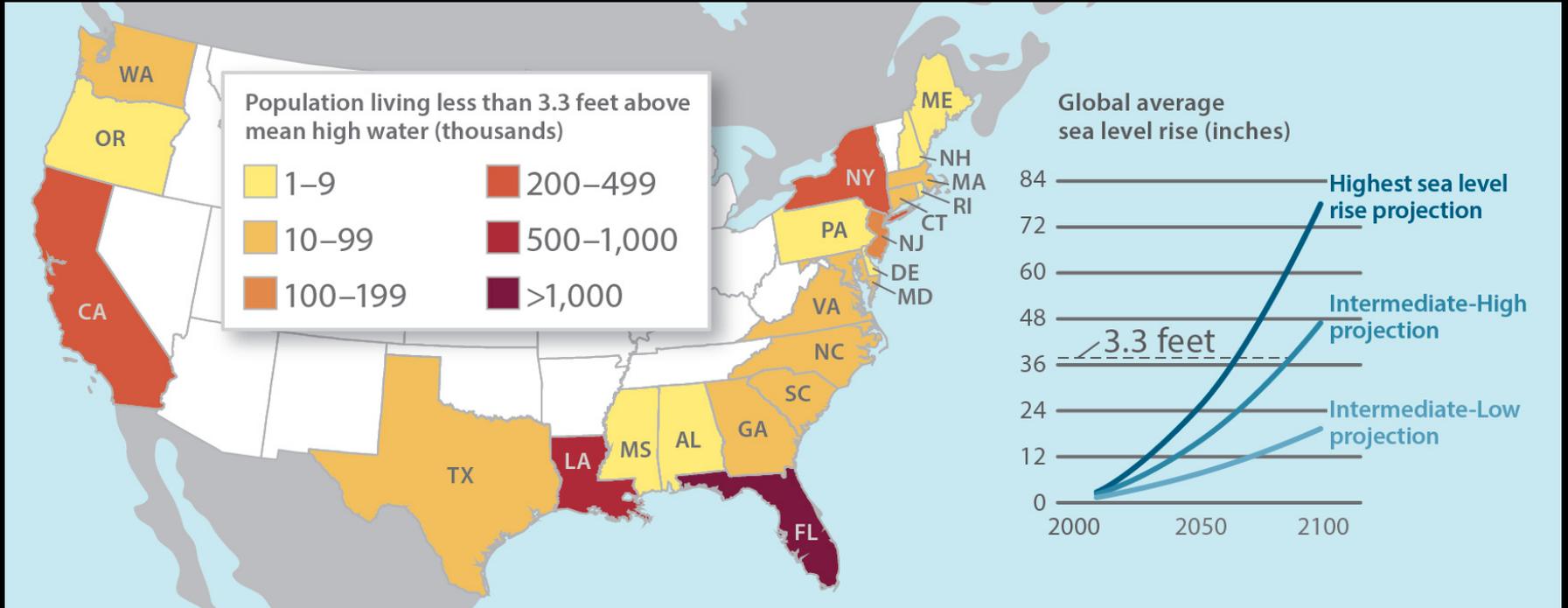


123 Lives Lost
> \$30 billion



Superstorm Sandy:
159 Lives Lost
> \$65 billion

Sea Level Rise



Under-regulated?

Environmental laws and exemptions for the oil and gas industry

Environmental law	Exemption
Safe Drinking Water Act	Hydraulic fracturing exempt from regulation
Clean Water Act	Oil-and-gas operations exempt from stormwater runoff regulation
Clean Air Act	Oil-and-gas exploration and production exempt from the act's regulation of aggregated small sources of air pollutants
Emergency Planning and Community Right to Know Act	Oil-and-gas exploration and development exempt from reporting toxic emissions in the Toxic Release Inventory
Resource Conservation and Recovery Act	Oil-and-gas field wastes exempted from control
Comprehensive Environmental Response, Compensation, and Liability Act	Oil and gas are not defined as hazardous substances
National Environmental Policy Act	Oil-and-gas development enjoys broad categorical exclusions from comprehensive environmental impact statements

