QUALITY. INDEPENDENCE. IMPACT.

Ensuring a fair transition for coal workers and their communities

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Outline

- Old bad news
- New bad news
- Opportunities

Coal is the most carbon intensive fuel and it has lots of substitutes Emissions in Kg C/mBTU



Almost all US coal is used for electricity production

U.S. coal flow, 2018

million short tons



Notes: • Production categories are estimated; all data are preliminary. • Values are derived from source data prior to rounding for publication. • Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), *Monthly Energy Review* (April 2019), Tables 6.1 and 6.2; and EIA estimates based on U.S. Department of Labor, Mine Safety and Health Administration, Form 7000-2, "Quarterly Mine Employment and Coal Production Report."



2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

US coal use has declined steeply in US power sector



Source: U.S. Energy Information Administration. Note: Two series have been merged to achieve continuity of data.

U.S. coal production has dropped disproportionately in Appalachia



U.S. coal employment has fallen 42% since 2011



Projections with no new climate policy

AEO2020 coal production by region million short tons



Electricity

generation from selected fuels

billion kilowatthours



U.S. renewable electricity generation is the fastest-growing electricity resource throughout the projection period.



Most of the growth in renewable electricity generation is from

Continued declines in the capital costs for solar and wind are supported by federal tax credits and higher state-level renewables targets.

U.S. coal-fired and nuclear electricity generation declines

Electricity generation from nuclear and coal billion kilowetthours



What happens to US coal production under climate policy?

US Energy Information Administration's Annual Energy Outlook (AEO 2018) modeled:

-- a price on CO₂ from the power sector (only)

-- \$25 /ton CO₂ in 2020, rising at 5 % real annually

Projections help anticipate a range of possible outcomes

Large uncertainties around policy & model assumption/parameters

CO₂ Price Case: Total US Coal Production



Source: U.S. EIA's \$25 per ton of CO₂ "side case" from Annual Energy Outlook 2018

CO₂ Price Case: Powder River Basin Coal Production



Source: U.S. EIA's \$25 per ton of CO₂ "side case" from Annual Energy Outlook 2018

CO₂ Price Case: Appalachia Coal Production



Source: U.S. EIA's \$25 per ton of CO_2 "side case" from Annual Energy Outlook 2018 Includes northern, southern, and central Appalachia

Coal country challenges

- Miner retirement/health care benefits
- Black lung liability trust fund
- Underfunded reclamation
- Bankruptcies
- Impaired water quality
- Eroding fiscal conditions

https://www.brookings.edu/research/the-risk-of-fiscalcollapse-in-coal-reliant-communities/









Source: WY 2017 Budget Fiscal Data Book

12 most coal-reliant US counties by 2015 employment share



Three mining-intensive counties...

Significant data limitations

Boone County, WV (pop. 22,000)

- 70% decline in coal from 2012-2017;
- -> 38% decline in county govt revenue.

Campbell County, WY (pop. 46,170)

- Two largest revenue sources tied strongly to coal
- Mine bankruptcies thwart tax collection

Mercer County, ND (pop. 8,267)

 Coal severance, coal conversion, and royalties provide around 1/2 revenue to county government (as of 2016)





Could risks extend to counties with coal-fired power plants?

Distribution of coal plants in the Lower 48 states



Federal government tools are lacking...

- POWER initiative/grant programs
- Lots of other bills and proposals
- No great precedent for what's needed:
 - » Base closings
 - » Trade Adjustment Assistance

Map of the Appalachian Regional Commission Service Area

 Need \$10's of billions for a proper transition

https://fas.org/sgp/crs/misc/R46015.pdf



Which climate policy future would work best for coal-reliant areas?

- •Weak federal policy & misc. state action
- •Regulatory system, e.g. under Clean Air Act
 - »Protracted, legally and environmentally uncertain
- Policy reversals
- Carbon tax/fee
 - »Needs new legislation
 - »More cost effective than regulation.
 - »High uncertainty about timing, price trajectory, regulatory backstop, coverage, use of revenue, border adjustments
 - »Raises revenue

How could it work?

- Economy-wide tax on carbon and other GHGs
- Ramp up over time
- Raise \$1 to \$2+ trillion over 10 years
 - » Hold poorest 25% harmless with about 15% of revenue
 - » Lower other taxes/provide rebates to households
 - » Border adjust
 - » Suspend other regulations, subsidies, mandates
 - » 3% of revenue targeted to coalfield transition could provide at least \$36 billion over 10 years

U.S. Carbon Pricing Bills, 216th Congress

- 1. <u>Energy Innovation and Carbon Dividend Act of 2019</u> (H.R.763) Reps. Deutch (D-Fla.) and Rooney (**R-Fla**.) Jan. 24, 2019
- 2. <u>Healthy Climate and Family Security Act of 2019</u> (S.940 and H.R.1960) Sen. Van Hollen (D-Md.) and Rep. Beyer (D-Va.) March 28, 2019;
- 3. <u>American Opportunity Carbon Fee Act of 2019</u> (S.1128) Sens. Whitehouse (D-R.I.), Schatz (D-Hawaii), Heinrich (D-N.M.), and Gillibrand (D-N.Y.) April 10, 2019
- 4. <u>The Climate Action Rebate Act of 2019</u> (S.2284 and H.R.4051) Sens. Coons (D-Del.) and Feinstein (D-Calif.), and Rep. Panetta (D-Calif.) July 25, 2019;
- 5. <u>The Stemming Warming and Augmenting Pay Act of 2019</u> (H.R.4058) Reps. Rooney (R-Fla.) and Lipinski (D-Ill.) July 25, 2019;
- 6. <u>The Raise Wages, Cut Carbon Act of 2019 Act of 2019</u> (H.R.3966) Reps. Lipinski (D-Ill.) and Rooney (**R-Fla**.) July 25, 2019
- 7. The America Wins Act of 2019 (H.R.4142) Rep. Larson (D-Conn.) August 2, 2019
- 8. The <u>Modernizing America with Rebuilding to Kickstart the Economy of the Twenty-first</u> <u>Century with a Historic Infrastructure-Centered Expansion Act of 2019</u> Reps. Fitzpatrick (R-Pa.) and Carbajal (D-Calif.) September 26, 2019.
- Plus proposal by the Climate Leadership Council, authored by James Baker and George Shultz

Concluding thoughts

- The transition: we are already in it and it's not fair
- Need a transition policy package
- Consider climate policies that will make coalreliant workers and communities better off

Energy Modeling Forum 32 Project

- EMF 32 Study on U.S. Carbon Tax Scenarios Special Issue of *Climate Change Economics*
- Guest Editors: A. Fawcett, J. McFarland,
 A. Morris, and J. Weyant
- <u>https://www.worldscientific.com/toc/cce</u> /09/01
- 15 papers: Intro, 4 cross-cuts, 10 modeler papers
- 11 models
- Harmonized carbon tax scenarios applied to fossil CO₂

