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THE **ECONOMIC EFFECTS** OF NEW EPA RULES ON THE STATE OF **NORTH CAROLINA**



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Executive Summary

Through the Environmental Protection Agency (EPA), the Obama administration has unveiled an unprecedented scope of regulation. The new regulations include CO₂ emission limits on new and existing electricity power plants and new lower limits on mercury emissions from electricity power plants.¹

The new rules are aimed at reducing CO₂ emissions from coal power plants, which is of particular interest to North Carolina as the state relies on electricity produced by coal fired power plants for a greater portion of its electricity than most states.

By decimating the coal industry in the state, and imposing higher electricity costs on both industrial and residential users, the EPA rules will inflict large negative impacts on the economy of North Carolina. The findings of this study conclude the state's economy will lose 32,120 jobs by 2030 due to the EPA rules, and total real disposable income would fall by \$3.5 billion. Moreover, annual investment in the state would decline by \$448 million by 2030.

¹ Nam D. Pham and Daniel J. Ikenson, A Critical Review of the Benefits and Costs of EPA Regulations on the U.S. Economy, NDP Consulting, <http://www.nam.org/~media/423A1826BF0747258F22BB9C68E31F8F.ashx> (November 2012).

Research and Analysis

Through the Environmental Protection Agency (EPA), the Obama administration has unveiled an unprecedented scope of regulation. The new regulations include CO₂ emission limits on new and existing electricity power plants and new lower limits on mercury emissions from electricity power plants.

The EPA aims the new rules directly at coal-fired electricity power plants, which provides 28.3 percent of the electricity generation in the United States.² The EPA rules are ambitious since coal is a dispatchable electricity source and provides the bulk of base load electricity to the nation's electric grids.

The rules for new plants would limit CO₂ emissions to 1.1 pounds (lbs.) per kilowatt hour (kWh) of electricity production.³ This is approximately half of the current average of 2.14 lbs. per kWh.⁴ The rule on existing coal plants would set the goal of reducing CO₂ emissions by 30% below the 2005 levels by 2030. The mercury rule would set emissions limits ranging from 0.0002 lbs. per Gigawatt hour (1,000,000 kilowatt hours) to 0.04 lbs. per Gigawatt hour.⁵

The EPA rules will force utilities to close coal-fired generation plants or adopt expensive and unproven technologies, such as carbon capture and storage.

The EPA estimates that that these new regulations will incur over \$50 billion in annual costs. However, the EPA contends that many of these regulations will provide tens of billions of dollars in benefits that will more than offset these enormous costs. Most of these benefits are in terms of improved health.

The EPA's cost and benefit estimates have come under criticism from a number of observers. The EPA calculations of cost tend to be much lower than industry estimates and benefit calculations are inflated.⁶ The EPA analysis suffers from the following:

1. The use of decades-long amortization schedules for capital expenditures obfuscates the full financial burden that will be imposed over a short time period;
2. The failure to estimate likely macroeconomic impacts of its proposed regulations; and,
3. The mis-identification of source reduction; most of the benefits derive from co-benefits from other pollutants regulated under different rules while the primary pollutant is reduced only minimally.

The cost of EPA regulations will not be experienced uniformly across all states, as states with a higher concentration of coal fired power plants will experience higher costs from the regulations. North Carolina derives 44 percent of its electricity from coal, one of the higher levels in the U.S. While the average retail electricity price is

² <http://www.eia.gov/electricity/state/unitedstates/index.cfm>,

³ U.S. Environmental Protection Agency, "Regulatory Impact Analysis for the Proposed Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units (September 2013), <http://www.epa.gov/ttnecas1/regdata/RIAs/EGUGHGNewSourceStandardsRIA.pdf>, accessed May 8, 2014.

⁴ <http://www.eia.gov/tools/faqs/faq.cfm?id=74&t=11>,

⁵ EPA, "Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards." (December 2011), 1-6.

⁶ Ibid.

⁷ U.S. Energy Information Agency, "State Electricity Profiles: Ohio", Table 5. Electric power industry generation by primary energy source, 1990-2012; <http://www.eia.gov/electricity/state/Ohio/index.cfm>.

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9.15 ¢/kWh, or 25th highest in the country, the average price of electricity has jumped by 17% percent from 2007 to 2012. Not a coincidence, electricity generation from coal has dropped by 36 percent over the same period.⁷ Over the same five-year period electricity generation using natural gas exploded in North Carolina by 334 percent, as natural gas prices plunged by 53 percent. One would have expected that the drop in the price of natural gas and the shift to use by electric utilities would have driven down electricity prices over the period.

The price increase could be due to high demand for natural gas at times of peak electricity and heating demand that drive the natural gas spot prices to soar as natural gas supply is unable to meet this elevated demand. This scenario played out in the Northeast and Midwest this past winter, when the so-called Polar Vortex (a long cold spell) caused natural gas demand to soar to over \$35 per million British Thermal Units (BTUs) from under \$5. The problem was especially problematic in New England, where natural gas produces over 55 percent of the electricity generation capacity.⁸

The new EPA rules will further reduce, if not eliminate, the use of coal over the next 15 years and send electricity prices soaring even higher.⁹

In this paper, the Beacon Hill Institute at Suffolk University (BHI) estimates the costs of these new EPA rules and the impact on the state's economy. To that end, BHI applied its STAMP® (State Tax Analysis Modeling Program) to estimate the economic effects of the EPA rules.¹⁰ We report the dollar values in 2012 Net Present Value dollars using a 3 percent discount rate. Table 1 displays the cost estimates and economic impact data for 2030.

Table 1: The Cost and Economic Impact of new EPA Rules on North Carolina (2012 \$)

Net benefits (cost)	2030
CO2 Rule for New Power Plants (millions \$)	-273
CO2 Rule for Existing Power Plants (millions \$)	-518
Utility Mercury Emissions (millions \$)	-948
Total net cost to North Carolina (millions \$)	(1,739)
Electricity Prices (cents per kWh)	1.94
Percent change (%)	21%
Total Employment (Jobs)	-32,120
Investment (\$ millions)	-448
Real Disposable Income (\$ millions)	-3,507

We estimate that the CO2 emission rule on new power plants will cost North Carolina \$273 million in 2030; the rule for existing plants will cost \$518 million and the mercury emissions rule will cost \$948 million. In total the three regulations will cost North Carolina \$1,739 million dollars. The regulations will drive up electricity prices in North Carolina by 1.94 cents per Kilowatt hour, or 21% by 2030.

These increased energy prices would inflict significant harm on the North Carolina economy. The state econo-

⁸ Roger Bezdek and Frank Clemente, "Protect the American People: Moratorium on Coal Plant Closures Essential," <http://instituteeforenergyresearch.org/wp-content/uploads/2014/06/Protect-the-American-People.-Moratorium-on-Coal-Plant-Closures-Essential.pdf> (June 2014).

⁹ Roger Bezdek and Frank Clemente, "Protect the American People: Moratorium on Coal Plant Closures Essential," <http://instituteeforenergyresearch.org/wp-content/uploads/2014/06/Protect-the-American-People.-Moratorium-on-Coal-Plant-Closures-Essential.pdf> (June 2014).

¹⁰ Detailed information about the STAMP® model can be found at http://www.beaconhill.org/STAMP_Web_Brochure/STAMP_HowSTAMPworks.html and <http://beaconhillinstitute.blogspot.com/2014/05/in-defense-of-stamp-as-tax-modeling-tool.html>.

my would shed 32,120 jobs by 2030. The job losses and price increases would combine to reduce real incomes as firms, households and governments spend more of their budgets on energy and less on other items, such as home goods, entertainment and clothing. As a result, real disposable income would fall by \$3.5 billion per year by 2030. Furthermore, annual investment in the state would fall by \$448 million. The investment losses are mildly offset by the need to increase investment in other electricity technologies.

Conclusion

The EPA has used its rulemaking authority under the Clean Air Act to force coal to either shutdown or adopt expensive and untested technologies. These policies will have grave effects on the cost and/or the reliability of the national electricity supply. North Carolina will experience larger electricity cost and reliability impacts than the nation as a whole due to its higher portion of electricity production from coal fired power plants.

The rules are aimed at reducing CO₂ emissions from producers of coal power plants by either shutting them down or making their cost uncompetitive in the market place. If the electricity production from coal is eliminated, the diversity of the electricity supply sources will fall and become more dependent of natural gas and its price fluctuations. If the new expensive and untested carbon capture and sequestration technology is adopted electricity prices will increase.

The higher electricity costs threaten the state's industrial base. The rules proposed by the EPA would therefore inflict large negative impacts on the economy of North Carolina. The state would experience significant declines in employment, wages, disposable income and investment upon implementation of the policy. North Carolina policymakers need to be aware of these serious consequences that come with these rules.

Methodology

BHI utilized its STAMP (State Tax Analysis Modeling Program) model to identify the economic effects and understand how they operate through a state's economy. STAMP is a five-year dynamic CGE (computable general equilibrium) model that has been programmed to simulate changes in taxes, costs (general and sector-specific) and other economic inputs. As such, it provides a mathematical description of the economic relationships among producers, households, governments and the rest of the world. It is general in the sense that it takes all the important markets, such as the capital and labor markets, and flows into account. It is an equilibrium model because it assumes that demand equals supply in every market (goods and services, labor and capital). This equilibrium is achieved by allowing prices to adjust within the model. It is computable because it can be used to generate numeric solutions to concrete policy and tax changes.¹¹

BHI calculated the impact of the fossil fuel price increases on the price level for each of the (27) sectors of the economy within the STAMP model. Using the Energy Information Agency's (EIA) national data on GHG emissions by the residential, commercial, and industrial as well as transportation sectors; we allocated the national emissions to the STAMP sectors.¹² We then used data from the U.S. Census Bureau's Economic Census as a proxy

¹¹ For a clear introduction to CGE tax models, see John B. Shoven and John Whalley, "Applied General-Equilibrium Models of Taxation and International Trade: An Introduction and Survey," *Journal of Economic Literature* 22 (September, 1984): 1008. Shoven and Whalley have also written a useful book on the practice of CGE modeling entitled *Applying General Equilibrium* (Cambridge: Cambridge University Press, 1992).

¹² U.S. Department of Energy, Energy Information Agency, *American Energy Outlook 2009*, Table 18: Carbon Dioxide Emissions by Sector and Source, Internet, available at www.eia.doe.gov/oiaf/servicerpt/stimulus/excel/aeostimtab_18.xls.

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for the size of each industry in each state relative to the national data.¹³ We applied the cost of carbon, adjusted to be equivalent to 3.67 metric tons of CO₂, to GHG emissions in each sector, which gives us our total cost to the economy. We converted these price increases in dollars into percentage changes based on the annual value of production in each sector.

We simulated these changes in the STAMP model as a percentage price increase on fuel to measure the dynamic effects on the state economy. The model provides estimates of the proposals' impact on employment, wages and income in North Carolina. Each estimate represents the change that would take place in the indicated variable against a "baseline" assumption about the value of that variable for a specified year in the absence of the cap-and-trade policy.

The Beacon Hill Institute at Suffolk University in Boston focuses on federal, state and local economic policies as they affect citizens and businesses. The institute conducts research and educational programs to provide timely, concise and readable analyses that help voters, policymakers and opinion leaders understand today's leading public policy issues.

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**THE BEACON HILL INSTITUTE
FOR PUBLIC POLICY RESEARCH**

Suffolk University
8 Ashburton Place
Boston, MA 02108
Phone: 617-573-8750 Fax: 617-994-4279
bhi@beaconhill.org
<http://www.beaconhill.org>

¹³2002 Economic Census, Summary Statistics by 2002 NAICS, United States, Internet, available at <http://www.census.gov/econ/census02/data/us/US000.HTM>.