WHAT WILL CO$_2$ STANDARDS MEAN FOR OHIO?

President Obama announced a national climate plan in June 2013, and directed the U.S. Environmental Protection Agency (EPA) to set carbon pollution standards for the power sector. Once EPA establishes those standards, states will implement their own plans for achieving those reductions. In this fact sheet, WRI examines existing tools Ohio can use to reduce power plant emissions.
WRI analysis shows that Ohio has many opportunities to reduce carbon pollution from its power sector. Ohio actually is in a strong position to meet, and possibly exceed, forthcoming emissions standards for existing power plants. Carbon dioxide emissions from Ohio’s power sector were 18 percent below 2005 levels in 2011 (the most recent year for which we have energy data from Ohio). According to reference case projections from the Ohio Public Utility Commission, they are projected to remain at or above 2011 levels through 2020. However, this reference case does not account for the state’s existing renewable portfolio standard (RPS) and energy efficiency resource standard (EERS). Ohio can reduce power sector CO₂ emissions to 27 percent below 2011 levels in 2020 by achieving the targets in these existing state policies and taking advantage of the CO₂ reduction opportunities that use the existing infrastructure listed below. This is equivalent to a 41 percent reduction in emissions from 2005 levels. Reductions of this magnitude would exceed those required by potentially stringent standards for existing power plants.

**Box 1 | What’s Ahead for the Power Sector?**

The power sector is the leading source of carbon dioxide (CO₂) emissions in the United States, but also offers some of the most cost-effective opportunities to reduce those emissions. Despite recent decreases in power sector emissions—due to the recession, increasing competition from renewable energy, and the low price of natural gas—current projections show that, absent policy action, emissions will increase in the coming decades.1

**New Power Plants:** President Obama directed EPA to update draft CO₂ emissions standards for new power plants by September 2013.2 These standards will likely provide a backstop ensuring that new power plants produce significantly lower CO₂ emissions per megawatt-hour of power generation than the average existing coal plant. However, new coal plants are unlikely to be built even in the absence of the standards because of relatively low natural gas prices, among other factors.3 If the re-proposed standards are largely similar to the draft proposal issued last April, it is unlikely they will have a significant impact on near-term GHG emissions.

**Existing Power Plants:** EPA also has been directed to (a) propose CO₂ emissions standards for existing power plants by June 1, 2014; (b) finalize these standards by June 1, 2015; and (c) require states to submit their proposed implementation plans by June 30, 2016. The Clean Air Act provides EPA with considerable flexibility in setting guidelines for states to meet these standards. States could be allowed to pursue a range of programs that encourage activities—such as fuel switching, dispatch of existing low-carbon power plants, increased generation by renewable sources, and energy efficiency, among other options—for meeting emissions targets. EPA also could set guidelines that allow for emissions rate averaging across power sector generation units to help meet the standard.

**HOW OHIO CAN REDUCE POWER SECTOR EMISSIONS**

Ohio could achieve even greater long-term emissions reductions by expanding existing policies. By taking the actions listed below, which would likely require additional legislation, Ohio can reduce power sector CO₂ emissions by an additional 14 percent in the next six years, to 41 percent below 2011 levels by 2020 and 62 percent below 2011 levels by 2030.6

- **CO₂ REDUCTIONS FROM EXISTING POLICIES**
  - Meeting the EERS (-10 percent in 2020 compared to 2011 levels)
  - Meeting the RPS (-7 percent in 2020 compared to 2011 levels)

- **CO₂ REDUCTION OPPORTUNITIES USING AVAILABLE INFRASTRUCTURE**
  - Increasing combined heat and power (CHP) capacity at commercial and industrial facilities (-3 percent compared to 2011 levels)
  - Fully utilizing existing combined cycle natural gas capacity (-7 percent in 2020 compared to 2011 levels)
  - Increasing the efficiency of the existing coal-fired power plant fleet (-2 percent in 2020 compared to 2011 levels)
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Note: EPA has not yet proposed a national emissions standard for existing power plants. For purposes of illustration, this analysis shows emissions reductions that would occur if EPA adopted the Natural Resources Defense Council’s proposed standards for existing power plants; in Ohio, this would require CO₂ emissions reductions of 22 percent below 2011 levels in 2020. We also show the emissions reductions that would occur if EPA were to adopt a more ambitious “go-getter” reduction schedule that aligns with a national reduction pathway necessary to meet the Administration’s goal of reducing emissions 17 percent below 2005 levels by 2020. National power sector emissions in the “go-getter” scenario drop 38 percent from 2005 to 2020; we show the equivalent percent reductions applied to Ohio’s power sector (24 percent from 2011 to 2020). See footnote 6 for additional explanation.

- Expanding the RPS (-1 percent in 2030 compared to 2011 levels)⁶
- Accelerating the EERS (-5 percent in 2020 compared to 2011 levels)
- Further increasing CHP capacity at commercial and industrial facilities (-9 percent in 2020 compared to 2011 levels)

**OPPORTUNITIES IN DETAIL**

**Existing and Expanded Energy Efficiency Resource Standards.** In 2008, Ohio enacted an energy efficiency resource standard requiring utilities to implement programs that achieve cumulative electricity savings of 22 percent between 2009 and 2025 with specific annual benchmarks. Targeted annual savings started at 0.3 percent per year in 2009, ramping up to 1 percent per year from 2013–18 and 2 percent per year from 2019–25. Utilities are planning to meet the targets through discounts and rebates on energy efficient lighting; weatherization and household appliances; lighting retrofits; and energy management and CHP programs for commercial customers.⁹ Analysis by the American Council for an Energy-Efficient Economy has shown that the economic benefits of meeting the standard will outweigh the costs, with the potential to save electricity customers in Ohio over $5 billion through 2020.¹⁰ By achieving its annual electricity savings targets, Ohio can reduce its power sector emissions by 10 percent per year beginning in 2015 and continues to achieve this rate of savings through 2030, which is within the range of Ohio’s estimated cost-effective energy efficiency potential.¹¹

*Existing and Expanded Renewable Standards.** Ohio’s renewable and advanced energy portfolio standard requires 25 percent of the electricity sold by each utility or
electric services company within the state to be generated from alternative energy sources by 2025. At least 12.5 percent of sales by 2024 must be generated from renewable energy resources, including wind, hydropower, biomass, and at least 0.5 percent solar.12,13 To reach the renewable standard by 2024, Ohio will need to increase its renewable sales by nearly 1 percent per year between 2012 and 2024. Renewable energy in Ohio has been growing rapidly since 2010: wind capacity grew from 9 MW to over 400 MW in 2012 with completion of Iberdrola’s Blue Creek Wind Farm, and several utility-scale solar projects are currently in development.14 By meeting its renewable standard, the state can reduce its power sector emissions by 7 percent in 2020 compared to 2011 levels. If Ohio continues to increase its renewable sales at the same rate after its target has been reached in 2024, it can reduce power sector CO₂ emissions by 11 percent in 2030 compared to 2011 levels.

Increasing CHP at Commercial and Industrial Facilities. Ohio is among the top five states with the greatest technical potential for new CHP capacity, but has utilized only a small fraction of this potential until recently.15 In the past five years, it has become a leader in creating favorable conditions for CHP deployment.16 In 2012, Ohio partnered with the U.S. Department of Energy (DOE) to provide guidance, technical assistance, and sharing of best practices among industrial facilities. DOE and the Ohio PUC encourage industrial customers to consider CHP as a long-term cost savings strategy that can help achieve compliance with boiler Maximum Achievable Control Technology compliance. In 2012, Ohio also began offering CHP as an eligible resource to count toward its energy efficiency resource standard.17 The state has 9.8 GW of technical potential for new CHP, and is currently utilizing about 5 percent of this potential. If the state could achieve 25 percent of this potential by 2030, it would achieve reductions beyond the existing EERS, reducing power sector CO₂ emissions by 3 percent in 2020 compared to 2011 levels. If Ohio could achieve 50 percent of its technical potential by 2030, it would achieve reductions beyond the expanded EERS, reducing power sector emissions by 9 percent in 2020 compared to 2011 levels.

Utilizing Slack Natural Gas Capacity. According to the Energy Information Administration data, the operating capacity of Ohio’s existing combined cycle natural gas fleet was only 47 percent in 2011.18 Increasing the operating capacity of all existing units—including two that have come online since 2011—to 75 percent would cut power sector CO₂ emissions by 7 percent in 2020 compared to 2011 levels.19,20 See Box 3 for additional information on Ohio’s power sector.

Increasing Efficiency at Existing Coal Plants. According to the National Energy Technology Laboratory and researchers at Lehigh University, it is likely that the existing coal fleet could achieve a 5 percent increase in efficiency on average.21 For purposes of this analysis, we conservatively assume that Ohio’s coal fleet would achieve a 2.5 percent increase in efficiency, half of these potential levels. Existing coal plants can increase efficiency through refurbishment22 and improved operation and maintenance practices, though the actual efficiency potential depends on plant age and other physical limitations.23,24 Another option to reduce the emissions intensity of a coal plant is co-firing with natural gas using the igniters that are already built into many existing pulverized coal boilers.25 These actions can lead to reductions in power-sector CO₂ emissions of up to 2 percent in 2020 compared to 2011 levels.

**OUTLOOK FOR OHIO**

Ohio has already put measures in place that will achieve GHG emissions reductions and has the opportunity to
achieve greater reductions building off of its progress to date. While there have been recent proposals to repeal the state’s RPS or EERS, doing so would increase the state’s emissions and make meeting forthcoming emissions standards more difficult. However, by meeting the requirements of these existing policies and taking advantage of available infrastructure and underutilized resources, Ohio is in a strong position to comply with upcoming EPA standards for existing power plants. Through federal and state-level actions, the United States can meet its commitment to reduce emissions 17 percent below 2005 levels by 2020.
ENDNOTES


4. Note, the sum of reductions from individual measures listed below may not match this total due to rounding. We calculated emissions reductions for existing policies using the annual reference case emissions rates for each fuel type. See the appendix for additional information on the assumptions and methodology used for this analysis.

5. Proposed standards by the Natural Resources Defense Council (available at: <http://www.nrdc.org/air/pollution-standards/files/pollution-standards-report.pdf>) would result in GHG emissions reductions in Ohio of 22 percent below 2011 levels in 2020. In WRI’s Can the U.S. Get There From Here?, which focuses on reductions from 2005 levels, the most stringent scenario (the “go-getter” scenario) would achieve a 38 percent reduction from the power sector nationally between 2005 and 2020. For Ohio, this is equivalent to a 24 percent reduction from 2011 levels. (It is unlikely that EPA standards would require identical reductions in each state, given the wide variation in emission intensities when the standards will be implemented.)

6. Emissions reductions calculated using the emissions rate resulting from the adjusted BAU projection that includes Ohio’s EERS and RPS policies. Reductions listed as a result of an expanded or accelerated policy are additional to reductions from existing policies.


8. We assume that Ohio expands its RPS program after current targets have been reached. Since the current target ends in 2024, our assumed expanded RPS does not yield additional savings in 2020.


11. Assessments prepared for Ohio utilities found the cost-effective economic potential for energy efficiency savings is equivalent to 17 percent of baseline electricity sales in 2019 and 29 percent of sales in 2028; see: <http://glennschool.osu.edu/research/policy/cost-of-inefficiency/The%20Costs%20of%20Inefficiency%20-%20Dormady3.pdf>. The expanded standard assumed here is conservative by comparison, resulting in electricity reductions equivalent to 11 percent of sales in 2019 and 23 percent of sales in 2028. A study by ACEEE estimated even greater cost-effective economic potential for energy efficiency savings, equivalent to 33 percent of baseline electricity sales in 2025; see: <http://www.aceee.org/sites/default/files/publications/researchreports/E092.pdf>.


13. The remaining 12.5 percent of the standard can be generated from advanced energy resources. The Ohio PUC’s definition of advanced energy sources includes fossil fuel burning units (“new, retrofitted, refueled, or repowered generating facility located in Ohio, including a simple or combined-cycle natural gas generating facility or a generating facility that uses biomass, coal, modular nuclear, or any other fuel as its input”). We conservatively assume that this portion of the standard will be met using fossil fuel resources and therefore will not drive additional CO₂ emissions reductions.


16. In 2012, Ohio ranked second on ACEEE’s State Energy Efficiency Scorecard rating based on its adoption of measures to encourage deployment of CHP systems. These measures include standard interconnection rules, inclusion of CHP in efficiency standards, financial incentives, favorable net metering regulations, emissions regulations, and other supportive policies.


19. NGCC units are designed to be operated up to 85 percent capacity (see http://mitei.mit.edu/system/files/NaturalGas_Chapter4_Electricity.pdf), but actual maximum capacity factors may differ among units. We conservatively assume a maximum capacity factor of 75 percent. All three of Ohio’s existing NGCC plants reached a monthly capacity factor of 75 percent or greater during 2011, demonstrating that natural gas utilization at this rate is possible in these plants.

20. We did not account for the associated increases in methane associated with the increased production of natural gas due to a higher demand for the fuel. Going forward, industry should work with EPA to reduce methane leakage rates from natural gas systems. For more information, see: <http://www.wri.org/publication/clearing-the-air>.

22. While there are high upfront costs associated with refurbishing existing coal units, the resulting increase in unit efficiency will lead to annual fuel savings. For example, the National Energy Technology Laboratory found a payback period of less than 4 years for a refurbishment technology that achieves a 2 percent heat rate improvement. For more information, see Benefits of the Big Bend Power Station Project, National Energy Technology Laboratory. Accessible at: <http://www.netl.doe.gov/technologies/coalpower/cctc/ccpi/pubs/tampa.pdf>; and “Analyses Show Benefits of Improving Unit Heat Rate as Part of a Carbon Mitigation Strategy.” Lehigh Energy Update 28 (1), February 2010. Accessible at: <http://www.lehigh.edu/~inenr/leu/leu_65.pdf>.


POLICY FRAMEWORK AND INTERACTION

This analysis assumes the existing policies and other reduction opportunities listed above are fully implemented. Depending on the combination of measures actually implemented by Ohio, each will have different impacts on the generation mix and resulting emissions. For example, increasing the efficiency of existing coal-fired power plants results in fewer emissions reductions in this analysis than would be the case if it were considered in isolation, because implementation of the EERS and RPS and an increase in natural gas generation all decrease the state’s coal-fired generation. The emissions reductions presented in the text are a result of each policy in combination with all other policies. We first applied existing EERS and RPS policies to calculate an adjusted reference case. Next, we increased CHP capacity and increased utilization of existing natural gas capacity compared to this adjusted reference case. Last, we increased the efficiency of any remaining coal plants. When considering the expanded policies, we applied the expanded EERS followed by increased CHP capacity, and then applied the expanded RPS to the resulting adjusted demand.

Equally important is the policy framework, which will define how each of these measures counts toward compliance under EPA’s standards. We assumed that the emissions reductions from each measure would count directly toward the standard. State measures may be counted differently in the actual standards, thus actual compliance levels could potentially be greater or less than what was modeled. See the appendix for additional information on our methodology and modeling assumptions.