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Fact Sheet

POWER SECTOR OPPORTUNITIES FOR REDUCING CARBON DIOXIDE EMISSIONS: MICHIGAN

MICHAEL OBEITER, KRISTIN MEEK, AND REBECCA GASPER

CONTACT

Michael Obeiter
Senior Associate
Climate and Energy Program
mobeiter@wri.org

Kristin Meek
Associate
Climate and Energy Program
kmeek@wri.org

Rebecca Gasper
Research Associate
Climate and Energy Program
rgasper@wri.org

WHAT WILL CO_2 STANDARDS MEAN FOR MICHIGAN?

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 reductions. In this fact sheet, WRI examines existing tools Michigan can use to reduce power plant emissions.

Box 1 | What's Ahead for the Power Sector?

The power sector is the leading source of carbon dioxide (CO_2) 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 CO_2 emissions standards for new power plants by September 2013.[2] These standards will likely provide a backstop ensuring new power plants produce significantly lower CO_2 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 CO_2 emissions.

Existing Power Plants: EPA also has been directed to (a) propose CO_2 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.

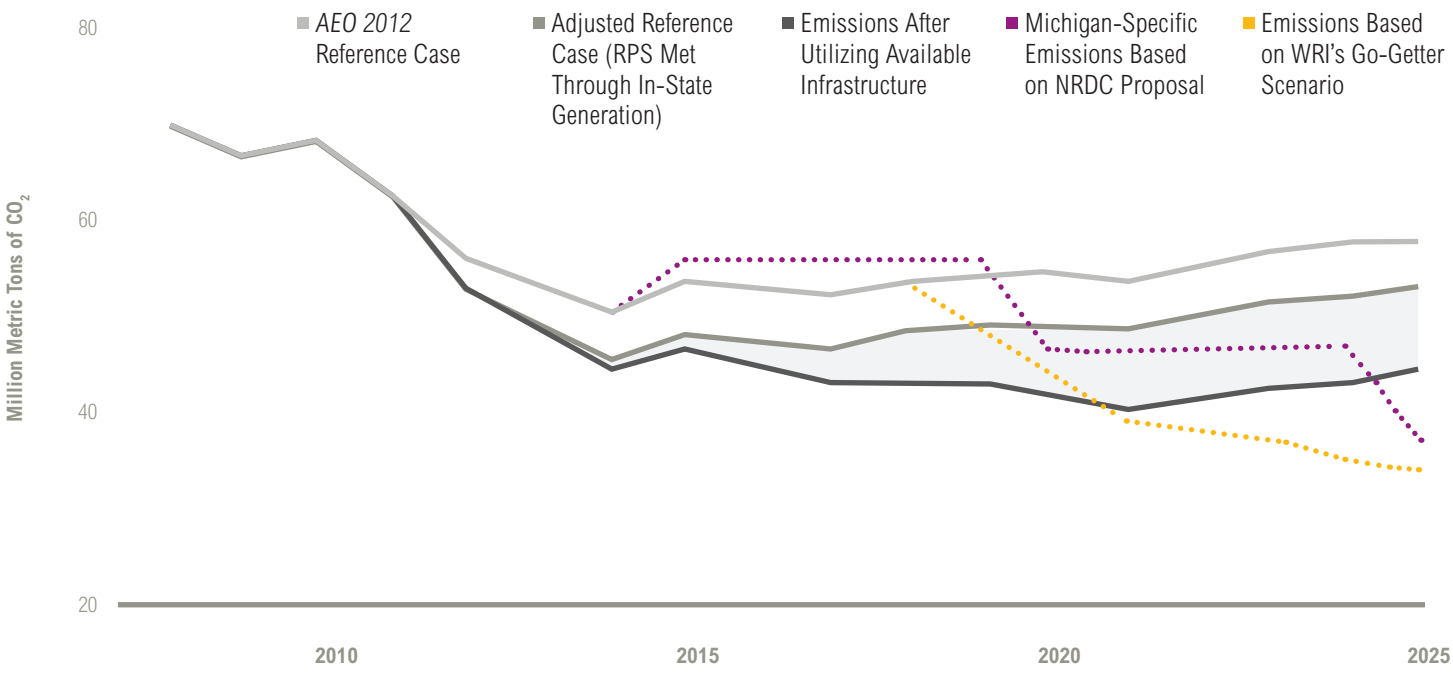
HOW MICHIGAN CAN REDUCE POWER SECTOR EMISSIONS

WRI analysis shows that Michigan has many opportunities to reduce carbon pollution from its power sector. Michigan is in a strong position to meet, and possibly exceed, forthcoming emissions standards for existing power plants in the near- to mid-term. Carbon dioxide emissions from Michigan's power sector were 13 percent below 2005 levels in 2011 (the most recent year for which we have energy data for Michigan). According to reference case projections based on the Energy Information Administration's *Annual Energy Outlook 2012 (AEO 2012),* emissions will continue to fall through 2017, but then will rise slowly to 5 percent below 2011 levels by 2030. This reference case includes the state's existing renewable portfolio standard (RPS) and energy efficiency resource standard (EERS; see below for more detail). We adjusted the reference case to assume that the renewable energy generation required by the RPS occurs through in-state renewable generation, as opposed to purchasing renewable energy credits generated out of state.[4]

Michigan can reduce power sector CO_2 emissions to 33 percent below 2011 levels in 2020 by achieving the targets in these existing state policies and taking advantage of the CO_2 reduction opportunities that use the existing infrastructure listed below.[5] This is equivalent to a 42 percent reduction in emissions from 2005 levels. Reductions of this magnitude would exceed those required by potentially stringent standards for existing power plants.[6]

- **CO_2 REDUCTIONS FROM EXISTING POLICIES[7]**
  - Meeting the RPS through in-state generation (-8 percent in 2020 compared to 2011 levels)
- **CO_2 REDUCTION OPPORTUNITIES USING AVAILABLE INFRASTRUCTURE**
  - Increasing combined heat and power (CHP) capacity at commercial and industrial facilities (-4 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 (-1 percent in 2020 compared to 2011 levels)

Figure 1 | **Michigan Carbon Dioxide Reduction Opportunities for Power Sector Compliance Under The Clean Air Act**



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 (NRDC) proposed standards for existing power plants, which would require CO_2 emissions reductions in Michigan of 25 percent below 2011 levels in 2020. We also show the emissions reductions that would occur if EPA adopted a more ambitious "go-getter" reduction schedule, which aligns with a national reduction pathway necessary to meet the Administration's goal of reducing emissions 17 percent below 2005 levels by 2020.[8] National power sector emissions in the "go-getter" scenario drop 38 percent from 2005 to 2020; we show the equivalent percent reductions applied to Michigan's power sector (29 percent from 2011 to 2020). See endnote 6 for additional explanation.

Michigan could achieve even greater long-term emissions reductions by expanding existing policies. By taking the actions listed below, which would likely require additional legislation, Michigan can reduce power sector CO_2 emissions by an additional 20 percent in the next six years, to 53 percent below 2011 levels by 2020 and 76 percent below 2011 levels by 2030.[9]

- Expanding the RPS (-5 percent in 2020 compared to 2011 levels)
- Accelerating the EERS (-10 percent in 2020 compared to 2011 levels)
- Further increasing CHP capacity at commercial and industrial facilities (-5 percent in 2020 compared to 2011 levels)

OPPORTUNITIES IN DETAIL

Existing and Expanded Energy Efficiency Resource Standards. In 2008, Michigan enacted an energy efficiency resource standard requiring annual electricity savings starting at 0.3 percent of the previous year's sales in 2008 and ramping up to 1 percent of the previous year's sales in 2012 and thereafter.[10,11] Michigan's utilities offer a variety of energy saving programs to all customers in order to meet their targets, including rebates, financing options, and energy analysis tools. NRDC found that the standard's benefits outweighed its costs by threefold through the first three years of the program, with total benefits in excess of $1 billion. Utilities exceeded their targets each year from 2009 to 2011 by amounts ranging from 16 percent to 49 percent.[12]

If Michigan enacts new legislation to ramp up its annual electricity savings to 2 percent per year beginning in 2015 and continues to achieve this rate of savings through 2030, it can reduce power sector CO_2 emissions by an additional 10 percent below 2011 levels in 2020. According to NRDC, increasing the target to 2 percent per year would result in annual net benefits of over $1.5 billion.[13]

Existing and Expanded Renewable Standards. Michigan's renewable portfolio standard requires 10 percent of electricity sold in the state to be generated by renewable

sources by 2015.[14] To meet this standard, Michigan will need to increase its renewable sales by about 1 percent per year between 2011 and 2015. According to EIA data, renewable generating capacity in Michigan has grown significantly in recent years, from 792 MW in 2009 to 1,069 MW in 2011. Preliminary estimates from the 2012 EIA-860 database show that 600 MW of new wind capacity were added in 2012 or planned for 2013,[15] and the Michigan Public Service Commission (PSC) indicates that additional wind projects are under development.[16] The Michigan PSC's annual report on the implementation of the standard found that the levelized costs of renewables have been declining since the start of the program and are lower than the cost of all new fossil-fuel-fired power plants regardless of technology type.[17]

By meeting its renewable standard through in-state generation,[18] Michigan can reduce its power sector emissions by an additional 8 percent in 2020 compared to 2011 levels beyond the reductions captured in the *AEO 2012* reference case. If Michigan continues to increase its renewable sales at the same rate after its target has been reached in 2015, it can reduce power sector CO_2 emissions by an additional 13 percent in 2020 compared to 2011 levels.

Box 2 | About This Series

In *Can The U.S. Get There From Here?*, WRI identified four key actions the Obama Administration must take in the absence of congressional action in order to meet the U.S. commitment to reduce greenhouse gas (GHG) emissions 17 percent below 2005 levels by 2020. These actions include setting performance standards for existing power plants, reducing consumption of hydrofluorocarbons, reducing fugitive methane emissions from natural gas systems, and increasing energy efficiency. Of these four actions, the greatest opportunity for reductions comes from the power sector. In his recently announced Climate Action Plan, President Obama has directed EPA to work expeditiously to finalize carbon dioxide (CO_2) emission standards for new power plants and adopt standards for existing power plants. As states prepare to comply with these standards, it will be necessary to understand available opportunities for reducing CO_2 emissions from the power sector. This series of fact sheets aims to shed light on these opportunities by illustrating the CO_2 emissions reduction potential from measures in a variety of states. We show how these emissions savings stack up against the reductions that could be required under forthcoming standards. This series is based on WRI analysis conducted using publicly available data. See the appendix for additional information on our methodology and modeling assumptions.

Increasing CHP at Commercial and Industrial Facilities. According to ICF International, Michigan has significant technical potential for CHP, with nearly 5 GW of potential new capacity for a total potential capacity of 8 GW.[19] As of July 2013, Michigan had 3 GW of installed CHP, about one-third of its technical potential.[20] The majority of this capacity was added in the 1990s, with only about 100 MW of new CHP added since 2005. While Michigan has favorable interconnection standards and includes CHP as an eligible resource under its EERS, the state has the opportunity to take additional steps to encourage CHP deployment.[21] The State and Local Energy Efficiency Action Network found that many industrial facilities can achieve annual energy savings of 15 percent or greater with systems that pay for themselves in less than three years.[22]

If the state could add 25 percent of the additional technical potential for new CHP by 2030 (for a total of 54 percent of total technical potential), it would achieve emissions reductions beyond the existing EERS, reducing power sector CO_2 emissions by 4 percent in 2020 compared to 2011 levels. If the state ramped up CHP capacity on a path to achieve 50 percent of the additional technical potential by 2030 (achieving 69 percent of total technical potential), it would achieve reductions beyond the expanded EERS, reducing power sector emissions by 9 percent in 2020 compared to 2011 levels.

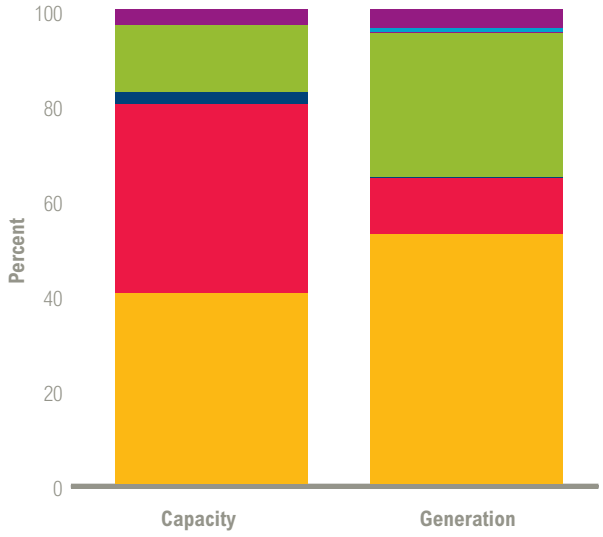
Utilizing Slack Natural Gas Capacity. According to EIA data, the capacity factor of Michigan's existing combined cycle natural gas fleet was only 24 percent in 2011—meaning that these plants generated about one-third of the electricity they are capable of producing.[23] Increasing the capacity factor of these existing units to 75 percent would cut power sector CO_2 emissions by 7 percent in 2020 compared to 2011 levels.[24, 25, 26] (See Box 3 for additional information on Michigan's power sector.)

Increasing Efficiency at Existing Coal Plants. According to the National Energy Technology Laboratory (NETL) and researchers at Lehigh University, it is likely that the existing coal fleet could achieve a 5 percent increase in efficiency on average.[27] For purposes of this analysis, we conservatively assume that Michigan's coal fleet would achieve a 2.5 percent increase in efficiency, half of these potential levels. While there are high upfront costs associated with refurbishing existing coal units, the resulting increase in unit efficiency will lead to annual fuel savings.[28] Existing coal plants can increase efficiency through refurbishment and improved operation and

Box 3 | Michigan Power Sector Profile

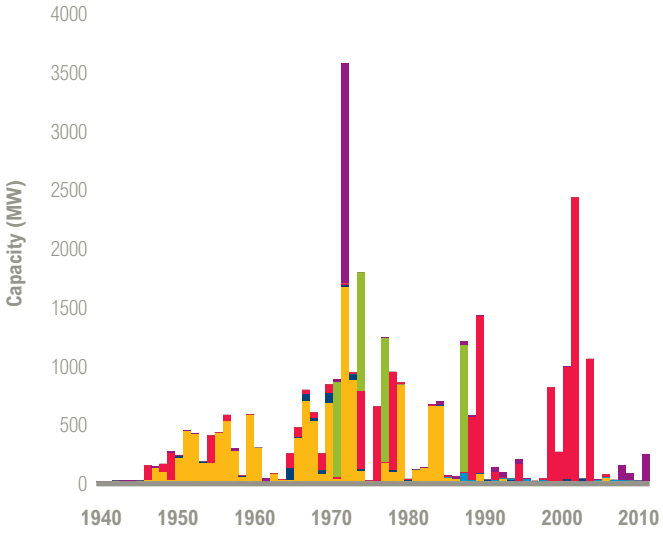
Until the late 1980s, most new capacity being built in Michigan was coal-fired. Since then, natural gas has comprised the bulk of new capacity additions.[29] Renewable generating capacity has grown significantly since 2009, with at least 600 MW of new wind capacity added in 2012 or coming on-line in 2013. (Note that the chart below only goes through 2011.) Between 2005 and 2011, coal-fired generation in the state decreased by 16 percent, due to declining demand and changes in the fuel mix, including increased use of natural gas and renewables. This trend may continue as the state's aging coal plants are retired. The average age of the state's coal generators with at least 50 MW generating capacity is over 48 years, and the Union of Concerned Scientists estimates that between 16 and 32 units (comprising 1,200 MW to 3,500 MW generating capacity) are no longer economically competitive.[30] Still, coal comprised over half of in-state generation in 2011, while nuclear and natural gas sources comprised 30 percent and 12 percent, respectively. In 2011, Michigan contributed 3 percent of total U.S. CO_2 emissions in the power sector and 2 percent of electricity generation, with a state CO_2 emissions intensity of 1,380 lbs per MWh. While this is higher than the U.S. average (about 1,200 lbs per MWh), our analysis shows that by using existing policies and infrastructure, Michigan could reduce the carbon intensity of its power sector to around 960 lbs per MWh by 2020.

Michigan Generation and Generating Capacity by Fuel, 2011



Source: U.S. Energy Information Administration Form EIA-860 and Annual Energy Review

New Electric Generating Capacity Additions by Fuel Type



Source: U.S. Energy Information Administration Form EIA-860, which includes existing electric generating units at plants with at least 1 MW capacity (electric utilities, independent power producers, and combined heat and power plants) that are connected to a power grid. Data represents installed summer capacity.

BOTH CHARTS USE THE FOLLOWING LEGEND: Coal | Natural Gas | Oil | Other Fossil | Nuclear | Renewables

maintenance practices, though the actual efficiency potential depends on plant age and other physical limitations.[31, 32] 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.[33] These actions can lead to reductions in power-sector CO_2 emissions of up to 1 percent compared to 2011 levels in 2020.

OUTLOOK FOR MICHIGAN

Michigan has already put measures in place that will achieve CO_2 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,[34] doing so would increase the state's emissions and make meeting future emissions standards more difficult. However, by meeting the requirements of its existing renewable energy and energy efficiency standards and taking advantage of available infrastructure and underutilized resources, Michigan 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

1. According to EIA's *AEO 2013* Reference Case, CO_2 emissions from the power sector will be 14 percent below 2005 levels by 2020 and only 5 percent below 2005 levels by 2035. See U.S. Department of Energy/Energy Information Administration. 2013. "Energy-Related Carbon Dioxide Emissions by Sector and Source, United States, Reference Case." In U.S. DOE/EIA. *Annual Energy Outlook 2013*. Washington, D.C.: Government Printing Office. Accessible at: <http://www.eia.gov/forecasts/aeo/>.
2. "Fact Sheet: President Obama's Climate Action Plan." White House, Office of the Press Secretary, June 25, 2013. Accessible at: <http://www.whitehouse.gov/the-press-office/2013/06/25/fact-sheet-president-obama-s-climate-action-plan>. "Memorandum for the Administrator of the Environmental Protection Agency." White House, Office of the Press Secretary, June 25, 2013. Accessible at: <http://www.ucsusa.org/assets/documents/global_warming/White-House-Memo-to-EPA-Administrator-on-Power-Sector-Carbon-Pollution-Standards-June-25-2013.pdf>.
3. U.S. Department of Energy/Energy Information Administration. 2013. "Electric Generating Capacity, Reference Case." In U.S. DOE/EIA. 2013. *Annual Energy Outlook 2013*. Washington, D.C.: Government Printing Office. Accessible at: <http://www.eia.gov/forecasts/aeo/>. For more details, see also: <http://www.wri.org/publication/us-electricity-markets-increasingly-favor-alternatives-to-coal>.
4. The *AEO 2012* models compliance with renewable portfolio standards through a combination of in-state generation and purchases of renewable energy credits (RECs) from out of state. For purposes of this analysis, we assume that in the face of new CO_2 standards, all renewable electricity generated for compliance with the state's RPS occurs in-state, and adjust the reference case accordingly. Michigan's RPS requires that all renewable energy credits come from generation at facilities located in Michigan or the service territories of Michigan utilities, which would include relatively small service areas in Indiana and Wisconsin. In the past, only about 1 percent of the RPS has been met using out-of-state generation (personal communication, Douglas Jester, 5 Lakes Energy).
5. The sum of reductions from the individual measures listed—along with the reductions captured in the reference case—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.
6. EPA has not yet proposed a national emissions standard for existing power plants. To illustrate the possible stringency of the future standards, this analysis shows emissions reductions for two scenarios. 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 CO_2 emissions reductions in Michigan of 25 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 Michigan, this is equivalent to a 29 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.)
7. Estimated CO_2 savings from the existing energy efficiency standard, which are incorporated in the *AEO 2012* reference case, are approximately 13 percent below 2011 levels in 2020.

8. Nicholas Bianco, Franz Litz, Kristin Meek, and Rebecca Gasper. 2013. *Can The U.S. Get There From Here? Using Existing Federal Laws and State Action to Reduce Greenhouse Gas Emissions*. Washington, DC: World Resources Institute. Accessible at: <http://pdf.wri.org/can_us_get_there_from_here.pdf>.
9. Emissions reductions calculated using the emissions rate resulting from the adjusted reference case projection, which includes Michigan's EERS and RPS policies. Reductions listed as a result of expanded policies are additional to reductions from existing policies.
10. Public Act 295, Sec 77. Accessible at: < http://www.legislature.mi.gov/documents/2007-2008/publicact/pdf/2008-PA-0295.pdfhttp://www.michigan.gov/documents/mpsc/reductions_electric_energy_413058_7.pdf>.
11. We assume that all CO_2 benefits from meeting the existing energy efficiency resource standard are captured in the *AEO 2012* reference case.
12. NRDC. 2012. *Building on Michigan's Energy Efficiency Accomplishments*. Accessible at: <http://switchboard.nrdc.org/blogs/rstanfield/NRDC%2C%20Building%20on%20Michigan%27s%20Energy%20Efficiency%20Accomplishments.pdf>.
13. NRDC. 2012. *Building on Michigan's Energy Efficiency Accomplishments*. Accessible at: <http://switchboard.nrdc.org/blogs/rstanfield/NRDC%2C%20Building%20on%20Michigan%27s%20Energy%20Efficiency%20Accomplishments.pdf>.
14. Public Act 295, Sec 77. Accessible at: < http://www.legislature.mi.gov/documents/2007-2008/publicact/pdf/2008-PA-0295.pdfhttp://www.michigan.gov/documents/mpsc/reductions_electric_energy_413058_7.pdf>.
15. These estimates are based on the "early release" 2012 version of the EIA-860 database (http://www.eia.gov/electricity/data/eia860/), which was pending further review at the time of this publication.
16. Michigan Public Service Commission. 2013. *Report on the Implementation of the PA 295 Renewable Energy Standard and the Cost-Effectiveness of the Energy Standards*. Accessible at: <http://www.michigan.gov/documents/mpsc/implementation_of_PA295_renewable_energy_411615_7.pdf>.
17. Michigan Public Service Commission. 2013. *Report on the Implementation of the PA 295 Renewable Energy Standard and the Cost-Effectiveness of the Energy Standards*. Accessible at: <http://www.michigan.gov/documents/mpsc/implementation_of_PA295_renewable_energy_411615_7.pdf>.
18. For purposes of this analysis, we assume that in the face of new CO_2 standards, all renewable electricity generated for compliance with the state's RPS occurs within the state. As previously noted, only limited amounts of out-of-state renewable generation have been used for compliance with Michigan's RPS to date, since the credits must come from in-state facilities or those in the service territories of Michigan utilities.
19. ICF International. 2009. *Effect of a 30 Percent Investment Tax Credit on the Economic Market Potential for Combined Heat and Power.* Accessible at: <http://www.localpower.org/WADE_USCHPA_ITC_Report.pdf>.
20. ICF CHP database. Accessible at: < http://www.eea-inc.com/chpdata/>.
21. In 2012, Michigan ranked 17th on ACEEE's State Energy Efficiency Scorecard rating based on its adoption of measures to encourage deployment of CHP systems. Other measures the state could take include standard interconnection rules, inclusion of CHP in efficiency standards, financial incentives, favorable net metering regulations, emissions regulations, technical support and guidance, and other supportive programs and policies.
22. SEE Action Network. 2012. *Industrial Energy Efficiency and Combined Heat and Power.* Accessible at: <http://www1.eere.energy.gov/seeaction/pdfs/industrial_factsheet.pdf>.
23. WRI estimates based on data from U.S. Energy Information Administration, EIA-923 Generation and Fuel Data, <http://www.eia.gov/electricity/data/eia923/>; and *EIA-860 Annual Electric Generator Data*, <http://www.eia.gov/electricity/data/eia860/>.
24. 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 assume a conservative maximum capacity factor of 75 percent.
25. We did not account for the 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 additional information, see: <http://www.wri.org/publication/clearing-the-air>.
26. Our estimate of potential generation from NGCC units includes all existing units and any units proposed through 2017 listed in the EIA-860 database. In July 2013, the Michigan Department of Environmental Quality approved a new 700 MW NGCC plant planned by Consumers Energy, which has not yet been listed in the EIA-860 database. (For more details, see: http://www.consumersenergy.com/News.aspx?id=6397&year=2013.) Since there are additional administrative steps and financing that need to occur before construction proceeds, we conservatively exclude this plant from our analysis. If this plant comes online in 2017 as planned, there will be additional NGCC natural gas capacity available to displace coal generation and an opportunity for greater CO_2 emissions reductions.
27. Phil DiPetro and Katrina Krulla. 2010. *Improving the Efficiency of Coal-Fired Power Plants for Near Term Greenhouse Gas Emissions Reductions.* National Energy Technology Laboratory, Office of Systems, Analyses and Planning. DOE/NETL-2010/1411. Accessible at: <http://www.netl.doe.gov/energy-analyses/pubs/ImpCFPPGHGRdctns_0410.pdf>. Chris Nichols, Gregson Vaux, Connie Zaremsky, James Murphy, and Massood Ramezan. 2008. *Reducing CO2 Emissions by Improving the Efficiency of the Existing Coal-fired Power Plant Fleet.* National Energy Technology Laboratory, Office of Systems, Analyses, and Planning, and Research and Development Solutions. LLC.DOE/NETL-2008/1329. Accessible at: <http://www.netl.doe.gov/energy-analyses/pubs/CFPP%20Efficiency-FINAL.pdf>. "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>.
28. For example, the National Energy Technology Laboratory found a payback period of less than four 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>.
29. Unless otherwise indicated, we relied upon the U.S. Energy Information Administration *Annual Energy Review* and *Form EIA-860* for data reported in Box 3.
30. Union of Concerned Scientists. 2012. *Ripe for Retirement: The Case for Closing Michigan's Costliest Coal Plants*.
31. Phil DiPetro and Katrina Krulla. 2010. *Improving the Efficiency of Coal-Fired Power Plants for Near Term Greenhouse Gas Emissions Reductions.* National Energy Technology Laboratory, Office of Systems, Analyses and Planning. DOE/NETL-2010/1411. Accessible at: <http://www.netl.doe.gov/energy-analyses/pubs/ImpCFPPGHGRdctns_0410.pdf>.
32. "Regulating Greenhouse Gas Emissions Under the Clean Air Act." 73 Register §147(2008). Accessible at: <http://www.gpo.gov/fdsys/pkg/FR-2008-07-30/pdf/E8-16432.pdf>.
33. Personal communication with Tomas Carbonell, Environmental Defense Fund, July 12, 2013.
34. House Bill No. 5447. Accessible at: <http://www.legislature.mi.gov/documents/2011-2012/billintroduced/House/htm/2012-HIB-5447.htm>.

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 Michigan, 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 the existing RPS to calculate an adjusted reference case assuming the standard is met through in-state generation. 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 as important is the policy framework, which will define how each of these measures counts toward compliance under the 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 the modeled estimates. See the appendix for additional information on our methodology and modeling assumptions.