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FACT SHEET

HOW MICHIGAN CAN MEET ITS CLEAN POWER PLAN TARGETS

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WHAT DOES THE CLEAN POWER PLAN MEAN FOR MICHIGAN?

In August 2015, the U.S. Environmental Protection Agency (EPA) finalized the Clean Power Plan (CPP), the first-ever carbon pollution standards for existing power plants (Box 1). The CPP builds on progress already under way to move the country toward a cleaner electricity system, including rapidly falling prices of renewables and increased deployment of money-saving energy efficiency measures. The plan enables states to use a wide range of options to meet the standards, including existing clean energy policies and existing power plants (the focus of this analysis), other tools to cut electricity use and increase the use of renewables, and broader initiatives such as participation in a cap-and-trade program or use of a carbon tax (Box 2).

Because Michigan has already put clean energy policies in place to promote renewable development and improve energy efficiency, the state is well-positioned to meet its CPP standards. In fact, the state has the opportunity to go even further than its required reductions by expanding these successful policies, which have targets that remain level after this year. In this fact sheet, we show how Michigan can meet, and even exceed, its CPP standards through its clean energy policies and better use of existing power plants while minimizing compliance costs, ensuring reliability, and harnessing economic opportunities in clean energy.

WHAT DOES THE CLEAN POWER PLAN REQUIRE FOR MICHIGAN'S POWER PLANTS?

Each state has the flexibility to use one of three targets provided in the Clean Power Plan, either (1) an emission rate target, which measures the carbon intensity of the state's existing fossil electricity generation; (2) a mass-based target, which measures the absolute level of carbon dioxide (CO_2) emissions allowed by the state's affected power plants; or (3) a mass-based target for new and existing power plants (i.e., new source complement).

Michigan can choose one of the following three targets:

- **Emission rate target:** 1,169 pounds per Megawatt-hour (lbs./MWh) by 2030, a reduction of 39 percent below power plants' 2012 emission rate of 1,928 lbs./MWh.
- **Mass-based target:** 47.5 million short tons of CO_2, which is about 33 percent lower than the state's CO_2 emissions in 2012.
- **Mass-based target for new and existing sources:** 48.1 million short tons of CO_2 in 2030, which is about 32 percent lower than the state's CO_2 emissions in 2012.

The percent reductions above are calculated using an adjusted 2012 baseline that includes the CO_2 emissions and generation from fossil plants under construction as of January 8, 2014 and are affected by the Clean Power Plan, consistent with EPA's methodology.

HOW MICHIGAN'S POWER PLANTS CAN MEET—OR EXCEED—THE CLEAN POWER PLAN REQUIREMENTS

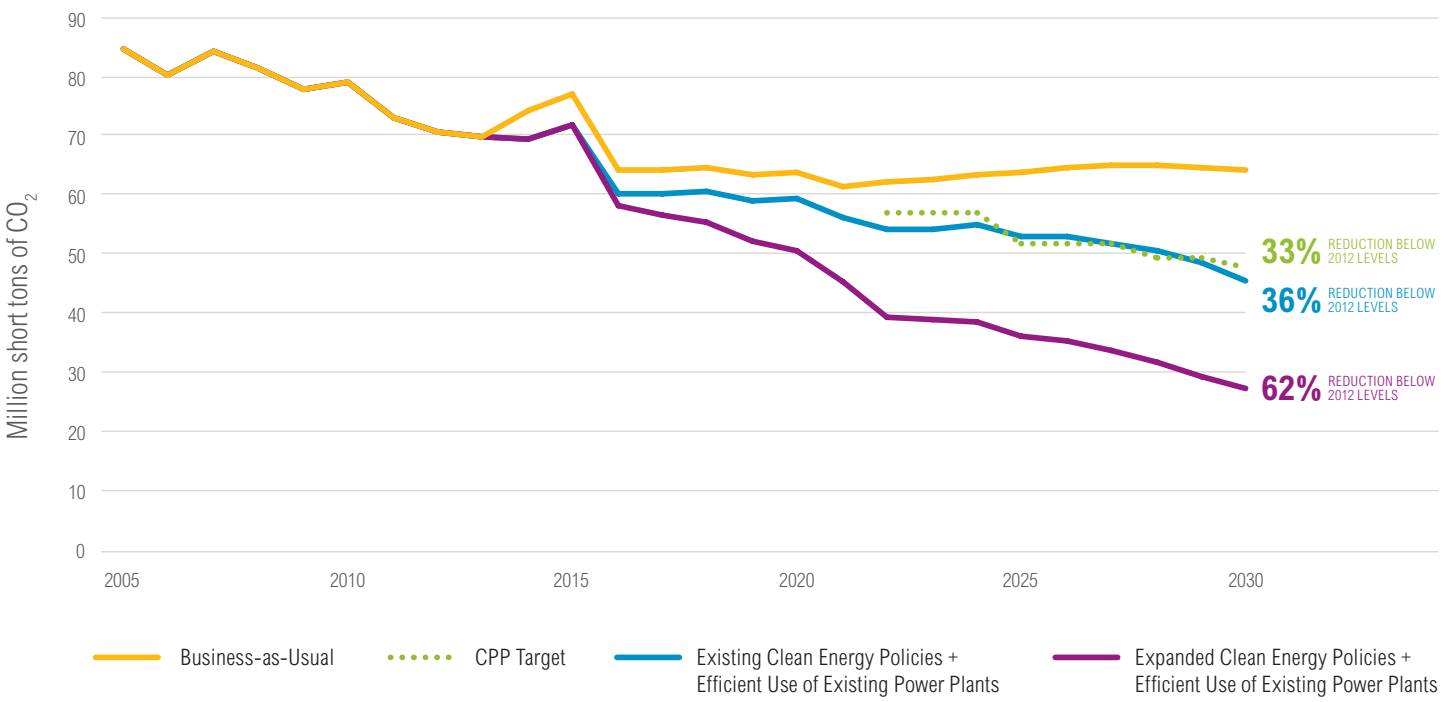
Michigan is in a strong position to meet or exceed its emission targets under the Clean Power Plan. CO_2 emissions from the state's power plants have already fallen 17 percent between 2005 and 2012 due to declining electricity demand and increasing use of natural gas and renewables. Coal-fired generation in the state decreased by 24 percent between 2005 and 2012, and this trend is expected to continue based on planned coal plant retirements.[1] According to our business-as-usual (BAU) projections, based in part on the U.S. Energy Information Administration's (EIA) *Annual Energy Outlook 2015* (AEO2015), existing power plant emissions in the state are expected to fall another 9 percent from 2012 to 2030.[2] However, Michigan could emit more CO_2 than our estimated BAU projections if it builds new natural gas plants in the future and decides to comply with EPA's existing source-only standard. Adopting EPA's new source complement standard (see Box 2) would further incentivize zero-carbon generation sources and ensure that future CO_2 emissions from Michigan's power sector do not increase.

CO_2 REDUCTIONS FROM EXISTING CLEAN ENERGY POLICIES

Michigan can build on its progress to date and achieve greater reductions by following through on its existing renewable energy and efficiency standards. By continuing to implement these existing renewable energy and efficiency policies, the state can achieve 98 percent of the reductions required to meet its mass-based emission target.[3] The small remaining gap can be closed by increasing the use of existing combined cycle natural gas plants or increasing coal plant efficiency.

- **Energy efficiency resource standard.** Michigan's energy efficiency resource standard requires annual electricity savings of 1 percent of the previous year's sales from 2012 forward.[4]
- **Renewable energy standard.** Michigan's utilities are on track to meet its renewable energy standard, which requires 10 percent of the state's electricity sales to come from renewable sources by 2015, and for the 2015 level of renewable credits to be maintained going forward.[5]

Figure 1 | **Existing Power Plant Emission Pathways for Michigan**



Note: This figure depicts the Clean Power Plan's interim and 2030 mass-based targets for Michigan's affected power plants (CPP target). The Existing Clean Energy Policies + Efficient Use of Existing Power Plants pathway shows emissions from affected plants after implementing the state's clean energy policies (efficiency and renewable energy standards) and making better use of the state's existing power plants (increasing generation of the existing combined cycle natural gas fleet and improving efficiency of existing coal plants). Expanded Clean Energy Policies + Efficient Use of Existing Power Plants pathway shows emissions after expanding clean energy policies and making better use of existing power plants. These pathways do not account for potential credits that Michigan could generate by taking early action under the Clean Energy Incentive Program.

These policies make good economic sense for the state—the price of wind has been quickly declining, with levelized costs well below the cost of a conventional coal plant, while efficiency programs have proven highly cost-effective and are saving millions on energy bills for Michigan residents.

CO_2 REDUCTION OPPORTUNITIES USING EXISTING POWER PLANTS

By taking the measures listed below in addition to its clean energy policies, Michigan can reduce existing power plant emissions 36 percent below 2012 levels by 2030, surpassing its mass-based target (Figure 1). If Michigan were to choose to use the rate-based target, these actions would reduce the average emission rate of Michigan's existing fossil fleet by 29 percent below its 2012 emission rate to 1,346 lbs. per MWh in 2030, achieving 76 percent of the reductions needed to meet the state's rate-based target of 1,169 lbs. per MWh.[6]

- **INCREASING THE USE OF EXISTING NATURAL GAS PLANTS**
  Michigan's most efficient natural gas plants—combined cycle (NGCC) units—generated less than one-fourth of the electricity they were capable of producing in 2012. Running existing NGCC plants at 75 percent in addition to the measures listed above can close the gap that remains, exceeding the reductions required to meet the mass-based target by 4 percent.[7]

- **INCREASING COAL PLANT EFFICIENCY**
  Operational improvements that increase the average efficiency of the remaining coal fleet by 4.3 percent beginning in 2022, together with the measures listed above, would allow Michigan to exceed the reductions required to meet the mass-based target by 9 percent.[8]

Box 1 | Overview Of EPA's Final Clean Power Plan

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. Power sector emissions at the national level decreased by 16 percent between 2005 and 2012 due to the recession, increasing penetration of renewable energy, increasing energy efficiency, and the low price of natural gas. Without new policies like the CPP, though, current projections show that emissions will slowly rise or hold steady through 2030 to reach 10–17 percent below 2005 levels.*

On August 3, 2015, EPA finalized standards for existing power plants that will help drive additional CO_2 emission reductions by 2030. States have the option to comply with either rate-based (lbs. CO_2 per megawatt-hour) or mass-based (short tons of CO_2) standards. EPA developed these state-specific standards by taking into account each state's existing fossil fleet along with an estimate of the potential to increase the existing coal fleet's efficiency, ramping down coal generation by increasing the utilization of the existing natural gas combined cycle fleet, and developing more renewable energy resources.

The Clean Power Plan makes use of the flexibility allowed by the Clean Air Act so that states can take advantage of several different measures to lower the carbon intensity of its power generation mix—such as fuel switching, dispatch of existing low-carbon power plants, increased generation by renewable sources, and energy efficiency. EPA also is providing states with several implementation plan options, including the option to get credit for early action, which we discuss in more detail in Box 2. States have until September 6, 2016 to submit either a final implementation plan or an initial submission with an extension request. All state plans should be completed by 2018 and compliance will begin in 2022. EPA will issue a federal implementation plan for states that do not submit their own plans. EPA proposed a federal plan in August 2015 and is expected to finalize the plan in the summer of 2016.

Notes: * While CO_2 emissions from the power sector have already fallen 16 percent since 2005 (relative to 2012 levels), the U.S. Energy Information Administration's Annual Energy Outlook 2015 projects that power sector emissions will slowly increase between 2012 and 2030 so that CO_2 emissions reach approximately 10 percent below 2005 levels. On the other hand, EPA's baseline projections for its modeling of the Clean Power Plan, which includes lower cost estimates for renewable technologies, estimate that power sector emissions will reach 17 percent below 2005 levels by 2030. Specifically, EPA's projections estimate less coal-fired generation and more natural gas and renewable generation in 2030 than EIA's projections.

CO_2 REDUCTION OPPORTUNITIES USING EXPANDED CLEAN ENERGY POLICIES

Michigan could achieve even deeper emission reductions and savings for consumers by expanding its clean energy policies. By taking the following actions in addition to the infrastructure opportunities listed above, the state can reduce existing power plant emissions 62 percent below 2012 levels by 2030, nearly doubling the required reductions under a mass-based target:

- Increasing the energy efficiency standard to 2 percent of the previous year's sales beginning in 2019.
- Increasing the renewable energy standard from the current 10 percent of the state's sales by 2015 to 20 percent by 2022.

Taking these actions would allow Michigan to surpass its rate-based target by reducing the emission rate of its existing fossil fleet to 1,134 lbs. per MWh if it opted for a rate-based approach. Since the CPP makes it easy for states to trade carbon allowances or emission rate credits, Michigan could generate revenue by going beyond the required reductions and selling excess credits to other states. Michigan could also generate extra credits by taking advantage of EPA's Clean Energy Incentive Program, which rewards early action in renewable energy and energy efficiency in low-income communities.

On the other hand, if Michigan repealed its clean energy policies and implemented only the infrastructure opportunities listed above, it would achieve only 43 percent of the reductions required to meet its 2030 mass-based target.[9] This would leave the state's existing plants with a shortfall of 13 million short tons of CO_2, which they would have to make up using other measures or by sending money out of state to purchase credits.

Box 2 | Clean Power Plan Compliance Options

The Clean Power Plan offers states significant flexibility. As states develop their implementation plans, they will need to make a number of decisions that will affect how they comply. Key considerations include:

- **TYPE OF TARGET**
  States can choose either a rate-based target (in lbs. CO_2/MWh) or a mass-based target (in short tons of CO_2). States using a rate-based target can adopt separate standards for coal and combined cycle natural gas units, a weighted average for all affected units, or equivalent standards that apply to individual units or groups of units. States using a mass-based target can use EPA's standard for existing units only, or for existing and new units collectively (known as a new source complement).

  Since mass-based plans will rely on reported power plant emissions, complementary actions to improve energy efficiency and increase renewable generation do not need to be quantified in the state plans. Rate-based plans require an explicit accounting of actions used to adjust the emission rate from affected units, as well as evaluation, measurement, and verification.

- **TYPE OF STATE PLAN**
  The CPP includes two types of state plans. Under an "emission standards" plan, states place mass- or rate-based emissions requirements directly on affected units, which are then allowed to reduce their emissions or rate directly or by using credits generated by fuel-switching, renewable energy, energy efficiency, or other approved measures. States that adopt a mass-based target can opt for a "state measures" plan. With this type of plan, states can use a portfolio of state-enforced measures that can apply both to affected units and other entities (for example, demand-side efficiency, renewable portfolio standards, cap-and-trade programs). Under this approach, states could also implement a carbon tax for compliance. This approach must include emission standards for affected power plants in case the portfolio approach does not achieve the required reductions.*

- **INDIVIDUAL OR MULTISTATE COMPLIANCE**
  States can choose to comply individually or as part of a multistate plan with an aggregated target. States also can coordinate with other states while retaining an individual state goal. Joining a regional cap-and-trade program may be the most cost-effective option for some states, lowering compliance costs while ensuring reliability.[a] Studies in the Southwest Power Pool, PJM, and MISO regions have found that regional compliance would be the most cost-effective option.[b]

  The Regional Greenhouse Gas Initiative illustrates how a multistate trading approach can help reduce emissions while driving investments in renewable energy and energy efficiency and saving money for electricity customers. Over the first six years of the program, investments from auction proceeds have generated nearly $3 billion in economic value added to the region and created over 28,000 job-years of employment.[c]

- **TRADING:** States don't need to join a cap-and-trade program or formally coordinate with other states to trade. EPA allows states to trade emission rate credits (rate-based target) or emission allowances (mass-based) regardless of their implementation plan type as long as states meet "trading ready" criteria provided in the rule.** Once trading-ready state plans are approved, states can begin trading right away without additional requirements or approval from EPA.

- **EARLY ACTION:** EPA is offering a Clean Energy Incentive Program to reward early investments in energy efficiency projects that benefit low-income communities and renewable energy. States can earn additional credits from EPA by implementing eligible projects in 2020 and 2021.

Notes: * According to the final rule, a state measures plan "must also include a contingent backstop of federally enforceable emission standards for affected EGUs that fully meet the emission guidelines and that would be triggered if the plan failed to achieve the required emission reductions on schedule." ** These criteria include use of an EPA-approved (or EPA-administered) emission and allowance tracking system (mass-based) and provisions for issuing, tracking, and submitting emission rate credits (rate-based). Section VIII of the final rule provides more guidance (http://www.epa.gov/airquality/cpp/cpp-final-rule.pdf).

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HOW MICHIGAN CAN MAXIMIZE THE ECONOMIC BENEFITS OF THE CLEAN POWER PLAN

As we have shown, Michigan's current clean energy policies can bring the state 98 percent of the way toward achieving its CPP targets. The rule in itself will therefore cause minimal changes to Michigan's economy. Still, Michigan can develop an implementation plan that maximizes the economic benefits to the state and achieves cost-effective emission reductions. Such a plan could include:

- **Adopting a market-based carbon pricing program:** A carbon pricing program—in the form of either a cap-and-trade program or a carbon fee—has major economic advantages over alternative implementation approaches:

  1. A carbon price encourages the most cost-effective emissions reductions without favoring any particular technology. A study of air pollution regulations found that market-based approaches have ranged from 1.1 times to 22 times more cost-effective than non-market approaches to regulation.[10]
  2. Revenues from allowance auctions or a carbon fee can be used to accomplish multiple public policy objectives, such as by reducing the tax burden on Michigan residents and businesses or making productive public investments. A carbon price of $10 per short ton for the power plant emissions allowed under Michigan's mass-based target would provide average annual revenues of roughly $475 million.[11] This revenue could be used to provide assistance to those who may be adversely affected by the carbon price, such as low income households and any displaced utility-sector workers; to make strategic investments in renewable energy and energy efficiency; or to offset other taxes. The Regional Greenhouse Gas Initiative illustrates how investment of auction revenue can benefit the local economy—investments of nearly $2 billion in auction proceeds into bill assistance, energy efficiency, renewable energy, and other uses from 2009–14 generated nearly $3 billion in economic value-added across the nine participating states.[12]
  3. The CPP encourages states to take advantage of interstate trading opportunities without needing to formally join a regional program. Taking advantage of interstate trading would also enable Michigan to sell surplus allowances and generate revenue from out-of-state sources if it surpasses its CPP targets. Assuming an allowance price of $10 per short ton, Michigan could generate an average of over $160 million per year in revenue between 2022 and 2030 by expanding its clean energy policies and using available infrastructure and selling the credits on interstate markets. (This does not include consideration of any credits that might be generated through the Clean Energy Incentive Program prior to 2022.)
  4. Carbon pricing provides financial incentives for regulated entities to reduce their emissions beyond the target, which encourages the adoption and diffusion of low-carbon energy technologies. Such technological advancements can lower overall compliance costs and boost economic growth.

- **Investing in energy efficiency:** By reducing electricity demand, improvements in energy efficiency reduce the need for investments in electricity supply, which frees up capital to invest in other productive areas across the economy. If the energy efficiency programs are less expensive than electricity generation—as evidence indicates many of them are, both on the national level and in Michigan[13]—electricity prices should fall, leaving Michigan residents with more income to spend, save, or invest. Michigan's Public Service Commission estimates that every dollar invested in the state's efficiency programs will return $4 to $5 in savings.[14]

The investments needed to move toward a low-carbon future will strengthen Michigan's economy over the long term. While these investments are likely to involve short-run economic costs—including somewhat higher electricity rates and fewer investment dollars available for alternative opportunities in the electricity sector or across the economy—they will pay off over time. Michigan residents will spend far less of their income on electricity thanks to improvements in efficiency and the low operating costs of renewable energy.[15] And less reliance on coal will enable more in-state investment—Michigan pays about $1.5 billion per year to other states to import coal.[16]

In a transition to a low-carbon power sector, jobs will be gained in the clean energy industry and will decline in high-carbon industries, like coal, accelerating trends already under way. The clean energy industry creates jobs in manufacturing, construction, home maintenance, and other sectors—in 2014, the wind and solar industries alone employed 6,100 people in Michigan.[17] State and federal governments should help manage the transition to a lower-carbon economy by offering job training or other programs to ensure that opportunities are available for all workers.

Strong implementation of the CPP is a critical component of the U.S. commitment to a global climate agreement that can help reduce global emissions and combat climate change. Failure to avoid the worst effects of climate change could result in high costs for Michigan's residents. According to a University of Maryland study,[18] continued warming could include the following effects on Michigan's future economy:

- More severe precipitation will increase flooding events, which could cost the state up to $700 million each year.
- Dredging of channels due to lower water level in the Great Lakes could cost up to $154 million annually by 2030.
- Higher temperatures and the decline in water levels are likely to diminish fish and wildlife stocks, which could cost Michigan hundreds of millions per year in tourism revenue.
- Reduced channel connectivity could lead to annual losses of nearly $1.5 billion in foreign trade for the ports of Detroit, Muskegon, and Port Huron.

In addition to helping combat climate change, lowering the carbon-intensity of the power sector in Michigan will lead to reductions in harmful local air pollutants. According to EPA, exposure to pollutants like particulate matter, nitrogen oxides, and sulfur dioxide can lead to respiratory issues or heart and lung diseases.[19] Reducing these emissions will make for a healthier work force that spends less on medical bills.

With the state's clean energy policies, CO_2 emissions from Michigan's existing power plants are on a pathway to decrease with or without the Clean Power Plan. Michigan can now use this rule as an opportunity to maximize economic benefits from continuing to curb emissions and thus meeting or exceeding its Clean Power Plan targets.

THE CLEAN POWER PLAN WILL MAINTAIN ELECTRIC GRID RELIABILITY

The Clean Power Plan provides flexibility aimed at ensuring the continued reliability of the nation's power grid.[20] Under the final CPP, states can choose from a wide variety of compliance options that are best suited to that state's existing resources and policies. While EPA is offering states incentives to invest in renewable energy and energy efficiency early, they also have given states additional time to complete and implement their plans by changing the compliance start date from 2020 to 2022. Allowing more time for planning and adjusting the interim targets to allow a "glide path" to the final targets directly addresses concerns raised by the Midcontinent Independent System Operator (MISO) regional transmission organization regarding the proposed rule.[21] In addition, the Clean Power Plan is requiring each state to consider reliability issues as they develop their implementation plans, while also providing a mechanism for states to revise their plans if significant unplanned reliability issues arise. EPA also created a reliability safety valve that allows a power plant to temporarily exceed its targets during unexpected events or emergencies that raise reliability concerns. EPA consulted closely with the Department of Energy and the Federal Energy Regulatory Commission in developing the CPP's reliability provisions. These agencies will continue to work together to monitor CPP implementation and help resolve any reliability concerns that arise.

The U.S. power sector also has long shown it has the ability to reliably deliver electricity to homes and businesses despite changes in electricity mix and demand. EPA's environmental regulations under the Clean Air Act, such as the Acid Rain Program or Mercury and Air Toxics Standards, have never caused blackouts. This is because EPA granted flexibility to power plants in the past—just like it is doing under the Clean Power Plan—and because state regulators have standard reliability practices that have been used for decades to address reliability issues if and when they arise.[22] Analyses of the proposed Clean Power Plan have shown that compliance is unlikely to affect reliability—nationwide and within the MISO region specifically—because of these standard practices and the flexibility inherent in the rule.[23] In addition, several studies have

found that the flexibility of the current grid would allow for renewable penetration levels exceeding those required by current state targets. These studies have shown that proven technologies and practices can reduce the cost of operating generation portfolios with high variable renewable energy levels and enable reliable grid operation with more than 50 percent renewable penetration.[24]

OPPORTUNITIES IN DETAIL

Below, we describe Michigan's opportunities to comply with the Clean Power Plan in more detail, including (1) increasing energy efficiency, (2) increasing renewable energy, (3) increasing use of natural gas, (4) improving coal plant efficiency, and (5) other compliance options.

1. ENERGY EFFICIENCY OPPORTUNITIES

Energy efficiency is the most cost-effective resource Michigan can use to cut its power sector emissions.[25] The state's existing energy efficiency resource standard, which requires annual electricity savings of 1 percent of the previous year's sales, has proven highly successful.[26] The state has exceeded its targets every year since the policy took effect due to a portfolio of energy-saving programs offered by utilities including rebates, financing options, and energy analysis tools.[27] Program evaluations by the Michigan Public Service Commission (PSC) for the years 2010–13 estimated that every dollar invested in the state's efficiency programs will return $3.55–$4.88 in savings.[28] The life-cycle savings of programs implemented in 2013 alone are expected to reach nearly $1 billion.[29]

While Michigan's efficiency standard ramped up from 0.3 percent of the previous year's sales in 2008 to 1 percent in 2012, under current law the standard will remain at 1 percent going forward. Michigan has the opportunity to capture even greater savings by building on its progress to date and passing new legislation to increase the standard. For instance, the proposed "Powering Michigan's Future" bill package introduced in April 2015 would ramp up annual electricity savings from the current 1 percent to 2 percent per year beginning in 2019. This level of savings has already been achieved or will be required by several other states, and is consistent with Governor Snyder's vision for Michigan's energy future, which emphasizes use of renewable electricity sources and improved energy efficiency.[30] Achieving reductions beyond those required by the CPP through efficiency could help the state generate extra emission credits to trade with other states. Michigan also is in a good position to take advantage of EPA's Clean Energy Incentive Program, which allows states to earn extra credits by deploying efficiency projects in low-income communities in 2020 and 2021, since utilities already invest in efficiency in these communities. Weakening or eliminating efficiency programs would make it more difficult and expensive to comply with the CPP.[31]

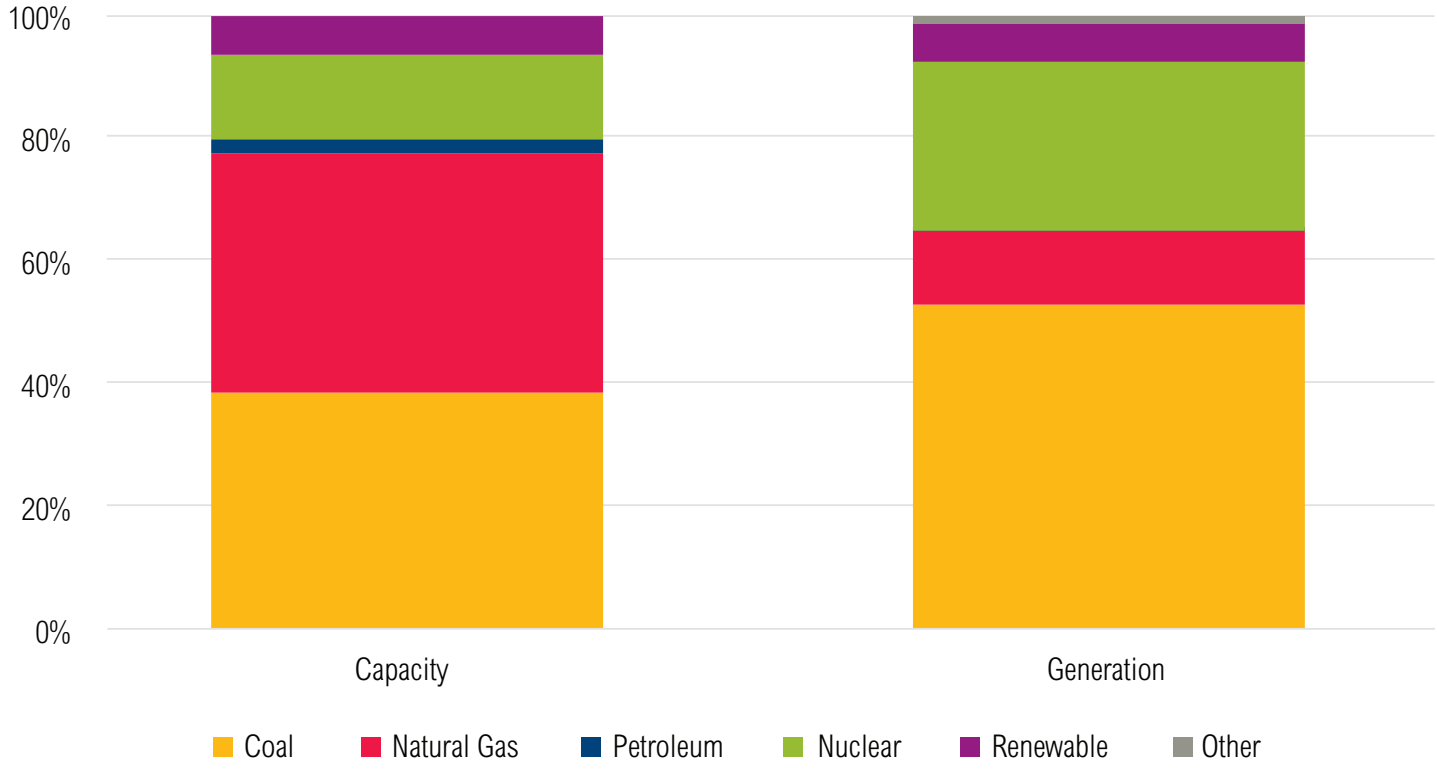
2. RENEWABLE ENERGY OPPORTUNITIES

Michigan's renewable energy standard (RES), which requires 10 percent of electricity sales to come from renewable sources by 2015, has driven significant development of clean energy in the state.[32] Renewable capacity in Michigan doubled between 2010 and 2013 with the addition of nearly 1,000 MW of wind capacity, with another 460 MW of wind planned for 2014 and 2015.[33] The state's largest utilities have also been deploying small-scale and pilot solar programs, totaling about 28 MW for RES compliance, according to the PSC's 2015 implementation report.[34] The PSC expects that all utilities will meet the standard in 2015, with the majority of compliance credits coming from in-state generation.[35, 36]

The RES has led to in-state investments of about $3 billion through 2014, supporting jobs in construction, manufacturing, installation, maintenance and repair, and other sectors. The Bureau of Labor Market Information and Strategic Initiatives estimated that renewable and alternative energy supported more than 8,000 jobs in the state in 2013.[37] The American Wind Energy Association estimates that Michigan's wind industry alone supported 3,000–4,000 jobs and brought in $4.6 million in annual lease payments to local landowners in 2014.[38]

Renewable development has been much cheaper than expected, with rapidly declining costs of wind projects over the past several years. The most recently approved contracts for new wind capacity were about half the cost of the first contracts approved in 2009–10, and the average cost of the state's renewable projects is now 42 percent lower than the cost of a new conventional coal plant and only 2 percent higher than the average cost of a combined cycle natural gas plant.[39] When factoring in energy efficiency, the PSC estimated that Michigan's clean energy policies are cheaper than any new generation, including natural gas combined cycle plants.[40] Over the past few years, utilities have secured long-term wind contracts at prices around 20 percent lower than the average overall cost of providing Michigan's electricity.[41] The Institute for Energy Innovation found that if natural gas prices approach projected levels of $6.73 per million British

Figure 2 | **Michigan Generation and Generating Capacity by Fuel, 2013**



thermal units in 2030, wind and solar will displace natural gas on economic grounds.[42] Meanwhile, the average price that utilities pay to import coal increased more than 30 percent from 2008–13.[43] Because Michigan doesn't have in-state coal resources, it must import all of its coal from other states—sending an average $1.5 billion per year out of state from 2008–13.[44,45]

The future of renewable development in the state is uncertain. The current RES requires utilities to maintain their 2015 level of renewable credits and does not require any future growth in renewables. Several recent legislative proposals focus on the RES, ranging from repealing the standard to doubling its requirements by 2022.[46] Studies have shown that Michigan can go further and achieve at least 30 percent renewable integration, and doing so could generate billions in new investments with little impact on electricity rates.[47, 48] Repealing the RES, or moving to a planning process without enforceable renewable mandates, could reduce investor certainty and slow recent trends, making it more difficult to comply with the Clean Power Plan and capture the economic benefits previously described.[49]

3. INCREASING THE USE OF EXISTING NATURAL GAS PLANTS

According to EIA data, the capacity factor of Michigan's existing combined cycle natural gas fleet was only 23 percent in 2013—meaning that these plants generated less than one-fourth of the electricity they are capable of producing. As a result, natural gas comprised only 12 percent of total generation in 2013, even though it comprised nearly 40 percent of total generating capacity in the state (Figure 2).[50] Increasing the capacity factor of these existing units to 75 percent, together with Michigan's existing clean energy policies, could help the state exceed the required reductions under its mass-based target by 4 percent.[51, 52]

4. INCREASING COAL PLANT EFFICIENCY

Existing coal plants can increase their efficiency through refurbishment and improved operation and maintenance practices.[53,54] In developing the final CPP, EPA found that coal plants could significantly increase their efficiency by improving operations to return to the best performance they have achieved in the past. By comparing average coal plant heat rates in 2012 to their best demonstrated performance between 2002 and 2012, EPA estimated that the coal fleet could achieve average efficiency improvements ranging from 2.1 to 4.3 percent in the different interconnection regions.[55]

EPA expects that these improvements can largely be achieved through application of no- or low-cost best practices (e.g., operations and maintenance improvements; replacing worn seals and valves; cleaning equipment) and will not require equipment upgrades. However, upgrades can be used to comply with the rule. While there are high up-front costs associated with refurbishing existing coal units, the resulting increase in unit efficiency will lead to annual fuel savings.[56] Some plants could also decrease their emission intensity by co-firing with natural gas using the igniters that are already built into many existing pulverized coal boilers.[57]

Increasing the efficiency of Michigan's existing coal fleet by an average 4.3 percent starting in 2022—the potential improvement rate that EPA identified for the eastern interconnection—could help Michigan exceed the reductions required under its mass-based target by 9 percent when implemented with existing clean energy policies and increasing use of natural gas.

5. OTHER COMPLIANCE OPTIONS

The compliance options we modeled in our analysis are illustrative of the reductions that the state could achieve using its clean energy policies and existing infrastructure. Michigan could take advantage of other opportunities to help meet its target, including use of combined heat and power at industrial and commercial facilities, use of combined heat and power at power plants,[58] adopting and enforcing up-to-date building energy codes, and setting state appliance standards for appliances not covered by federal standards, among other measures that improve efficiency or increase use of renewables. In addition to using individual policies, states also can take broader approaches to reduce emissions, including joining a cap-and-trade program or implementing a carbon tax. As previously discussed, market-based approaches can help reduce compliance costs while generating revenue for the state.

OUTLOOK FOR MICHIGAN

Michigan is in a strong position to comply with the Clean Power Plan while taking advantage of economic opportunities and maintaining grid reliability. Michigan's clean energy policies are already driving investment in renewables and energy-efficient technologies, saving money for the state's residents while reducing power sector CO_2 emissions and other harmful air pollution. Michigan can meet its mass-based standard by continuing to implement these policies together with greater use of existing combined cycle natural gas plants or improvements to coal plant efficiency. Repealing or weakening these policies, as recently proposed, could make meeting the standards more difficult and expensive. But by expanding these policies, Michigan can scale up their benefits and achieve deeper reductions more cost-effectively.

Box 3 | **About the Series**

In *Delivering on the U.S. Climate Commitment,* WRI identified ten key actions the Obama administration must take in the absence of congressional action in order to meet the U.S. commitment to reducing greenhouse gas (GHG) emissions by 26-28 percent below 2005 levels by 2025. 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 ten actions, the greatest opportunity for reductions comes from the power sector. In his Climate Action Plan, President Obama 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 potential for CO_2 emissions reductions in a variety of states. We show how these emissions savings stack up against the reductions required under the Clean Power Plan. This series is based on WRI analysis conducted using publicly available data. See the appendix for additional information on our methodology and modeling assumptions.[a]

Notes:
a. World Resources Institute. 2015. *How States Can Meet Their Clean Power Plan Targets. Appendix A: Detailed Overview of Methods.* Washington, DC: World Resources Institute.

POLICY FRAMEWORK AND INTERACTION

This analysis assumes the existing policies and other reduction opportunities discussed in the text 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 use of existing combined cycle natural gas plants results in fewer emissions reductions in this analysis than would be the case if it were considered in isolation, because implementation of the renewable energy standard decreases the amount of coal-fired generation that would otherwise be available to shift to natural gas. The emissions reductions presented in the text are a result of each policy applied in the following sequence: (1) energy efficiency improvements applied to business-as-usual generation; (2) increased renewable generation applied to the resulting adjusted generation; (3) increased use of existing combined cycle natural gas units; and (4) increased efficiency of any remaining coal units. For consistency with EPA's approach, we include only the existing fossil fleet as part of our business-as-usual projections and only new renewable generation and energy efficiency measures put into place after 2012.

ENDNOTES

1. Recent announced coal retirements include Consumers Energy's "classic seven" scheduled for 2016 and DTE Electric's Trenton Channel 7 scheduled no later than 2016. According to the order on the PSC's investigation into utility supply and reliability plans, the lost capacity will be mitigated through new natural gas combined cycle builds, purchase of existing simple cycle and combined cycle natural gas plants, increased imports to affected regions, and improved efficiency and demand response (http://efile.mpsc.state.mi.us/efile/docs/17751/0090.pdf). These retirements were not included in the Annual Energy Outlook 2015 (AEO 2015). We adjusted our business-as-usual emission projections to reflect these retirements by subtracting the generation of these eight units in 2013 (5.5 TWh) from total coal generation projections from 2016 through 2030. This reduced business-as-usual emissions from existing plants by about 10 percent in 2030.

2. Because AEO 2015 does not include state-level projections, we relied on regional projections of annual electricity generation growth rates by fuel for Michigan's electricity projections. Because neighboring states have varying policies that will affect future in-state generation differently, these regional projections may not fully capture all the relevant trends that are expected to occur within the state's power sector.

3. While the AEO 2015 does not explicitly model state efficiency standards, its projections do capture some of the effects of these programs through regional demand trends. We estimate the amount of efficiency embedded in our BAU projections using a methodology developed by EPA and Synapse (http://epa.gov/statelocalclimate/documents/pdf/EPA%20background%20and%20methodology%20EE_RE_02122014.pdf; http://www.synapse-energy.com/project/state-energy-efficiency-embedded-annual-energy-outlook-forecasts). See Appendix for details. The emission reductions listed here reflect the additional efficiency from Michigan's standard that is not embedded in the BAU projections. Renewable energy standards are explicitly modeled in AEO2015; however, in our analysis we assume that the standards are met through in-state generation and adjust renewable projections accordingly. This results in 1–4 TWh of additional renewable generation per year beyond business-as-usual projections between 2014 and 2026. From 2027–30, renewable generation reaches or exceeds 10 percent under business-as-usual.

4. 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>.

5. 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>.

6. States can choose to develop an implementation plan based on either the mass- or rate-based target. Michigan would not need to meet the rate-based target if it chooses to use a mass-based target.

7. Our analysis also finds that running existing NGCC plants at 75 percent together with clean energy policies can get Michigan 70 percent of the way toward meeting its rate-based emission standard.

8. Our analysis also finds that increasing coal plant efficiency together with all other measures can get Michigan 76 percent of the way toward meeting its rate-based emission standard.

9. This figure is calculated assuming all renewable requirements end in 2016 and no additional efficiency is captured beyond that already embedded in BAU projections from measures implemented to date.

10. For more information, see: <http://yosemite1.epa.gov/EE/epa/eed.nsf/6058a0895486355785257662006 39df3/f9c8c8a37d6aab6f8525774200597f42!OpenDocument >.

11. This estimate of annual revenue from a $10 carbon price uses Michigan's interim and final mass-based targets between 2022 (56.9 million short tons of CO_2) and 2030 (47.5 million short tons of CO_2). Revenue in any given year will be higher or lower, depending on the response to the carbon price.

12. Analysis Group. 2011. "The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States." Accessible at: <http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/economic_impact_rggi_report.pdf>. Analysis Group. 2015. "The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States." Accessible at: <http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/analysis_group_rggi_report_july_2015.pdf>.

13. According to the Michigan Public Service Commission, the cost of conserved energy from efficiency programs in 2013 was 2 cents per kilowatt-hour, whereas the average retail electricity price in the state was 11 cents per kilowatt-hour (see http://www.michigan.gov/documents/mpsc/PA_295_Renewable_Energy_481423_7.pdf and http://www.eia.gov/electricity/state/michigan/). For national efficiency program costs, see: <http://emp.lbl.gov/sites/all/files/total-cost-of-saved-energy.pdf>.

14. According to annual Michigan Public Service Commission reports on the implementation of the efficiency standard from 2011–14. Data reflect the effects of both electricity and natural gas efficiency programs. Reports accessible at: http://www.michigan.gov/documents/mpsc/eo_legislature_report2011_369985_7.pdf; https://www.michigan.gov/documents/mpsc/2012_EO_Report_404891_7.pdf; https://www.michigan.gov/documents/mpsc/eo_report_441092_7.pdf; http://michigan.gov/documents/mpsc/2014_eo_report_475141_7.pdf.

15. EPA modeling of the CPP estimated that electricity bills for the average American will be 7–7.7 percent lower in 2030 due to changes in the average electricity price and demand.

16. Calculated using EIA data on the quantity and cost of coal shipments to electric utilities by state for 2008 through 2013 (http://www.eia.gov/coal/data.cfm).

17. White House. 2015." A Cleaner, More Efficient Power Sector in Michigan." Accessible at: <https://www.whitehouse.gov/sites/default/files/image/climate/Michigan_Factsheet.pdf>.

18. University of Maryland, Center for Integrative Environmental Research. 2008. "Economic Impacts of Climate Change on Michigan." Accessible at: <http://cier.umd.edu/climateadaptation/Michigan%20Economic%20Impacts%20of%20Climate%20Change.pdf>.

19. For more information, see:< http://www.epa.gov/airquality/urbanair/>.

20. U.S. Environmental Protection Agency. 2015. "Keeping Energy Affordable and Reliable." Accessible at:<http://www.epa.gov/airquality/cpp/fs-cpp-reliability.pdf>.

21. See:<https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/ICT%20Materials/ERSC/2015/20150512/20150512%20ERSC%20Item%2006b%20Clean%20Power%20Plan%20Update.pdf>.

22. Susan F. Tierney. 2015. "How to Examine the U.S. Energy Information Administration's Report: Analysis of the Impacts of EPA's Clean Power Plan." Testimony Before the U.S. House of Representatives Committee on Science, Space and Technology, Subcommittee on the Environment and Subcommittee on Energy. Accessible at: <http://www.analysisgroup.com/uploadedfiles/content/news_and_events/news/tierney_testimony_house_science_and_technology_committee_6-22-2015.pdf>. Analysis Group. 2015. "Electric System Reliability and EPA's Clean Power Plan:Tools and Practices." Accessible at: <http://www.analysisgroup.com/uploadedFiles/Content/Insights/Publishing/Electric_System_Reliability_and_EPAs_Clean_Power_Plan_Tools_and_Practices.pdf>.

23. For example: Brattle Group. "2015. EPA's Clean Power Plan and Reliability: Assessing NERC's Initial Reliability Review." Accessible at: <http://info.aee.net/hs-fs/hub/211732/file-2486162659-pdf/PDF/EPAs-Clean-Power-Plan--Reliability-Brattle.pdf?t=1438552731095>. Analysis Group. 2015. "Electric System Reliability and EPA's Clean Power Plan:Tools and Practices." Accessible at: <http://www.analysisgroup.com/uploadedFiles/Content/Insights/Publishing/Electric_System_Reliability_and_EPAs_Clean_Power_Plan_Tools_and_Practices.pdf>. Analysis Group. 2015. "Electric System Reliability and EPA's Clean Power Plan: The Case of MISO." Accessible at: <http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/analysis_group_clean_power_plan_miso_reliability.pdf>.

24. C. Linvill, J. Migden-Ostrander, and M. Hogan. 2014. "Clean Energy Keeps the Lights On." Accessible at: <http://www.raponline.org/press-release/clean-energy-keeps-the-lights-on>.

25. Institute for Energy Innovation. 2015. "Michigan and the Clean Power Plan: Assessment of Cost-Effective Compliance Options." Accessible at: <http://instituteforenergyinnovation.org/files/dmfile/MichiganandtheCleanPowerPlan2.pdf>.

26. Public Act 295, Sec 77. Accessible at: <http://www.legislature.mi.gov/documents/2007-2008/publicact/pdf/2008-PA-0295.pdf http://www.michigan.gov/documents/mpsc/reductions_electric_energy_413058_7.pdf>.

27. Michigan Public Service Commission. 2014. "2014 Report on the Implementation of P.A. 295 Utility Energy Optimization Programs." Accessible at: <http://www.michigan.gov/documents/mpsc/2014_eo_report_475141_7.pdf>.

28. According to annual Michigan Public Service Commission reports on the implementation of the efficiency standard from 2011–14. Data reflect the effects of both electricity and natural gas efficiency programs. Reports accessible at:<http://www.michigan.gov/documents/mpsc/eo_legislature_report2011_369985_7.pdf; https://www.michigan.gov/documents/mpsc/2012_EO_Report_404891_7.pdf; https://www.michigan.gov/documents/mpsc/eo_report_441092_7.pdf; http://michigan.gov/documents/mpsc/2014_eo_report_475141_7.pdf>.

29. Michigan Public Service Commission. 2014. "2014 Report on the Implementation of P.A. 295 Utility Energy Optimization Programs." Accessible at: <http://www.michigan.gov/documents/mpsc/2014_eo_report_475141_7.pdf>.

30. State of Michigan Executive Office, November 28, 2012. "A Special Message from Governor Rick Snyder: Ensuring our Future: Energy and the Environment." Accessible at: <http://www.michigan.gov/documents/snyder/EE_Message_FINAL_pdf_404563_7.pdf>.

31. Market barriers can limit the deployment of energy efficient technologies and best practices, so policies are needed to harness all cost-effective opportunities. According to research by the American Council for an Energy-Efficient Economy, states with efficiency standards in place have achieved much greater annual electricity savings than states without them (see: http://aceee.org/sites/default/files/publications/researchreports/u1403.pdf).

32. Public Act 295, Sec 77. Accessible at: <http://www.legislature.mi.gov/documents/2007-2008/publicact/pdf/2008-PA-0295.pdf; http://www.michigan.gov/documents/mpsc/reductions_electric_energy_413058_7.pdf>.

33. U.S. Energy Information Administration. EIA-860 Annual Electric Generator Data. Accessible at: <http://www.eia.gov/electricity/data/eia860/>.

34. Michigan Public Service Commission. 2015. *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/PA_295_Renewable_Energy_481423_7.pdf>.

35. Michigan Public Service Commission. 2015. *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/PA_295_Renewable_Energy_481423_7.pdf>.

36. In total, the PSC credits the RES with development of over 1,450 MW of new renewable capacity in Michigan since the policy took effect.

37. Data provided to the MI PSC. See: <http://www.michigan.gov/documents/mpsc/PA_295_Renewable_Energy_481423_7.pdf>.

38. American Wind Energy Association. "U.S. Wind Energy State Facts." Accessible at: <http://awea.files.cms-plus.com/FileDownloads/pdfs/Michigan.pdf>.

39. Based on MI PSC data of the weighted average cost of renewable contracts excluding pilot solar projects ($76.55 per MWh) and the average cost of a new conventional coal-fired power facility used as a guidepost by the Commission for RES policy evaluation ($133 per MWh). See: <http://www.michigan.gov/documents/mpsc/PA_295_Renewable_Energy_481423_7.pdf>. The PSC does not have a specific guidepost estimate for combined cycle natural gas plants, so this comparison is based on the levelized cost used by EIA in the AEO2015 (http://www.eia.gov/forecasts/aeo/electricity_generation.cfm).

40. Based on MI PSC data of the weighted average cost of renewable contracts excluding pilot solar projects ($76.55 per MWh), the weighted average cost of conserved energy associated with efficiency programs ($20.00 per MWh), and the average cost of a new conventional coal-fired power facility used as a guidepost by the Commission for RES policy evaluation ($133 per MWh). For more details, see: <http://www.michigan.gov/documents/mpsc/PA_295_Renewable_Energy_481423_7.pdf>.

41. Michigan Public Service Commission. 2015. *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/PA_295_Renewable_Energy_481423_7.pdf>.

42. Institute for Energy Innovation. 2015. "Michigan and the Clean Power Plan: Assessment of Cost-Effective Compliance Options." Accessible at: <http://instituteforenergyinnovation.org/files/dmfile/MichiganandtheCleanPowerPlan2.pdf>.

43. According to EIA data on the cost of coal shipments to electric utilities by state. Accessible at: <http://www.eia.gov/coal/data.cfm>.

44. Union of Concerned Scientists. 2014. "Charting Michigan's Renewable Energy Future." Accessible at: <http://www.ucsusa.org/sites/default/files/legacy/assets/documents/clean_energy/Charting-Michigan-s-Renewable-Energy-Future.pdf>.

45. Calculated using EIA data on the quantity and cost of coal shipments to electric utilities by state (http://www.eia.gov/coal/data.cfm).

46. For a summary of pending or passed renewable energy legislation as of August 25, 2015, see: Michigan Public Service Commission. *Synopsis of Michigan Renewable Energy Legislation 2015-2016 Pending or Passed Legislation.* Accessible at: <https://www.michigan.gov/documents/mpsc/Synopsis_of_Michigan_Renewable_Energy_Legislation_-_March_2013_413610_7.pdf>.

47. Michigan Public Service Commission and Michigan Energy Office. 2013. "Readying Michigan to Make Good Energy Decisions: Renewable Energy." Accessible at: <http://www.michigan.gov/documents/energy/renewable_final_438952_7.pdf>.

48. Union of Concerned Scientists. 2014. "Charting Michigan's Renewable Energy Future." Accessible at: <http://www.ucsusa.org/sites/default/files/legacy/assets/documents/clean_energy/Charting-Michigan-s-Renewable-Energy-Future.pdf>.

49. The National Renewable Energy Laboratory found a significant relationship between renewable energy deployment and state policies that include mandates for renewable energy, and this relationship was stronger the longer the policies' time periods. For more details, see: <http://www.nrel.gov/docs/fy11osti/49193.pdf> and <http://info.aee.net/hubfs/PDF/AEEI-Market-Response-Report.pdf?t=1438552731095>.

50. 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/>.

51. Our estimate of potential generation from NGCC units includes all existing units listed in the EIA-860 database. 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.

52. 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> and <http://www.wri.org/publication/reducing-methane-emissions-natural-gas-development-strategies-state-level-policymakers>.

53. 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>.

54. "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>.

55. EPA calculated potential heat rate improvement for each region using three different analytical approaches and used the most conservative value for each region when setting the final targets. For more details, see the Clean Power Plan GHG Mitigation Measures Technical Support Document, accessible at: <http://epa.gov/airquality/cpp/tsd-cpp-ghg-mitigation-measures.pdf>.

56. 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>.

57. Personal communication with Tomas Carbonell, Environmental Defense Fund, July 12, 2013.

58. Power plants that use combined heat and power can count the useful thermal output toward CPP compliance by converting to the equivalent amount of electricity generation. EPA estimated that Michigan's useful thermal output was equivalent to 4.3 TWh of generation in 2012, about 4 percent of total power sector generation that year.

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ABOUT WRI

World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity and human well-being.

Our Challenge
Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision
We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach
COUNT IT
We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT
We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT
We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.