December 18, 2015

North Dakota Department of Health
Division of Air Quality
918 E. Divide Avenue
Bismarck, North Dakota 58501-1947
Attn: Terry L. O'Clair, Director
Via Electronic Mail at airquality@nd.gov

Re: Public Comment & Public Meetings on Development of a State Plan Related to EPA's Clean Power Plan

Dear Mr. O'Clair:

On October 12, 2015, the North Dakota Department of Health published formal notice of a forty-five day public comment period concerning the development of North Dakota's State Implementation Plan to comply with the Environmental Protection Agency's historic Clean Power Plan, the first-ever national standards for emissions of carbon dioxide from existing power plants. The following comments are submitted on behalf of the Sierra Club and our more than 600 members in North Dakota regarding this critical rulemaking. We thank you for the opportunity to comment and look forward to future participation in shaping our clean energy future.

Sincerely,

Todd Leake

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<u>SIERRA CLUB'S COMMENTS ON THE DEVELOPMENT OF A STATE PLAN RELATED TO EPA'S CLEAN POWER PLAN</u>

Executive Summary

Sierra Club commends the North Dakota Department of Health for initiating an early planning process to address the threats posed by climate disruption and to compose a plan for compliance with the Clean Power Plan. North Dakota should implement a strong and just compliance plan that prioritizes investments in clean energy and energy efficiency rather than more polluting energy sources such as natural gas. We must also do our best to ensure that all communities share in the benefits of cleaner air and the clean energy economy, including those communities that currently produce or use fossil fuels like coal and natural gas.

Without action from the state to address carbon emissions, North Dakota is not on track to comply with the state-level target set forth in the final Clean Power Plan. Failure to develop a compliant plan will lead to an EPA-issued Federal Implementation Plan. It is thus in our best interest to develop a compliant plan now.

Fortunately, there is a pathway to compliance. By continuing to grow North Dakota's cost-effective and clean wind energy resources, boosting energy efficiency savings targets in line with national best practices, and transitioning away from North Dakota's oldest, dirtiest, and least economic coal plants, North Dakota will be well-positioned to not only comply but help grow North Dakota's clean energy economy.

More specifically, by:

1) Installing 1,500 megawatts of wind energy by 2031;
2) Achieving 0.08% incremental energy efficiency savings in 2016, doubling our savings each year through 2021, and maintaining at least 2% incremental savings through the compliance period; and
3) Phasing out 115 megawatts of coal-fired power from the fifty-year-old RM Heskett plant by 2020 and another 190 megawatts from the 47-year-old Stanton plant by 2028,

North Dakota can meet the targets set forth in the Clean Power Plan.

The following summarizes our top-level technical recommendations for the framework of North Dakota's compliance strategy:

- If North Dakota pursues a mass-based compliance approach, it is critical that the plan include the following elements:

- New gas generation should be included under the cap in order to prevent the "leakage" of carbon emissions from affected to non-affected sources, as required by EPA.

- The value of allowances must be captured for public good, and preferably reinvested in energy efficiency measures, renewable energy projects, and economic justice initiatives.

- Investments in North Dakota's abundant clean and renewable energy resources—particularly in wind—will not only help control generation costs but also hedge against fuel price volatility, prevent pollution, increase our generation diversity, and help maintain our energy exporter status. Our compliance plan should not reward dirtier energy alternatives that emit carbon dioxide and other harmful air pollutants.

- Energy efficiency investments should also be a cornerstone of our compliance strategy. Currently, North Dakota has significant room for improvement in energy efficiency measures, which can unlock the net-economic benefits of waste elimination and reduced electric bills, particularly for lower income and industrial customers. Increased energy efficiency will also improve grid reliability and create jobs within the state.

- To the extent that North Dakota allows the trading of emissions allowances, provisions must be included that prevent added or disproportionate impact on communities historically burdened by pollution from fossil power generation. The Department of Health should conduct outreach to these communities and continue to monitor impacts on them throughout the compliance period. Outreach to tribal nations should play an important role in this effort.

- Clean energy and efficiency projects should be incentivized in communities most affected by the transition away from coal to clean energy, and funding from allowances would ideally be available to assist workers and such communities. Utilities and generators operating within North Dakota should also be encouraged to plan with workers and community leaders for the transition to a cleaner energy economy.

I. Introduction

The Clean Power Plan (CPP) represents an essential first step in combatting climate disruption by reining in carbon pollution from the power sector for the first time. North Dakota is essential to this effort. In 2013, our State was responsible for 56.6 million metric tons of carbon pollution, the second-highest per capita emissions in the United States.[1] The electric power sector in North Dakota is responsible for over 50% of this pollution.[2]

In light of this, we appreciate and support the early planning process initiated by the North Dakota Department of Health (DoH) to work toward a plan for CPP compliance that reflects the needs of all North Dakotans. We urge DoH to adopt a state-specific plan and to aim for submission by the early deadline, September 2016. This approach will ensure that we comply in a way that is most advantageous for North Dakota, and will send clear signals to the electric markets about what steps will be necessary to comply. It will also ensure that we are doing our fair share to prevent the negative impacts of climate change and carbon pollution on North Dakota residents.

The evidence is clear that the costs of inaction on climate disruption far outweigh any costs of transitioning to cleaner energy sources. As we discuss below, a properly-designed CPP compliance plan that is both strong and just should yield net economic benefits compared to the status quo. Such a plan should maximize investments in carbon-free renewable energy and energy efficiency, and avoid encouraging a widespread shift from coal to gas-fired generation. It is also clear that North Dakota's regional grid is well positioned to reliably handle the strong shift to clean energy that is required by the CPP.[3]

The policies Sierra Club recommends in these comments represent a suite of actions that North Dakota should take in order to maximize pollution reduction and co-benefits of a clean energy economy, while making sure that all residents and communities realize these benefits. To the extent possible, these recommendations should be incorporated directly into the State Implementation Plan (SIP) that DoH will submit to the Environmental Protection Agency (EPA). In some cases, as noted below, it may be beneficial to work with the legislature to amend or

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[1] U.S. Energy Information Administration: Independent Statistics and Analysis, "Environment: Energy-Related Carbon Dioxide Emissions at the States Level, 2000-2013," available at: http://www.eia.gov/environment/emissions/state/analysis/, see Table I and Table V

[2] *Id.* Table 3. Electric power responsible for 28.7 million metric tons, or 50.7% of North Dakota carbon emissions.

[3] See, for example, Analysis Group, *Electric System Reliability and EPA's Clean Power Plan: The Case of MISO* (June 8, 2015), concluding that the Midwest Independent Transmission Operator, the operator of much of North Dakota's electricity grid, is "well positioned to use existing tools and operating procedures to maintain electric system reliability at the same time the region lower carbon pollution from power plants." MISO has also explained that the impact of more than 12,000 MW of wind generation on its need for fast-acting operating reserves has been "little to none." MSIO, Multi-Faceted Solution for Managing Flexibility with High Penetration of Renewable Resources, *available at* http://ww.ferc.gov/CalendarFiles/20140411130433-T1-A%20%20Navid.pdf.

create policies which would complement the SIP and result in a better outcome for North Dakotans.

II. Compliance Pathway with New Source Complement

North Dakota must take action in order to comply with the CPP. An analysis using the Synapse Clean Power Plan Planning Tool (CP3T) indicates that while North Dakota utilities' projected additions of wind capacity and improvements in energy efficiency do represent a step in the right direction, alone they will not achieve compliance for new and existing sources. Fortunately, North Dakota has a pathway to compliance. By transitioning away from two of North Dakota's oldest coal-fired power plants, and through the additional growth in clean energy and efficiency, North Dakota can meet the CPP targets while also building a new clean energy economy. This growth is reasonable and achievable given the state's wind potential, the recent pace of added wind capacity, the current energy efficiency levels, and new regional transmission projects.

Following EPA's publication of the final CPP, Sierra Club analyzed a number of compliance scenarios for North Dakota using the CP3T tool. In each, Sierra Club modeled a scenario incorporating and adding to the state's currently projected wind and gas capacity additions, efficiency improvements, and coal retirements at aging facilities. The following detailed scenario represents one highly feasible pathway to compliance for North Dakota, using a mass-based cap that includes new gas sources. The model assumes that added capacity from wind and gas will directly displace coal-fired generation within the state, but retains North Dakota's current levels of energy exports.

a. *Final North Dakota CPP Targets*[4]

North Dakota: Mass-based existing and New Source Complement (CO_2 emissions, short tons)	
2012 Baseline	33,370,886
Interim Period (2022-2029)	23,878,144
2030 Final Goal	21,099,677

b. *New Wind Capacity*

- From IRPs and project data, it is anticipated that North Dakota will add 1137 megawatts of wind capacity over the next several years. Adding another 400 megawatts between 2016 and 2031, when combined with the elements below,

[4] See EPA, *Clean Power Plan: State at a Glance—North Dakota,* available at http://www3.epa.gov/airquality/cpptoolbox/north-dakota.pdf.

would bring the state into compliance.

  - The addition of 1500 megawatts of wind is readily achievable for several reasons. First, it tracks the pace of installation over the past five years. Second, the state has abundant and currently underutilized wind resources. As discussed in greater detail in Section V, the National Renewable Energies Lab has placed our state's theoretical wind capacity at 770,000 megawatts. Finally, recent upgrades were made to our region's transmission lines with large scale renewable integration in mind.

c. *Efficiency Improvements*

  - The model assumes 0.08% incremental savings in 2016 (the highest value achieved from 2012 – 2014), and doubles our savings each year until it reaches 2.56% in 2021, and maintaining at least 2% incremental savings through the compliance period. This pace is in line with national best practices and top-performing states nationwide.

d. *Changes to Fossil Generation*

  - The model assumes 0.08% incremental savings in 2016 (the highest value achieved from 2012 – 2014), and doubles our savings each year until it reaches 2.56% in 2021, and maintaining at least 2% incremental savings through the compliance period. This pace is in line with national best practices and top-performing states nationwide.
  - The model assumes the retirement of two aging coal plants.
    - First, phasing out 115 megawatts of coal-fired power from the fifty-year-old RM Heskett plant by 2020.
    - Second, in 2028, the 190 megawatts of coal generation are retired from the 47-year-old Stanton plant.
- This model also assumes 110 megawatts of new gas capacity added in 2016, and an additional 1230 megawatts added between 2018 and 2019, as has been included in planning documents.

e. *Results*

  - North Dakota would comply with its 2030 mass target of 21 million tons. The state would also comply with all interim targets.
  - Relative to 2012, coal use decreases by 46% by 2030. Wind use doubles from 2012 to 2030.
  - North Dakota maintains its current energy export levels.

III. Compliance Method and Allowance Allocation

a. Compliance Method

North Dakota should use a mass-based target for compliance, provided that two critical criteria are met.[5] For ease of implementation and to maintain the integrity of North Dakota's emission reductions, the mass-based target should incorporate the new source complement which includes new sources as well as existing sources. If DoH elects not to include the new source complement, it will have to submit an EPA approved plan to mitigate carbon emission "leakage" from affected to non-affected sources, and document that such a plan is working, which will most likely be more complicated than the state's option to include new sources under the CPP target.[6] Whether by the new source complement or a plan to mitigate carbon leakage, states must address new sources under the CPP. It is thus important to note that while North Dakota law does not permit the enactment of air regulations more stringent than required by the federal Clean Air Act,[7] the new source complement would not violation this provision.

Second, allowances must be viewed as public resources, and the value of these allowances under a mass-based system should be captured for the public good. An auction, along with a fair and sensible distribution of the proceeds, will achieve a substantial reduction in carbon emissions while minimizing the financial costs to consumers. Conversely, an allocation of free permits to the polluting utilities based on their historical emissions has higher societal costs and would therefore unnecessarily add to the challenge of implementing emission reductions.

Ideally, allowances would be auctioned to the highest bidder, after setting aside some allowances for non-affected sources including wind energy, solar energy and energy efficiency. Proceeds from the auction should then be reinvested for public benefit in the following ways:

- Investment in energy efficiency projects in order to maximize net customer savings, as discussed more in sections V and VI, as well as clean energy job creation;

[5] Although Sierra Club suggests adopting a mass-based plan—so long as certain key elements are included—our internal analysis using the Synapse Clean Power Plan Planning Tool suggested that the mass-based target for North Dakota was less stringent than the state's rate-based target when factoring in new sources. More in-depth technical analysis would be required to fully understand the difference results that may be achieved between the two systems. Because adopting a mass-based goal may sacrifice some of the pollution reductions and clean energy development that might be achieved in a rate-based system, it is doubly important to ensure that the mass-based plan is as strong as possible.

[6] Such a plan could include additional allowance set asides for carbon-free generators to offset emissions from new gas.

[7] N.D. Cent. Code Ann. 23-01-04.1

- Creation of a fund to provide financial assistance to workers and families affected by the transition from coal, and for communities in which coal represents a significant part of their current economy, as discussed more in section VII;
- Partial returns to electricity customers to complement rate relief already provided by demand-reducing energy efficiency projects

Auctioning of allowances would likely generate significant funding to address the policy priorities outlined above. EPA projects that starting in 2022, affected sources in North Dakota will be responsible for over 25 million tons of carbon pollution,[8] with each ton requiring an allowance. As an example, the latest allowance auction conducted by the Regional Greenhouse Gas Initiative (RGGI) yielded an allowance price of $6.02/ton.[9] If projected North Dakota allowances sold for this price, they would generate over $150 million in revenues each year. These funds could be reinvested in clean energy projects, efficiency measures, job transition, and other public benefits, including returns to electricity ratepayers. In RGGI states, this approach has resulted in increased jobs and net economic value, while still reducing emissions substantially.[10]

By contrast, the free allocation of allowances would sacrifice public benefits and equitable and efficient distribution, and limit the ability of North Dakota and DoH to minimize impacts on the public. The allowances—whether freely allocated or not—carry monetary value as a necessary and scarce commodity. Free allocation to power plant owners means that the entire value of allowances goes to the owners. By selling allowances on the trading market, it is possible that both regulated and unregulated entities could recover pure profit, as they would not have paid anything for the initial allocation of allowances. To return this benefit to the public, the Public Service Commission would need to direct regulated utilities as to how to use the profit earned through the sale of allowances. However, if the utilities use the allowances for their own compliance, there would be no benefit to distribute. With an auction, the state will receive the revenues, which can then be used to minimize impacts on the public, particularly lower-income households.

b. Authority for auctions under a mass-based program

A mass-based program for CPP compliance falls within the scope of existing authority conferred to the DoH under applicable laws. North Dakota's Air Pollution Control laws expressly

[8] EPA: Clean Power Plan At a Glance: North Dakota, http://www3.epa.gov/airquality/cpptoolbox/north-dakota.pdf.
[9] RGGI, Market Monitor Report for Auction 29 (Sept. 2015), *available at* http://www.rggi.org/docs/Auctions/29/PR091115_Auction29.pdf
[10] See Paul J Hubbard et al, The Economic Impact of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States (2011), *available at* http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/economic_impact_rggi_report.pdf

designate DoH as the agency to administer a statewide program of air pollution,[11] and further authorize the Department to "provide by rules any procedures necessary and appropriate to develop, implement, and enforce any air pollution prevention and control program established by the Clean Air Act."[12] Such rules may include "economic incentives such as fees, marketable permits, and auctions of emissions rights" as provided by the Clean Air Act.[13] The CPP, in turn, expressly allows for state autonomy in the allocation of allowances.

The uses of auction revenues that we advocate for here, including investments in workers' and communities' transition, serve the larger purpose of eliminating air pollution from affected power plants under the CPP. The DoH, in promulgating rules for the auction of emissions allowances, may want to establish separate accounts and expressly state the purposes for which DoH or other agencies may disburse collected monies as necessary to implement the CPP. Otherwise, if the DoH works with the North Dakota Legislature to create a cap-and-trade program through separate legislation or an amendment to the Air Pollution Control laws, the statute could further expand the fund to address these purposes in legislation, and other agencies could be empowered to administer them.

c. Allocation Alternatives

If the DoH decides not to auction off carbon allowances for every ton of CO2 emitted by polluters and reinvest the proceeds in efficiency, renewable energy, and other public benefits, there are a number of alternative allocation methods which could be explored, including but not limited to those discussed below. Although each of these methods have drawbacks compared to an auction, they are all preferable to an inequitable scenario wherein some carbon polluters potentially receive windfall profits, and public benefits are limited.

- *Cap and dividend option*. In this scenario, the state auctions off allowances (after set-asides) to carbon polluters (i.e. affected sources.) Instead of investing the proceeds in its policy priorities, it simply returns the full auction proceeds to electric customers. The drawbacks of this include less investment in efficiency and potentially impacted communities than under the preferred scenario. The formula for distribution of proceeds should benefit lower income customers, and should be designed to encourage efficiency (i.e., should not be tied solely to the amount of electricity a customer uses).
- *Optional participation in allowance auction*. In this scenario, each affected source would have its air pollution permit revised to include a maximum permitted level of carbon pollution. The total pollution levels for all sources would be less than the statewide mass

[11] N.D. Cent. Code Ann. § 23-25-02
[12] N.D. Cent. Code Ann. § 23-25-03
[13] *Id.*

target for existing and new sources in a given year. Allowances would be available to make up the difference between the cumulative permitted emission levels and the statewide cap, and would be auctioned off, with the proceeds available to be used as outlined in our preferred scenario. The difference is that affected sources would not necessarily have to purchase any allowances. They could instead chose to meet their permit limits solely through heat rate improvements or generation curtailment. The drawback of this option is that it is more complicated to administer and to determine the proper permitted emission limits, rather than to simply require one allowance to be held for every ton of carbon emitted.

- *Granting of allowances according to carbon-efficiency*. In this scenario, the state grants all allowances (after set-asides) to generators. However, it does so to the most carbon-efficient sources of energy, rather to the most polluting sources. To administer, a carbon pollution intensity figure is calculated for each existing generating unit by dividing the tons of CO2 emitted in the previous year by the number of megawatt-hours (MWh) generated. Using this figure, the generating units (including verified energy efficiency projects) are then ranked from least to most carbon intensive. One carbon allowance should be granted for each MWh generated (or saved) in the previous year by the unit with the lowest remaining carbon intensity until the allowances are fully allocated. This is preferable to granting allowances to carbon polluters first because the cleaner sources could generate additional revenue from allowance sales to invest in new projects.

Rather than distributing all allowances to regulated sources, DoH should use allowance set-asides to promote the development of new wind, solar and efficiency resources. Projects developed after submittal of the SIP to EPA should be eligible to receive allowances for each ton of carbon offset from the beginning of their operation through the end of the compliance period. For allowances issued before the compliance period begins in 2022, EPA requires that the allowances be borrowed from state cap on CO2 for the initial compliance period so that the early action allowances do not increase the total CO2 emissions allowed under the CPP. The early action allowances may be banked by the developer until they can be sold to an affected source. The anticipated revenues from the sale of allowances should lower the cost of capital for new clean energy projects in our state. Projects commencing construction (in the case of renewable energy) or operations (in the case of energy efficiency) after the submission of the final state plan and generating or saving energy in 2020-21 would be eligible for matching credits from EPA under the Clean Energy Incentive Program (discussed more in Section V).

A portion of the allowances in each compliance year should also be set aside for providing economic assistance to communities and workers directly impacted by power plant closures (discussed more in Section VII). These set-asides should occur regardless of the method chosen for allocating allowances.

d. State Measures Plan

The DoH requested input on whether North Dakota should adopt an "emissions standards plan" or a "State Measures Plan." Sierra Club recommends that the state pursue an emissions standards plan, which would put the onus of meeting the carbon emission cap directly on the regulated sources, rather than leaving the state or other entities on the hook. The State Measures Plan approach is of dubious legality in that it allows measures to be included in the state implementation plan that are not necessarily enforceable by citizens.

IV. Participation in Trading

Sierra Club generally opposes trading of pollution credits or allowances due to the possibility that certain sources can end up polluting much more than others, which can lead to pollution "hotspots," which tend to be disproportionately close to low-income communities, communities of color, and communities historically burdened by pollution. Trading of carbon allowances is different because the impacts of carbon pollution are distributed globally rather than locally or regionally, so there is no risk of *carbon* hotspots. Nevertheless, the largest sources of carbon dioxide—coal-fired power plants—emit large amounts of unhealthy co-pollutants that are correlated to the amount of carbon dioxide they emit. These co-pollutants *do* have localized impacts. As the CPP shifts generation from coal to less carbon intense sources, the overall emissions of co-pollutants will decrease, but the pollution benefits will not necessarily be evenly distributed. It is possible that some power plants will use trading to avoid cutting carbon pollution, thus continuing to expose nearby communities to co-pollutants. It is also possible that trading could enable some power plants to increase their generation, thereby increasing co-pollutant emissions and associated health impacts in those communities.

At the same time, trading of carbon allowances or emission rate credits, both intra- and inter-state, lowers generators' cost of compliance with carbon regulations by providing flexibility for sources to reduce carbon emissions where it is most cost-effective.[14] The Midcontinent Independent System Operator (MISO), which is the entity responsible for much of the grid operation and reliability in North Dakota and across many Midwestern and Southern states, has also recognized the benefits of cooperative CPP compliance.[15] We support the adoption of a trading-ready program that would allow for multi-state trading, but with certain limitations to

[14] See, for example, Susan Tierney and Paul Hibbard, Carbon Control and Competitive Wholesale Electricity Markets: Compliance Paths for Efficient Market Outcomes (May 2015), *available at* https://www.epsa.org/forms/uploadFiles/3108C0000001F.filename.Analysis_Group_-_Clean_Power_Plan__Markets_May_2015_Final.pdf

[15] MISO, Analysis of EPA's Proposal to Reduce C02 Emissions from Existing Generating Units Phase I and II (finding regional cooperation could reduce compliance costs by 40% as compared to making similar emissions cuts separately in an analysis of the proposed Clean Power Plan rule).

drive reductions of co-pollutants in already overburdened communities, as discussed more in section VII.

V. Energy Efficiency & Renewables

Under a mass-based system, compliance is measured by total stack emissions from regulated sources. Increasing renewable energy use in North Dakota should displace fossil generation and thus lower those stack emissions.[16] With low natural gas prices and increased wind and solar options, older inefficient coal plants are often the first generators to be removed from the dispatch stack when there is an abundance of electricity available to the grid because of higher operating and fuel costs. For example, a Union of Concerned Scientists study found increasing in-state renewable energy serving Minnesota to 40% by 2030 would offset existing imports, largely from North Dakota, and allow the state to become a net exporter by 2030.[17] North Dakota should specifically encourage in-state renewable energy development because it can generate jobs and economic development benefiting North Dakota residents.

North Dakota is particularly well-suited for transitioning to clean energy. According to the American Wind Energy Association (AWEA), the state has the sixth largest wind resource in the country. [18] The National Renewable Energy Laboratory showed that the state has a theoretical potential, after subtracting land that is unsuitable for energy development, totaling 770,000 megawatts (MW)—more capacity than all the fossil-fueled power plants in the United States combined. In addition, planned or under-construction transmission upgrades in the MISO region are alone are expected to enable 43 million MWh of additional wind across the MISO footprint, the approximate output of 14,000 MW of new wind capacity.[19] To date, however, North Dakota has only installed 1,886 MW of wind capacity,[20] leaving the state with significant potential for additional cost-effective wind energy development.

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[16] While renewable energy generation always dispatches before fossil-fuel generation due to its lack of fuel costs, in-state renewable energy generation is more likely than distant, out-of-state renewable energy to displace in-state fossil fuel generation, and is therefore more likely to result in progress toward North Dakota's CPP compliance obligation.

[17] Union of Concerned Scientists, *Advancing Minnesota's Clean Energy Economy: Building on a History of Leadership and Success*, at Figure 4, *available at* http://www.ucsusa.org/sites/default/files/attach/2015/01/Advancing-Minnesotas-Clean-Energy-Economy-Full-Report.pdf

[18] Natural Resources Defense Council, *Renewable Energy For America: North Dakota*, *available at* http://www.nrdc.org/energy/renewables/ndakota.asp

[19] AWEA Annual Market Report (2015) available at: http://www.awea.org/Resources/Content.aspx?ItemNumber=7525 and MISO, Multi-Value Project Status as of July 2015 available at: https://www.misoenergy.org/Planning/TransmissionExpansionPlanning/Pages/MVPAnalysis.aspx

[20] US Department of Energy: Energy Efficiency and Renewable Energy, *WindExchange: Installed Wind Capacity, available at* http://apps2.eere.energy.gov/wind/windexchange/wind_installed_capacity.asp

Moreover, the wind energy industry has been an economic boon for the state with the potential for expansion. To date, the industry has created more than 1,000 manufacturing jobs in the state. DMI Industries, a turbine tower manufacturer employing 500 people, has a plant in West Fargo. Another company, LM Glasfiber, produces turbine blades in Grand Forks. Because of its location in the heart of the "wind belt" and its reliable workforce, North Dakota is well-situated to see more of such job creation if it implements the right policies.

Given the abundance of our renewable resources[21], the state could do more to incentivize their utilization. One approach would be to extend and strengthen North Dakota's renewable resource procurement guidelines, which ask that electric utilities meet a "voluntary" objective of obtaining 10% of their generation from renewable resources by 2015. First, to assist in meeting CPP targets, the requirement should be extended through 2030 to mirror the compliance period. Second, the procurement target should be mandatory. Third, the law should require that a certain percentage of renewable generation originate in the state, in order to bring renewable development to North Dakota and to better ensure displacement of in-state fossil generation, thereby making progress toward our compliance obligation. Finally, the procurement guideline should not include biomass, which is a term that applies to many different fuel sources with unique carbon impacts despite often mistakenly assumed to be a carbon-neutral fuel.[22]

Energy efficiency is the least cost resource available, and, along with renewable energy growth, should be a key component of carbon emissions reductions and CPP compliance. North Dakota can improve in this area – the state does not currently have any energy efficiency standards, and in 2014 our state was ranked last in energy efficiency, with an energy score of 4 (out of 50 possible points) awarded by the American Council for an Energy-Efficient Economy.[23] If the state auctions off carbon allowances, it would have millions of dollars to invest in energy efficiency, which provide tangible and significant ratepayer benefits. As an example of the

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[21] "North Dakota also has strong solar energy potential. Given the relatively dry climate, particularly in the western part of the state, North Dakota receives more sunlight than any other state on the Canadian border. Its long summer days provide greater solar electricity potential than places like Jacksonville, Florida, and Houston, Texas. Most of North Dakota has an average solar energy density of 4to 5 kWh per square meter per day, enough sunlight to derive significant amounts of energy. However, there are currently very few solar installations in North Dakota. The Energy Information Administration reports shipments of photovoltaic cells to North Dakota totaling only 31kilowatts in 2008 and 2009, and 3,622 square feet of solar thermal collectors in the same period." *See* Natural Resources Defense Council, Renewable Energy For America: North Dakota, *available at* http://www.nrdc.org/energy/renewables/ndakota.asp

[22] Stack CO2 emissions from biomass plants average 150% of emissions from coal plants and 340% of emissions from combined cycle gas plants. It is true that these trees would eventually decay and release their carbon into the atmosphere, but this process takes decades to centuries, while combustion releases the carbon immediately. Afterwards, the slow process of forest regrowth means that re-sequestration of carbon will take many more decades; well beyond the 2030 initial compliance deadline for the Clean Power Plan. *See* EIA data as cited by the Partnership for Policy Integrity: http://www.pfpi.net/wp-content/uploads/2015/11/PFPI-bioenergy-and-the-CPP-Nov-45-2015.pdf, slide 4.

[23] ACEEE, *2014 State Energy Efficiency Scorecard Executive Summary*, *available at* http://aceee.org/files/pdf/summary/u1408-summary.pdf

possible benefits, re-investments of about $1 billion in RGGI allowance proceeds have returned more than $2.9 billion in lifetime energy bill savings to more than 3.7 million participating households and 17,800 businesses.[24]

There are many ways in which the state can promote efficiency investments using auction funds. For example, a statewide program for school efficiency could be established, with priority given to schools in low-income communities. Comprehensive energy management plans, for instance, involve no capital expenditures and can provide significant savings for schools and taxpayers. In addition to behavioral changes and system optimization, the state could facilitate a program to provide third-party efficiency retrofits through energy service providers. This type of program could be broadened to include municipal buildings and community centers. State agencies should follow this example and maximize their own energy savings through comprehensive energy management programs. As discussed in section II, if these types of programs cannot have access to funds generated from allowance auctions, they should receive set-aside allowances based on verified savings that they can then sell to finance additional investments in EE.

North Dakota should state its intent to participate in the Clean Energy Incentive Program (CEIP) for the purpose of creating incentives for low-income energy efficiency.

Early action on energy efficiency is important for two main reasons. From an environmental perspective, early reductions in carbon pollution are critical because they have a larger cumulative impact on atmospheric carbon than later emissions reductions. Thus they provide greater benefits in terms of climate stabilization. From an economic justice perspective, we should do everything possible to ensure that low-income electricity customers have universal access to energy efficiency programs so that they can realize savings on their utility bills regardless of any changes to electric rates.[25] These programs can also benefit the community as a whole by creating green-collar jobs where they are needed most.

Allowances from the compliance period (2022-2030) would be set aside to providers of verified low-income efficiency projects under the CEIP during the pre-compliance period between finalization of the state plan and 2022.[26] Under EPA's outline of the CEIP in the final CPP, for each two verified MWhs saved, the EE provider would be granted allowances equivalent to two

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[24] See RGGI, *RGGI Benefits*, *available at* http://www.rggi.org/rggi_benefits.

[25] Approximately 11.5% of North Dakotans live in poverty, according to the US Census available at: http://www.census.gov/quickfacts/table/PST045214/38,00

[26] Here we are advocating that North Dakota begin its CEIP prior to 2020 in order to bring low-income efficiency online as quickly as possible. Projects that happen before 2020 would not be eligible for matching EPA allowances or credits, but could still be granted allowance set-asides that are borrowed from the pool of 2022-2030 compliance allowances.

Emission Rate Credits ("ERCs") from the state and two matching ERCs from EPA.[27] These allowances could then be sold in 2022, and the proceeds used to finance additional efficiency programs in low-income neighborhoods. As EPA has noted, the program must be implemented in such a way that the stringency of the state goal is maintained—in a mass-based program, early action allowances thus must be "borrowed" from the budget reflecting the state goal for the interim compliance period starting in 2022 and cannot be distributed again during the compliance period.

By accepting matching credits from EPA that are above and beyond the state's carbon pollution cap, participation in the CEIP holds the risk that more carbon pollution would be allowed than without the program. It is therefore important to ensure that the program truly creates incentives for additional carbon-reducing projects and does not merely reward "business as usual" projects that would be developed anyway. To this end, and to encourage that no community is left out of North Dakota's clean energy transition, we recommend that the program be designed to particularly emphasize and reward development of low-income energy efficiency which faces market barriers to being realized that incentives can help address like access to upfront capital. Since these types of projects are not happening as a matter of course, encouragement through the CEIP would result in early carbon dioxide reductions that would not have otherwise occurred and could balance out or exceed the potential above-the-cap carbon pollution represented by EPA's "matching credits." They also would benefit low-income consumers by lowering their energy bills, thereby putting more money in their pockets for other important needs. We also recommend that the state study what level of allowances per MWh would be needed to provide enough of an incentive for project development, and aim to offer that level of allowances to these projects in low-income communities as an early action credit.[28]

VI. Least-Cost Compliance and Reliability Issues

Lowest cost of Compliance

Maximizing investment in cost-effective energy efficiency represents the compliance pathway with the lowest cost. The more energy efficiency measures are deployed in North Dakota, the more businesses and residential ratepayers will save on their electricity costs. This is because throughout the United States, the cost of saving a kilowatt-hour (kWh) of electric energy has proven far lower than the cost of generating that same kWh. Most utilities and states are finding that the levelized cost of saving energy, defined as the total cost of a program divided by the

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[27] An Emission Rate Credit is the credit granted for 1 MWh of zero-carbon energy. EPA has not yet determined an appropriate translation between ERCs and allowances for purposes of the CEIP.
[28] EPA puts some limitations on the credits granted through the CEIP, but allows the state to design its own early action set-aside program as well, which could supplement the CEIP.

lifetime energy savings associated with the program, is in the range of 2 to 5 cents/kWh.[29] By comparison, a survey of levelized costs of generation showed 7-10 cents per kWh for energy from a new gas combined cycle plant, and 11-14 cents per kWh for a new technology coal plant.[30] Plainly, energy efficiency is the lowest cost resource for utilities to match supply and demand for electricity, and it is area of opportunity for North Dakota.[31]

The savings from energy efficiency programs take two forms. Program participants save directly as the efficiency measures they install or incorporate into their buildings reduces their consumption and therefore their energy bills. In addition, all customers, even those who do not participate in efficiency programs, benefit from energy price suppression. When system-wide demand for electricity is reduced, fewer generating resources must operate. The most expensive generators are displaced first, which can lower the marginal price of electricity significantly. Reduced demand also lowers the amount of capacity that must be acquired by the grid operator, and thus the price paid for that capacity. Finally, efficiency and demand response can also obviate the need for costly transmission upgrades.

Electricity price suppression occurs when more renewable energy is deployed, much the same way efficiency does. Because the fuel costs of renewable energy are zero and the other variable costs are extremely low, these resources are used first when they are available. This displaces the highest marginal cost fossil fuel plants, thus lowering the wholesale price of electricity. This effect has been borne out by experience: between 2008 and 2013, the states that generated more than 7% of their electricity from wind, including North Dakota, saw a small decrease in electricity prices on average, while all other states saw an average increase in price of nearly 8% over the same time period.[32]

Reliability

In addition to the economic benefits, efficiency increases grid reliability. Investments in efficiency measures result in long term reductions in peak demand. This leads to higher reserve margins in generation and less transmission congestion, both of which make the power grid less likely to fail. The need for more efficiency was quite apparent during the record cold temperatures in 2014, which caused corresponding record winter power demand. It also caused record numbers of power plants to go offline temporarily because they were insufficiently

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[29] American Council for an Energy Efficient Economy, Report Number U1402 (2014), *available at* *http://aceee.org/research-report/u1402*.
[30] U.S. Energy Information Administration: Independent Statistics & Analysis, *Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2015* (June 2015), *available at* https://www.eia.gov/forecasts/aeo/pdf/electricity_generation.pdf
[31] North Dakota's achieved energy efficiency of 0.01% percent in 2014.
[32] *See* Governor's Wind Energy Coalition, "States with greater 'wind penetration' see lower electricity rates – analysis," February 17, 2014, available at: http://www.governorswindenergycoalition.org/?p=7794

weatherized, or had difficulty with fuel supplies (such as coal piles freezing and gas being diverted for space heating). Further efficiency and demand response investments would eliminate such close calls in the future.

MISO is the primary Independent System Operator that is responsible for maintaining reliability in North Dakota and elsewhere in the region. Although it does not operate a forward capacity auction, in part because utilities in most of the states are responsible for resource planning and expansion, MISO's most recent survey of states shows that it has sufficient reserves through at least 2019.[33] Despite some claims that the CPP will require adding more renewables than the grid can reliably accommodate, MISO has stated on several occasions that it is able to reliably integrate large amounts of wind[34] and explained that the impact of 12,000 MW of wind generation on its need for fast acting reserves was "little to none."[35] MISO also performs analyses to assure that plant retirements do not impact reliability. In sum, we are confident that MISO's electric grid will remain reliable and robust throughout CPP planning and implementation.

VII. Protection for Vulnerable and Over-burdened Communities

a. Over-burdened and Environmental Justice Communities

Low-income communities and Communities of Color, which collectively are referred to herein as Environmental Justice Communities (EJCs), are already at greater risk from pollution from fossil-fueled power plants than is the general population. In North Dakota and across the country, EPA conducted a proximity analysis using its newest screening tool (EJSCREEN), which found that a higher percentage of minority and low-income communities live near to power plants when compared to national averages.[36] Our state is fortunate to have fewer concentrated pollution impacts on EJCs than others—partly as a result of a smaller, more widespread population—but given our heavy reliance on coal generation and relatively high number of low-income communities, the SIP should facilitate meaningful community participation and consider potential impacts, both to comply with the rule and to protect our citizens.

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[33] MISO, 2015 Organization of MISO States MISO Survey Results (July 2015), *available at https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/SAWG/2015/20150402/20150402%20SAWG%20Item%2003%20OMS-MISO%20Resource%20Adequacy%20Survey.pdf*

[34] MISO, Multi-Faceted Solution for Managing Flexibility with High Penetration of Renewable Resources, *available at* http://www.ferc.gov/CalendarFiles/20140411130433-T1-A%20-%20Navid.pdf

[35] PRN Newswire, *Wind Output in MISO Surpasses 10 GW*, *available at* http://www.prnewswire.com/news-releases/wind-output-in-miso-surpasses-10gw-181059021.html

[36] Environmental Protection Agency, "EJ Screening Report for the Clean Power Plan: 2015" available at: http://www.epa.gov/airquality/cppcommunity/ejscreencpp.pdf

First, it is critical that low-income electricity customers are protected from increases in their electric bills as a result of CPP implementation. One of the best ways to do this is by maximizing investments in energy efficiency, which will suppress wholesale energy prices, and by ensuring that low-income customers have near-universal access to energy efficiency programs. This will ensure that the most economically vulnerable North Dakotans experience net benefits from CPP implementation. This issue is discussed in greater detail in Sections IV and V.

Next, it is possible that a few fossil fueled power plants will increase their operation, at least temporarily, as other plants retire if new, pollution-free generation is not immediately brought online to replace the retired capacity. This could result in exacerbation of co-pollutant hot-spots and related health problems. In order to effectively prevent exacerbation of pollution hot-spots, North Dakota would have to model emissions of co-pollutants and conduct a more detailed proximity analysis than that completed by EPA, which accounts for the dispersion of these pollutants beyond the 3-mile radius studied in the proximity analysis. One fossil generator that merits consideration is the fifty-year old RM Heskett Station, which is located near the relatively populous city of Mangan and not far from Bismarck, the state's second largest city. Of the eight North Dakota study areas analyzed by EPA using EJSCREEN, RM Heskett had by far the largest nearby population – over 12,000 people live within a three-mile radius.[37]

Finally, in addition to taking steps to prevent any creation or exacerbation of pollution hotspots resulting from CPP implementation, the Commonwealth can establish a program that provides funding to designated EJCs to mitigate other long-standing pollution sources. Funding could come from proceeds generated by allowance auctions. It could be available for community organizations to clean up or otherwise mitigate pollution problems that may be unrelated to the electric sector but which contribute to the cumulative pollution burden of the community.

It is critical that all residents of North Dakota will be able to participate in the crafting of policies that will affect them. The final rule requires states to ensure meaningful participation from communities in the SIP development process. The initial deadline for states to submit their plans is September 6, 2016, and any states seeking an extension beyond that deadline must still submit initial plans by September of next year that demonstrate how they have engaged low-income and minority communities, and they must also explain how they intend to ensure their continued involvement as they develop their final plans.

EPA has suggested specific examples of how to ensure meaningful participation from communities, including:

[37] *Id.*

- Outreach to specific communities and community leaders prior to initial plan submittal, to understand the nature of community concerns, ideas on how to address them, and whether residents feel additional analysis is necessary;
- Providing opportunities to comment on the initial plan and responding to those comments;
- Soliciting input on state environmental justice analyses;
- Ensuring participation from communities in the required public hearing [which includes organizing the hearings in the right places;
- Providing background information on their initial and final plans in the appropriate languages, and providing translators at the public hearings.

b. Meeting the needs of workers and economically vulnerable communities

The BlueGreen Alliance, a nationwide partnership of 15 unions and environmental organizations representing 16 million people, recently released a report modeling the economic and employment impacts of a transition to lower carbon emitting sources in the electric sector.[38] One of the report's key finding was that compliance with the Clean Power Plan is expected to create many more jobs than it displaces.[39] The fact is that renewable energy and efficiency, despite being lower in overall cost, are more labor intensive than fossil-fueled generation. Nevertheless, as with any change in a dynamic economy, some existing jobs will be lost, and the jobs that are created are not necessarily in the same place, nor do they necessarily demand the same set of skills and experience as the jobs that are lost. In consideration of the state's current coal industries, North Dakota should include policies in its SIP that aim to accomplish two broad objectives: first, maximizing the economic benefits that will flow from a transition to a clean energy economy and ensuring that they are available to all; and second, minimizing the impacts of energy transition on workers in the coal industry and the communities in which they live and work.

1. Maximizing economic benefits of compliance

North Dakota can take proactive steps to ensure that compliance with the CPP maximizes the creation of quality career opportunities. As part of the process of meaningful engagement, North Dakota should consult with the DOE-Labor Working Group, which can provide expertise to the state in helping maximize the development of quality careers as it develops its implementation plan. In addition, unions, workers and their communities should be treated as key stakeholders in the SIP development process; the state should strive to meaningfully engage with these parties in order to understand their perspectives.

[38] Mick Power et al, Managing the Employment Impact of Energy Transition in Pennsylvania Coal Country, available at http://www.bluegreenalliance.org/
[39] *Id.*

North Dakota should also take advantage of the fact that EPA will look favorably on state plans that prepare workers for new renewable energy (RE) and energy efficiency (EE) careers with registered union apprenticeship programs (as well as community and technical college programs) that result in validated skill certifications. Thus, to ensure that work undertaken pursuant to its state plan is performed to specifications, and is effective, safe, and timely, North Dakota should ensure that workers on any construction projects that reduce CO2 emissions under the state's SIP have been certified by:

1) an apprenticeship program that is registered with the U.S. DOL, Office of Apprenticeship or a state apprenticeship program approved by the DOL;
2) a skill certification aligned with the U.S. DOE Better Building Workforce Guidelines and validated by a third party accrediting body recognized by DOE; or
3) other skill certification validated by a third party accrediting.

More specifically, North Dakota should include in its plan a description of how the state will ensure that the skills of workers installing demand-side EE and RE projects or other measures intended to reduce CO2 emissions as well as the skills of workers who perform the evaluation, measurement and verification (EM&V) of demand-side EE and RE performance will be certified by a third party entity that:

1) Develops a competency based program aligned with a job task analysis and certification scheme;
2) Engages with subject matter experts in the development of the job task analysis and certification schemes that represent appropriate qualifications, categories of the jobs, and levels of experience;
3) Has clearly documented the process used to develop the job task analysis and certification schemes, covering such elements as the job description, knowledge, skills, and abilities;
4) Has pursued third-party accreditation aligned with consensus-based standards, for example ISO/IEC 17024. Examples of such entities include: parties aligned with the Department of Energy's (DOE) Better Building Workforce Guidelines and validated by a third party accrediting body recognized by DOE; or by an apprenticeship program that is registered with the federal Department of Labor (DOL), Office of Apprenticeship; or with a state apprenticeship program approved by the DOL, or by another skill certification validated by a third party accrediting body. This can help to substantiate the authenticity of emission reductions due to demand-side EE and RE and other CO2 emission reduction measures.

North Dakota should also take advantage of new and existing federal initiatives to create jobs and unlock access to RE and EE in vulnerable communities:

1) The National Community Solar Partnership launched by U.S. Department of Energy (DOE), the U.S. Department of Housing and Urban Development (HUD), the U.S. Department of Agriculture (USDA), and the EPA to unlock access to solar energy for the nearly 50 percent of households and businesses that are renters or do not have adequate roof space to install solar systems, with a focus on low- and moderate- income communities.
2) The Administration's goal to install 300 megawatts (MW) of RE in federally subsidized housing by 2020 and plans to provide technical assistance to make it easier to install solar energy on affordable housing, including clarifying how to use federal funding for EE and RE to continue enhancing employment opportunities in the solar industry for all Americans.
3) AmeriCorps funding to deploy solar energy and create jobs in underserved communities.
4) The Department of Energy's Weatherization Assistance Program
5) Health and Human Service's Low Income Home Energy Assistance Program
6) The Department of Agriculture's Energy Efficiency and Conservation Loan Program, High Cost Energy Grant Program, and the Rural Housing Service's Multi-Family Housing Program.
7) DOE and other agency programs to expand solar energy education and opportunities for job training, including:
    a. HUD, DOE, and the Department of Education's "STEM, Energy, and Economic Development" program;
    b. DOE's Diversity in Science and Technology Advances National Clean Energy in Solar (DISTANCE-Solar) Program; Grid Engineering for Accelerated Renewable Energy Deployment (GEARED);
    c. The Department of Labor's Trade Adjustment Assistance Community College and Career Training (TAACCCT), Apprenticeship USA Advancing Apprenticeships in the Energy Field, Job Corps Green Training and Greening of Centers, and YouthBuild; and
    d. EPA's Environmental Workforce Development and Job Training (EWDJT) program.
8) HUD programs supporting EE improvements and the deployment of RE on affordable housing, including its Energy Efficient Mortgage Program, and the use of Section 108 Community Development Block Grants.
9) Department of Treasury tax credits to support RE development and EE in low-income communities, including the New Markets Tax Credit Program and the Low-Income Housing Tax Credit.
10) EPA Programs such as:
    a. the RE-Powering America's Land Initiative, which promotes the reuse of potentially contaminated lands, landfills and mine sites – many of which are in

low-income communities – for RE through a combination of tailored redevelopment tools for communities and developers, as well as site-specific technical support.

b. The Green Power Partnership, which is increasing community use of renewable electricity across the country and in low-income communities.
c. EE programs throughout the country that leverage ENERGY STAR to deliver broad consumer energy-saving benefits.

2. Minimizing negative impacts on workers and communities

Even though the CPP will create far more jobs than it displaces, it is likely that some jobs will be lost. This is particularly true in coal mining and coal-fired electric utilities, which have experienced losses for years due to the changing economics of the coal market. In order to ensure that affected workers and communities do not unfairly bear the burden of climate protection policies that will benefit us all, North Dakota should directly invest in affected communities through its implementation of the CPP and utilization of complementary federal programs, as well as incentive utility practices that will smooth the transition for individual workers.

Incentivizing advance notice of retirements

It is possible that CPP compliance will result in the closure of some coal-fired units within North Dakota. Advance notice of retirements can smooth the transition for affected communities, while short notice periods exacerbate the impacts of closures.[40] MISO requires power plant operators to provide only 180 days' notice of a planned unit deactivation, to allow the grid operator to study the potential impacts of the deactivation on grid reliability.[41] If analyses reveal that reliability concerns cannot be addressed through transmission upgrades before the deactivation date, MISO convenes a stakeholder process to determine a course of action for the plant, including entering a typically offers the operator a System Support Resource (SSR) agreement. The SSR is an out of market payment for the plant to remain on standby if needed until the reliability issues are addressed.

While we believe MISO employs an adept process for managing a reliable transmission system through plant retirements, the process is not designed for, and is unable to provide, adequate

[40] Blue Green Alliance Policy Brief, America's Energy Transition (Sept. 2015) available at: http://www.bluegreenalliance.org/pdf/Energy-Transition-Cast-Study-vFINAL.pdf (for example, in 2013, FirstEnergy retired the Pennsylvania's Hatfield's Ferry and Mitchell power stations with only 90 days' notice, and such short notice exacerbated the impacts of the closures).
[41] MISO Chapter 4.4 Generation Retirements and Suspensions, http://www.misomtep.org/generation-retirements-suspensions-mtep15/.

economic protections for communities experiencing a plant retirement. There are numerous benefits to North Dakota for power plant owners and utilities to greater notice about planned unit retirements, to stagger the retirement of multi-unit facilities, and to engage with their communities. These include the following:

- Fewer layoffs would occur. Operators could cease hiring permanent positions after notice of intent to deactivate is given. Older existing employees would have the opportunity to take advantage of early retirement packages.
- Existing employees would have meaningful time to prepare for their future while still gainfully employed, whether that be planning for relocation to another facility, training for a job in an new field, or searching for new positions in the same field.
- Surrounding communities would have additional time to plan for economic diversification and replacement of lost tax revenue after unit closure.
- Transmission upgrades could be planned better and executed more cost-effectively, especially if multiple regional units give advance notice of deactivation. Better transmission planning and more comprehensive transmission projects could provide new jobs as line workers for some existing and former power plant workers.
- Greater transparency in the future availability of generation capacity allows new entrants into the capacity market to plan to build where the capacity will be needed, and reduce the risk of temporary but disruptive price spikes in certain transmission zones.

While the regulated and cooperative utilities in North Dakota are not heavily disincentivized from early retirement announcements, as in deregulated markets where generators want to maintain competitive advantage, it does not necessarily follow that early announcements will be made. The CPP allowance system, however, can provide a positive incentive for early announcement and community engagement. Fossil-fuel generators which announce a unit retirement, and which enter into a legal agreement with their host community and workers to help them prepare for the unit's retirement could be eligible to receive carbon allowances to meet a portion of its obligations between the date they announce a unit retirement and the date the unit retires. Meaningful steps an operator could take as part of a community agreement could include: staggered deactivation of units, enhanced early retirement packages for employees, timely decommissioning using local labor, local investment in efficiency and clean energy projects, and participation in community transition planning.

Investment in workers and communities

North Dakota should directly invest in affected communities through the use of proceeds from allocation allowances and by encouraging communities to take advantage of complementary CPP programs.

First, North Dakota should establish a transition fund using a portion of auction proceeds to help ease the transition in both communities facing plant retirements and communities with mining-related job losses. The level of funding devoted to the plan, and the process for allocation of funds should be determined through a stakeholder process involving representatives from labor unions, potentially impacted communities, and economic and energy experts who can assist DoH in projecting the scale and scope of employment impacts. Alternatively, some allowances could be allocated directly to designated community or worker trustees, who could sell the allowances to generators and invest the proceeds locally.

North Dakota should encourage communities to participate in the federal POWER Initiative, which will provide $55 million this year alone for coal communities to chart healthier economic futures. The goal is to diversity economies, attract new sources of investment, and create new jobs through awarded planning assistance and implementation grants. These grants will help communities organize themselves, develop comprehensive strategic plans that chart their economic future, and execute coordinated economic and workforce development activities based on their strategic plans.

In addition, there are currently several bipartisan measures under consideration in Congress to implement the legislative elements of the Obama Administration's POWER+ Plan. They include (1) $1 billion over five years from the Abandoned Mine Lands (AML) fund to support restoration of land and water polluted by coal mining in ways that support economic development; (2) $3.9 billion over 10 years to shore up health and pension benefits for retired coal miners.[42]

North Dakota should also use economic and labor market analysis to identify where the state can deploy strategies to provide a range of employment and training assistance to workers, and economic development assistance to communities affected by the rapid changes underway in the power sector and closely related industries, to diversify their economies, attract new sources of investment, and create new jobs. We should mobilize existing education and training resources, including those of community and technical colleges and registered apprenticeship programs, to ensure that both incumbent and new workers are trained for the skills necessary to meet employer demand for new workers in the utility, construction and related sectors, that such training includes career pathways for members of low-income communities and other vulnerable

[42] The White House, "The President's Budget, Fiscal Year 2016: Investing in Coal Communities, Workers and Technology: the Power+ Plan," available at: https://www.whitehouse.gov/sites/default/files/omb/budget/fy2016/assets/fact_sheets/investing-in-coal-communities-workers-and-technology-the-power-plan.pdf

communities to attain employment in these sectors, and that such training results in validated skill certifications for workers.[43]

VIII. Conclusion

The Clean Power Plan represents a long-overdue first step to reduce the climate disrupting carbon pollution from the electric sector, which is the largest source of such pollution nationally and in North Dakota. It is in the State's best interest to craft and submit in a timely fashion a plan that takes a proactive approach to the clean energy transition, and that ensures that all North Dakotans share in the benefits of that transition. Waiting for a federal plan will not afford us the flexibility to make the critical investments outlined above. Similarly, we must not miss the opportunity in the state plan to capture the value of carbon allowances from polluters. Instead we should use it to generate the greatest benefit for the citizens of our State. Additionally, we must not lock ourselves into decades of dependence on climate-disrupting natural gas by allowing existing sources to comply with the rule simply by shifting their generation to new gas plants. We should instead increase our utilization of the abundant, clean, and affordable wind and solar resources in our State.

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[43] As a potential model, the Construction Careers Handbook from the Partnership for Working Families is a guide for creating programs to make quality construction jobs available to lower income families: http://www.forworkingfamilies.org/resources/publications/construction-careers-handbook

Appendix I:

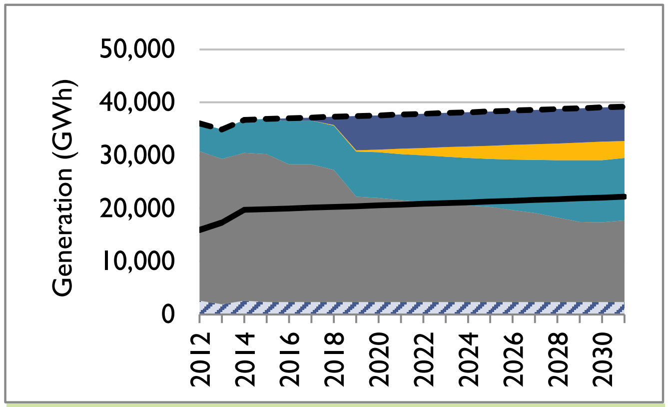
CP3T Model of North Dakota compliance with mass-based goal and new source complement

Dashboard - North Dakota

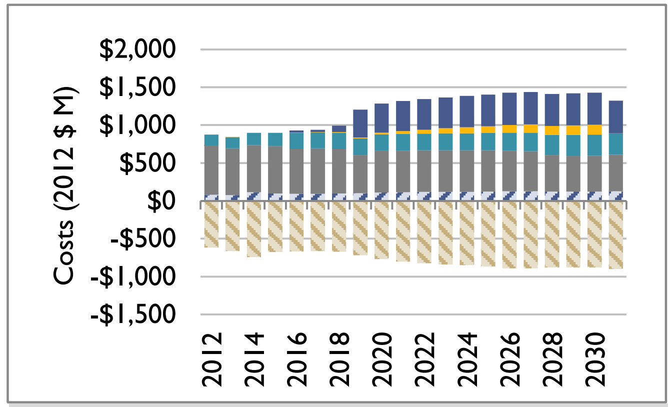
Click to return to start page

Restore default Excel

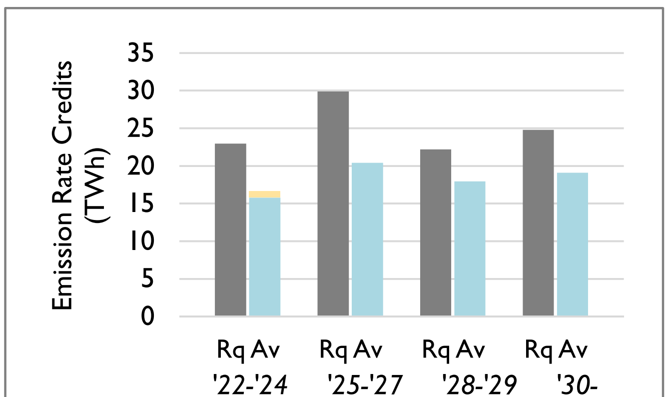
This panel allows you to view key diagnostics of your scenario.



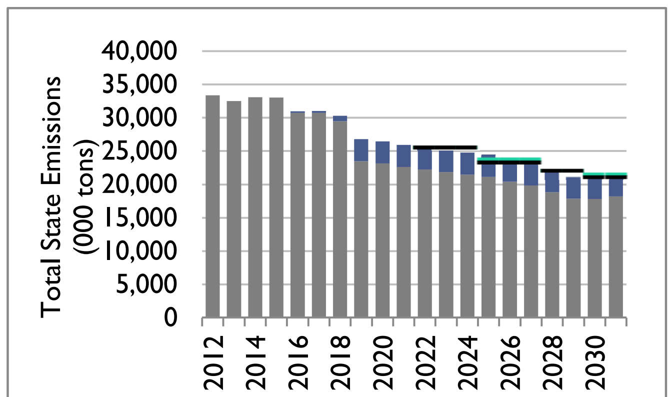
Generation requirements met



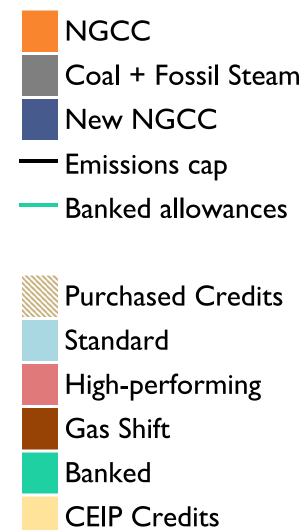
CP3T does not have a default cost requirement



GWh	'22 - '24	'25 - '27	'28 - '29	'30 - '31
Required ERCs	22,945	29,894	22,198	24,773
Available ERCs	16,649	20,422	17,928	19,105



000 tons	'22 - '24	'25 - '27	'28 - '29	'30 - '31
Emissions cap	76,662	71,437	44,109	42,951
Emissions allowed	75,530	71,386	43,358	42,677



Detailed Tables

Click here to return to the Dashboard

Annual Capacity		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Coal + Fossil Steam	*MW*	4,225	4,225	4,331	4,331	4,331	4,331	4,331	4,331	4,216	4,216	4,216	4,216	4,216	4,216	4,216	4,216	4,026	4,026	4,026	4,026
NGCC	*MW*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables	*MW*	336	353	397	422	520	525	531	544	550	555	561	567	573	578	607	636	688	739	745	751
New energy efficiency	*MW*	0	1	1	2	5	13	28	59	120	241	333	423	510	591	662	715	758	800	828	758
Nuclear	*MW*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New NGCC	*MW*	-	-	-	0	112	112	327	1,342	1,342	1,342	1,342	1,342	1,342	1,342	1,342	1,342	1,342	1,342	1,342	1,342
Other	*MW*	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650
Total	*MW*	5,211	5,228	5,379	5,404	5,618	5,631	5,867	6,925	6,877	7,004	7,102	7,198	7,290	7,377	7,477	7,558	7,463	7,557	7,590	7,526
Peak Demand plus Reserve Req.	*MW*	2,778	3,027	3,444	3,468	3,493	3,517	3,542	3,567	3,592	3,617	3,642	3,667	3,693	3,718	3,744	3,770	3,796	3,822	3,848	3,874

Annual Generation		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Coal + Fossil Steam	*GWh*	28,187	27,409	27,888	27,871	25,915	25,941	24,893	19,818	19,590	19,158	18,824	18,501	18,167	17,907	17,304	16,780	15,902	15,094	15,038	15,391
NGCC	*GWh*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Renewables (less Unbundled RECs)	*GWh*	5,280	5,524	6,228	6,616	8,156	8,241	8,331	8,530	8,627	8,710	8,801	8,891	8,989	9,071	9,523	9,974	10,799	11,599	11,689	11,780
New energy efficiency	*GWh*	0	3	5	7	23	55	119	247	503	1,013	1,401	1,778	2,143	2,484	2,783	3,003	3,186	3,361	3,477	3,185
Nuclear	*GWh*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New NGCC	*GWh*	-	-	-	0	539	538	1,574	6,464	6,482	6,464	6,464	6,464	6,482	6,464	6,464	6,464	6,482	6,464	6,464	6,464
Other	*GWh*	2,576	1,932	2,603	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370	2,370
Imports	*GWh*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	*GWh*	36,043	34,869	36,725	36,865	37,004	37,145	37,287	37,429	37,571	37,715	37,860	38,004	38,150	38,297	38,444	38,592	38,739	38,888	39,038	39,189
Sales	*GWh*	15,912	17,338	19,726	19,866	20,005	20,146	20,288	20,430	20,572	20,716	20,861	21,006	21,152	21,298	21,446	21,593	21,741	21,890	22,040	22,191
Sales + Exports	*GWh*	36,043	34,869	36,725	36,865	37,004	37,145	37,287	37,429	37,571	37,715	37,860	38,004	38,150	38,297	38,444	38,592	38,739	38,888	39,038	39,189

Annual Emissions		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Coal + Fossil Steam	*000 tons*	33,371	32,511	33,072	33,035	30,717	30,747	29,505	23,490	23,135	22,625	22,231	21,849	21,454	21,147	20,436	19,816	18,824	17,867	17,800	18,218
NGCC	*000 tons*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New energy efficiency	*000 tons*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nuclear	*000 tons*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New NGCC	*000 tons*	-	-	-	0	278	277	810	3,329	3,338	3,329	3,329	3,329	3,338	3,329	3,329	3,329	3,338	3,329	3,329	3,329
Other	*000 tons*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	*000 tons*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	*000 tons*	33,371	32,511	33,072	33,035	30,995	31,024	30,316	26,819	26,473	25,954	25,560	25,178	24,792	24,476	23,765	23,145	22,162	21,196	21,129	21,547

Clean Power Plan Compliance - Rate		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Non-binding Interim - Compliant?													No			No		No		No	
Goal: R1. Technology-Specific	*lbs/MWh*												-			-		-		1,305	
Fossil Steam	*lbs/MWh*												1,671			1,500		1,380		1,305	
NGCC	*lbs/MWh*												877			817		784		771	
Required ERCs	*GWh*												22,945			29,894		22,198		24,773	
Fossil Steam	*GWh*												22,945			29,894		22,198		24,773	
NGCC	*GWh*												0			0		0		0	
Available ERCs	*GWh*												16,649			20,422		17,928		19,105	
Standard ERCs	*GWh*												15,791			20,422		17,928		19,105	
High-performing ERCs	*GWh*												0			0		0		0	
Gas Shift ERCs	*GWh*												0			0		0		0	
CEIP ERCs	*GWh*												858			0		0		0	
Purchased ERCs	*GWh*												0			0		0		0	
Banked ERCs	*GWh*												0			0		0		0	
Binding Targets - Compliant?															No						
Goal: R1. Technology-Specific	*lbs/MWh*														-						
Fossil Steam	*lbs/MWh*														1,534						
NGCC	*lbs/MWh*														832						
Required ERCs	*GWh*														75,037						
Fossil Steam	*GWh*														75,037						
NGCC	*GWh*														0						
Available ERCs	*GWh*														54,998						
Standard ERCs	*GWh*														54,140						
High-performing ERCs	*GWh*														0						
Gas Shift ERCs	*GWh*														0						
CEIP ERCs	*GWh*														858						
Purchased ERCs	*GWh*														0						
		33,371	32,511	33,072	33,035	30,717	30,747	29,505	23,490	23,135	22,625	22,231	21,849	21,454	21,147	20,436	19,816	18,824	17,867	17,800	18,218

Clean Power Plan Compliance - Mass		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Annual comparison																					
Goal: M2. Existing & New	*000 tons*											25,554	25,554	25,554	23,435	23,435	23,435	22,029	22,029	21,100	21,100
Scenario Emissions	*000 tons*	33,371	32,511	33,072	33,035	30,995	31,024	30,316	26,819	26,473	25,954	25,560	25,178	24,792	24,476	23,765	23,145	22,162	21,196	21,129	21,547
Fossil Steam	*000 tons*	33,371	32,511	33,072	33,035	30,717	30,747	29,505	23,490	23,135	22,625	22,231	21,849	21,454	21,147	20,436	19,816	18,824	17,867	17,800	18,218
NGCC	*000 tons*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New NGCC	*000 tons*	-	-	-	0	278	277	810	3,329	3,338	3,329	3,329	3,329	3,338	3,329	3,329	3,329	3,338	3,329	3,329	3,329
Additions to Cap	*000 tons*	-	-	-	-	-	-	-	-	-	-	0	0	0	1,132	0	0	52	0	751	0
Purchased Allowances	*000 tons*	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0
Banked Allowances	*000 tons*	-	-	-	-	-	-	-	-	-	-	-	-	-	1,132	-	-	52	-	751	-
Non-binding Interim - Compliant?													Yes			Yes		Yes		Yes	
Goal: M2. Existing & New	*000 tons*												76,662			71,437		44,109		42,951	
Scenario Emissions	*000 tons*												75,530			71,386		43,358		42,677	
Remaining Banked Allowances	*000 tons*																				274
Binding Targets - Compliant?															Yes						
Goal: M2. Existing & New	*000 tons*														192,208						
Scenario Emissions	*000 tons*														190,274						

Annual Costs		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Coal + Fossil Steam	*2012 $ M*	$651	$617	$619	$626	$591	$599	$590	$503	$551	$548	$549	$548	$546	$545	$536	$529	$481	$467	$469	$481
NGCC	*2012 $ M*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewables	*2012 $ M*	$141	$147	$163	$173	$211	$213	$214	$218	$220	$221	$223	$224	$226	$227	$237	$246	$264	$281	$282	$284
New energy efficiency	*2012 $ M*	-	$0	$0	$0	$1	$3	$7	$12	$19	$37	$52	$65	$79	$91	$102	$111	$117	$124	$128	$0
Nuclear	*2012 $ M*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New NGCC	*2012 $ M*	$0	$0	$0	$0	$29	$29	$85	$367	$385	$396	$404	$409	$413	$418	$428	$426	$423	$422	$423	$430
Other	*2012 $ M*	$81	$76	$115	$97	$95	$94	$96	$102	$109	$114	$117	$119	$120	$123	$127	$126	$124	$124	$125	$127
Imports / Exports + Purchased Credit	*2012 $ M*	-$619	-$661	-$744	-$678	-$668	-$662	-$672	-$720	-$770	-$803	-$824	-$841	-$849	-$864	-$893	-$890	-$878	-$877	-$880	-$900
Total	*2012 $ M*	$254	$180	$153	$218	$260	$276	$320	$483	$514	$514	$519	$526	$535	$539	$536	$549	$532	$541	$548	$422

These tables are used to create charts		'22 - '24		'25 - '27		'28 - '29		'30 - '31	
		Rq	Av	Rq	Av	Rq	Av	Rq	Av
ERCs needed for Fossil Steam	*TWh*	23		30		22		25	
ERCs needed for NGCC	*TWh*	0		0		0		0	
Gas Shift ERCs	*TWh*		0		0		0		0
High-performing ERCs	*TWh*		0		0		0		0
Standard ERCs	*TWh*		16		20		18		19
CEIP ERCs	*TWh*		1		0		0		0
Purchased ERCs	*TWh*		0		0		0		0
Banked ERCs	*TWh*		0		0		0		0

Goal: M2. Existing & New plus purchased and banked allov		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	25,554	25,554	25,554	23,812	23,812	23,812	22,055	22,055	21,475	21,475
Goal: M2. Existing & New		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	25,554	25,554	25,554	23,435	23,435	23,435	22,029	22,029	21,100	21,100
Fossil Steam	*000 tons*	33,371	32,511	33,072	33,035	30,717	30,747	29,505	23,490	23,135	22,625	22,231	21,849	21,454	21,147	20,436	19,816	18,824	17,867	17,800	18,218
NGCC	*000 tons*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New NGCC	*000 tons*	-	-	-	0	278	277	810	3,329	3,338	3,329	3,329	3,329	3,338	3,329	3,329	3,329	3,338	3,329	3,329	3,329

Energy Efficiency Sales and Savings

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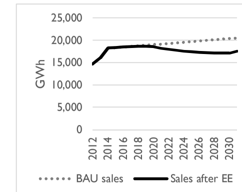
Enter your assumptions for the variables below.
The "Final" value will change accordingly.

		Source	
Annual sales growth rate	0.69%	[A]	*This is the AEO 2015 cumulative average growth rate for 2015 through 2031 for the state(s) selected. Note that historical EE savings have not been reconstituted into historical sales.*
2012 savings level	0.08%	[B]	*This is the 2012 savings level reported to EIA 861 for the state(s) selected. Savings levels for 2012-2014 are shown below.*
Incremental savings goal	1.00%	[C]	*The default incremental savings goal is 1.0%. If more than one state is selected, savings are assumed to be distributed across all states proportionally to sales.*
Year to start ramp	2020	[C]	*The default assumption is that states ramp from their 2012 savings level in 2020.*
Percent achieved per year	0.20%	[C]	*The default assumption is a ramp rate of 0.2% per year.*

User Input Calculations		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Annual sales growth rat	%	7.13%	8.96%	13.78%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%	0.69%
BAU sales	*GWh*	14,717	16,036	18,245	18,374	18,503	18,633	18,765	18,896	19,027	19,161	19,295	19,428	19,563	19,699	19,835	19,971	20,108	20,246	20,385	20,524
Sales after EE	*GWh*	14,717	16,033	18,240	18,368	18,482	18,582	18,654	18,667	18,560	18,219	17,992	17,774	17,570	17,388	17,246	17,178	17,145	17,120	17,150	17,562
First-year savings	%	0.08%	0.02%	0.01%	0.01%	0.08%	0.16%	0.32%	0.64%	1.28%	2.56%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	0.00%
Annual inc. savings	*GWh*		3	2	2	15	30	59	119	239	475	364	360	355	351	348	345	344	343	342	0
Expiring savings	*GWh*		0	0	0	0	0	0	0	1	1	3	9	16	34	70	140	174	180	234	272
Net cumulative savings	*GWh*		3	5	7	21	51	110	229	467	942	1,303	1,654	1,993	2,311	2,589	2,794	2,963	3,126	3,234	2,962
Net cumulative savings	%		0%	0%	0%	0%	0%	1%	1%	2%	5%	7%	9%	10%	12%	13%	14%	15%	15%	16%	14%
Final			3	5	7	21	51	110	229	467	942	1,303	1,654	1,993	2,311	2,589	2,794	2,963	3,126	3,234	2,962



Clean Energy Incentive ERCs		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**
Annual inc. savings	*GWh*				-	-	-	1	6	12	24	-	-	-	-	-	-	-	-	-	-
Expiring savings	*GWh*				-	-	-	0	0	0	0	-	-	-	-	-	-	-	-	-	-
Net cumulative saving	*GWh*				-	-	-	1	7	19	43	-	-	-	-	-	-	-	-	-	-
CEI credits available	*GWh*				-	-	-	-	-	38	85	-	-	-	-	-	-	-	-	-	-

Expiration Schedule	**Year 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**Source**
Percent of measures expiring per year	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	18.0%	17.1%	0.0%	11.9%	20.3%	0.0%	0.0%	0.0%	24.5%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	0.3%	[C]
Total percent of measures expired	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	18.0%	35.1%	35.1%	47.0%	67.3%	67.3%	67.3%	67.3%	91.8%	98.1%	98.1%	98.1%	98.1%	98.1%	98.1%	99.7%	100.0%	

The Clean Power Plan's Demand-Side Energy Efficiency Appendix provides an illustrative scenario in which all states do no EE programs until 2020, at which time they ramp up from 2013 savings levels to 1% at a rate of 0.2% per year.
The Clean Power Plan's Demand-Side Energy Efficiency Appendix assumes measures expire according to calculations derived in a 2015 LBNL Technical Memo.
Under the Clean Power Plan, Low Income EE receives "Clean Energy Incentive" ERCs in 2020 and 2021 for use in 2022 through 2030.

Embedded savings in AEO		**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**Source**
Annual expiring saving	*GWh*		1	3	5	7	11	14	17	19	22	25	26	28	30	31	32	32	32	32	32	[D]

Source	Title	URL	Note
[A]	AEO 2015 (Tables 55-58.22)	http://www.eia.gov/forecasts/aeo/data.cfm	-
[B]	EIA 861 2012	http://www.eia.gov/electricity/data/eia861/zip/f8612012.zip	-
[C]	EPA. Clean Power Plan TSD Data File: Demand-Side Energy Efficie	http://epa.gov/airquality/cpp/df-cpp-demand-side-ee-at3.xlsx	-
[D]	Synapse. State Energy Efficiency Embedded in Annual Energy Outlc	http://synapse-energy.com/sites/default/files/SynapseReport.2013-11.0.E	-

Imports and Exports

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		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Source
Sales	GWh	14,717	16,036	18,245																		[A]
T&D Losses	%	7.51%	7.51%	7.51%																		[B]
Sales + T&D Losses	GWh	15,912	17,338	19,726																		
Generation	GWh	36,043	34,869	36,725																		
Imports	GWh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Exports	GWh	20,131	17,531	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	16,999	

Note that changing the level of imports or exports does not take into account resource adequacy in neighboring states. Some portion of the "imports" above may actually be distributed generation or CHI

When CP3T first loads a state, imports and exports are adjusted in each year so that balance between sales and generation is achieved. Please examine these assumptions if imports and exports are important to your scenario

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Source
Import Emission Rate	lbs/MWh	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	[C]

Note that changing the level of imports or exports does not take into account resource adequacy in neighboring states. Some portion of the "imports" above may actually be distributed generation or CHI

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Source
Import / Export Prices	2012 $ / MWh	$31	$38	$44	$40	$39	$39	$40	$42	$45	$47	$48	$49	$50	$51	$53	$52	$52	$52	$52	$53	[D]

By default, imports and exports are priced according to the regional cost of producing energy from NGCCs. Imports add incremental costs to the system, while exports produce revenue

Source	Title	URL	Note
[A]	EIA 861 2012	http://www.eia.gov/electricity/data/eia861/zip/f8612012.zip	-
[B]	EPA. Clean Power Plan TSD, New Source Complements, page 3	http://www.epa.gov/airquality/cpp/tsd-cpp-new-source-complements.pdf	-
[C]	EPA. Clean Power Plan TSD, New Source Complements, page 8	http://www.epa.gov/airquality/cpp/tsd-cpp-new-source-complements.pdf	Emissions from imports are not counted in the Clean Power Plan and are displayed for informational purposes only.
[D]	EPA. Clean Power Plan TSD, Goal Computation, page 9	http://www.epa.gov/airquality/cpp/tsd-cpp-emission-performance-rate-go	-

Renewables Capacity and Generation

Click here to return to the Dashboard | Click here to check if you have a gap in generati | Click here to view assumptions for existing renewables

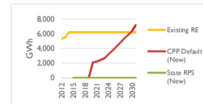
Summary - New Renewables		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Capacity	MW				108	533	558	583	638	663	688	713	738	763	788	913	1,038	1,263	1,488	1,513	1,538
Generation	GWh				388	1,928	2,013	2,103	2,302	2,399	2,482	2,573	2,663	2,761	2,844	3,295	3,746	4,571	5,371	5,461	5,552
Cap. for Peak Demand	MW				25	122	128	134	147	152	158	164	170	175	181	210	239	290	342	348	354

Existing and New Renewable Trajector		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Existing Renewables	GWh	5,280	5,524	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228	6,228
CPP Default (New)	GWh				0	0	0	0	0	2,067	2,181	2,402	2,623	3,153	3,683	4,214	4,744	5,274	5,804	6,335	7,151
State RPS (New)	GWh				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

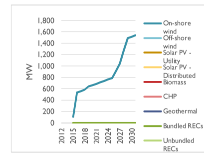
All new renewables are incremental to the "Existing" generation.

"CPP Default" assumes a 50/50 split between on-shore wind and utility PV generation. States receive a share of the forecasted interconnect generation based on each state's share of 2012 generation.

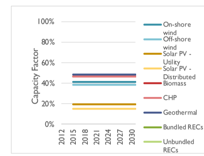
"State RPS" fills in the incremental RE generation required by your state's RPS. Generation is allocated to solar if a carve-out is specified by that state. All remaining generation is assumed to come from wind. Note that some states have more complex carve-outs not modeled by default.



Capacity		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
On-shore wind	MW				107.5	532.5	557.5	582.5	637.5	662.5	687.5	712.5	737.5	762.5	787.5	912.5	1037.5	1262.5	1487.5	1512.5	1537.5
Off-shore wind	MW																				
Solar PV - Utility	MW																				
Solar PV - Distributed	MW																				
Biomass	MW																				
CHP	MW																				
Geothermal	MW																				
Bundled RECs	MW				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unbundled RECs	MW																				



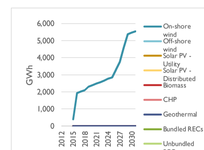
Capacity Factor		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Source
On-shore wind	%				41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	[A] [B] [C]
Off-shore wind	%				38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	[D]
Solar PV - Utility	%				19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	[A] [B] [C]
Solar PV - Distributed	%				15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	[A] [B] [C]
Biomass	%				47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	[B]
CHP	%				47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	[B]
Geothermal	%				48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	[B]
Bundled RECs	%																					
Unbundled RECs	%																					



Generation		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
On-shore wind	GWh				388	1,928	2,013	2,103	2,302	2,399	2,482	2,573	2,663	2,761	2,844	3,295	3,746	4,571	5,371	5,461	5,552
Off-shore wind	GWh				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar PV - Utility	GWh				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar PV - Distributed	GWh				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Biomass	GWh				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHP	GWh				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal	GWh				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bundled RECs	GWh																				
Unbundled RECs	GWh																				

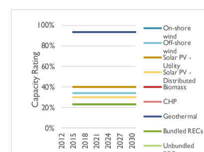
"Bundled RECs" are credits that are associated with delivered energy transmitted via HVDC.

"Unbundled RECs" are credits that are not associated with delivered energy. They are included in CP3T to allow modeling of RPS compliance, but otherwise do not displace in-state generation and do not have an effect on the electric system.

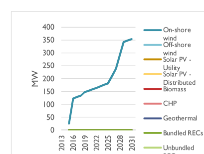


Note: The following two sections determine how much capacity is available for peak demand purposes.

Capacity Rating		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Source
On-shore wind	%				23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	[E]
Off-shore wind	%				34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	[E]
Solar PV - Utility	%				40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	[F]
Solar PV - Distributed	%				30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	[F]
Biomass	%				93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	[G]
CHP	%				93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	[G]
Geothermal	%				93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	[G]
Bundled RECs	%				23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	23%	[E]
Unbundled RECs	%																					



Capacity for Demand		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
On-shore wind	MW				25	122	128	134	147	152	158	164	170	175	181	210	239	290	342	348	354
Off-shore wind	MW				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar PV - Utility	MW				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar PV - Distributed	MW				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Biomass	MW				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHP	MW				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geothermal	MW				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bundled RECs	MW				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unbundled RECs	MW																				



Source	Title	URL	Note
[A]	AVERT v.1.2, Wind and PV capacity factors	http://epa.gov/avert/	For lower 48 states only
[B]	EPA. Clean Power Plan TSD, Goal Computation Appendix 1-5	http://www.epa.gov/airquality/cpp/tsd-cpp-emission-performance-rate-go	-
[C]	PVWatts Version 1, Wind and PV capacity factors (Alaska)	http://rredc.nrel.gov/solar/calculators/PVWATTS/version1/	For Alaska only
[D]	Cape Wind FAQs, Question 7, Off-shore wind capacity	http://www.capewind.org/faqs/cape-wind-basics#QUESTION7	-
[E]	2010 New England Wind Integration Study page 26, Wind capacity	http://www.uwig.org/newis_es.pdf	-
[F]	Synapse Assumption	-	-
[G]	Renewable Fuels Module of the National Energy Modeling System:	http://www.eia.gov/forecasts/aeo/nems/documentation/renewable/pdf/m	-