Impacts and Opportunities for Texas of the Clean Power Plan

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Executive Summary

On June 2, 2014, the U.S. Environmental Protection Agency (EPA) published a draft rule containing proposed regulations of carbon emissions from existing power plants. The EPA dubbed its proposal "The Clean Power Plan," (CPP) and laid out an innovative approach to regulation within section 111(d) of the Clean Air Act, the section which governs existing power plants. It proposes carbon emissions reductions from a combined set of state activities (called building blocks within the CPP) that would cut carbon pollution by 30 percent below 2005 U.S. levels. The plan lays out carbon emissions rate goals specific to each state. The building blocks include various technology and efficiency improvements that are already in use today by many states and utilities, including heat rate improvements at existing electricity generating units, increasing usage of natural gas to displace coal, expanding nuclear and renewable energy, and increasing energy efficiency.

The EPA, in a novel regulatory move, called these building blocks, the "Best System of Emissions Reductions" or BSER. The Clean Air Act requires EPA to define the BSER as a standard for clean air regulations. Typically, BSER means a particular technology or equipment used to clean pollutants from a smokestack. Here, the EPA defined BSER more broadly, noting that carbon is so difficult to scrub that it made more sense—and would be more cost effective—to look at the *whole electric system* in defining the Best System of Emission Reduction.

In the draft rule, all states must submit a State Implementation Plan (SIP), either individually or as part of multi-state cooperative plan in June of 2016, or apply for a one-year extension (two years if part of a multi-state plan). These SIPs will require statewide interagency cooperation and legislative action. If some states do not submit SIPs, the EPA is required under the Clean Air Act to create Federal Implementation Plans (FIPs) for those states.

In response to the EPA proposal, 12 states filed law suits against the EPA on August 1, 2014, although some legal scholars have dismissed this suit as pre-emptive (West Virginia v. EPA, 14-1146, U.S. Court of Appeals, District of Columbia). Texas has not joined this suit. If these states win their law suit, it is likely that the Courts will uphold precedent that established the EPA's right to regulate carbon, but the Courts could rule that they can only do so "inside the fenceline." If this occurs, it could be a Pyrrhic victory as compliance costs could greatly increase and the many benefits of increasing natural gas, renewable energy, and energy efficiency would not accrue to the states.

Fifteen Governors sent a letter to the President, urging him to withdraw the draft rule. Governor Perry did not sign this letter. There has been resistance to the rule in Texas to be sure but some state energy policymakers—including Railroad Commissioner and former PUCT Chairman Barry Smitherman and PUCT Commissioner Ken Anderson—have publicly called for the state to prepare for compliance.

In the Clean Power Plan, the EPA did not require emissions reductions based exclusively on reducing emissions at EGUs, but instead recommended a set of building blocks to reduce statewide energy use from polluting sources. While the building blocks include "inside the fenceline" methods, they also include "beyond the fenceline" strategies that will reduce emissions through an energy portfolio method. Specifically, the building blocks were based on the following strategies:

1) Implement 6% heat rate improvements in existing electricity generating units (EGUs)
2) Increase dispatch of natural gas combined cycle (NGCC) EGUs to a 70% capacity factor
3) Increase renewable energy and nuclear energy in the electricity generation mix, with a 20% renewable energy target in 2030, based on a regional renewable portfolio average [1]
4) Expand energy efficiency efforts to reduce State electricity demand by 1.5% per year, (before taking growth into account).[2]

EPA makes it clear that states do not have to use the building blocks as recommended, and can design their own strategies to arrive at the reduced emissions rates. The purpose of the building blocks is to allow for flexibility in meeting the goals. Therefore, each state can do as much or as little of each of the building blocks as deemed beneficial while still meeting the goal.

In the case of Texas, applying the building blocks would require some big but achievable changes:

- To meet building block 2 suggestions, natural gas generation would need to increase from the historic rate of 148,010,278 MWh to 230,873,298 MWh, which is a 56% increase, or less than 3% per year.
- For building block 3, the state would need to increase its renewable energy generation. Wind production, which has been increasing by an average of 23% each year since 1999, would need to increase about 6% per year through 2030, meaning Texas wind production increase is much slower than the current status quo (wind has increased by more than 20% per year over the last 15 years).
- Energy efficiency would need to make the greatest move, from around .18% to 1.5% total electricity sales. However, the last potential study done by the PUCT showed far more "economic savings potential" from energy efficiency than the levels suggested by the EPA in building block 4.[3]

Expanding energy efficiency at this rate, according to the EPA, would require a significant increased investment in energy efficiency. Yet, a review of statewide programs has found the cost of EE programs in Texas to be less than 2 cents per KWh. In addition, the cumulative impacts of efficiency reducing electricity use for Texas by 2030 would result in $5-8 billion in avoided electricity purchases (depending

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[1] See Chapter 4 in the "GHG Abatement Measures" TSD at: http://www2.epa.gov/sites/production/files/2014-06/documents/20140602tsd-ghg-abatement-measures.pdf

[2] A fuller explanation of the rationale and supporting documentation for all the four building blocks can be found in the "GHG Abatement Measures" TSD.

[3] "Assessment of the Feasible and Achievable Levels of Electricity Savings from Investor Owned Utilities in Texas: 2009-2018." Submitted to Texas Public Utilities Commission by Itron Inc. December 10, 2008.

on the cost of energy), with net savings to Texans of at least $2 billion and more likely between $4 and $7 billion. In other words, while efficiency programs will cost money (no energy resource is free), which will be paid for through higher electric rates, customers will use so much less energy that energy *bills* for all Texans will go down.

Because Texas has significant natural gas resources and the Clean Power Plan would require large national shifts from coal to natural gas, Texas stands to benefit greatly from the Plan. Utilizing energy efficiency as a key compliance strategy would return economic benefits and reduce costs of compliance. This paper will describe the rule and building blocks in greater detail with a focus on energy efficiency.

Introduction and Overall Approach of the EPA Proposal

The "Clean Power Plan" (CPP) is a new proposal to reduce carbon emissions from existing power plants made under Section 111(d) of the U.S. Clean Air Act by the U.S. Environmental Protection Agency (EPA) on June 2, 2014. This section of the Clean Air Act has been used only a few times during EPA's history and usually focuses on specific, individual sources of pollution or toxins. The 111(d) methodology in the proposal emphasizes that each state work in partnership with EPA to develop a State Implementation Plans (SIP) relying upon EPA to identify an "adequately demonstrated…best system of emission reduction" (BSER) for implementation.

Usually, the BSER would refer to a tested technology to be used at the source, or "within the fenceline," such as a scrubber installed at a coal plant specifically aimed at reducing pollution from the plant. In the Clean Power Plan proposal, EPA recognizes that economic, power-producing, and conservation characteristics of each state vary widely, and therefore, it did not propose to mandate standardized emissions limits for power plants. Instead of recommending a specific technology to be used at power plants, EPA identified four "building blocks" of various technology and efficiency improvements as the best system to reduce carbon emissions from each State's energy portfolio.

The four building blocks include the following:

- Heat rate improvements in existing electricity generating units (EGUs).
- Increasing dispatch of natural gas combined cycle (NGCC) EGUs .
- Incorporating increased renewable energy and nuclear energy in the electricity generation mix .
- Expanding energy efficiency to reduce state electricty demand

This novel "beyond the fenceline" method allows for states to design flexible methods to reach their goals through new generation and efficiency within their energy portfolio as opposed to requirements aimed at specific energy generating units.

The rules are slated to be implemented according to the following timeline:[4]

- **June 18, 2014:** Rule published in the Federal Register
- **Late July:** Public listening sessions in four cities
- **October 16, 2014:** End of 120-day comment period (Now extended to **December 1, 2014**)
- **June 2015:** Final rules released
- **June 2016:** All states submit initial or complete plans
- **June 2017:** Deadline to submit individual state plans eligible for one-year extension, and progress report for multi-state plans
- **June 2018:** Deadline to submit multi-state plans
- **2020-2029:** Interim compliance period
- **2030:** Start of final goal compliance period

Calculation of State Carbon Emission Rate Goals

EPA calculated an initial base year carbon emissions rate for each State for the year 2012 using data from the Energy Information Administration (EIA). The formula calculates the sum of carbon emissions from generation by coal-fired, oil or gas steam generation, natural gas combined cycle, and "other"[5] emissions, and divides the emissions by the state's total energy generation from those aforementioned sources plus the power produced by some nuclear facilities[6] and renewable energy as well as power conserved by energy efficiency. This provides the pounds of emissions per megawatt hour produced by the state in 2012.

To calculate each state's goal emission rate, EPA took into account the many differences among the states (such as anticipated economic growth and population changes, energy and environmental regulations already on the books, amount of already-installed renewable energy, and energy efficiency programs) when calculating each state's carbon emissions rate. To address these differences, EPA analyzed historical data about state emissions and the power sector and created a formula using the building blocks to determine emissions reductions. The formula applies the building blocks to each state's specific information, yielding a carbon intensity rate for each state.

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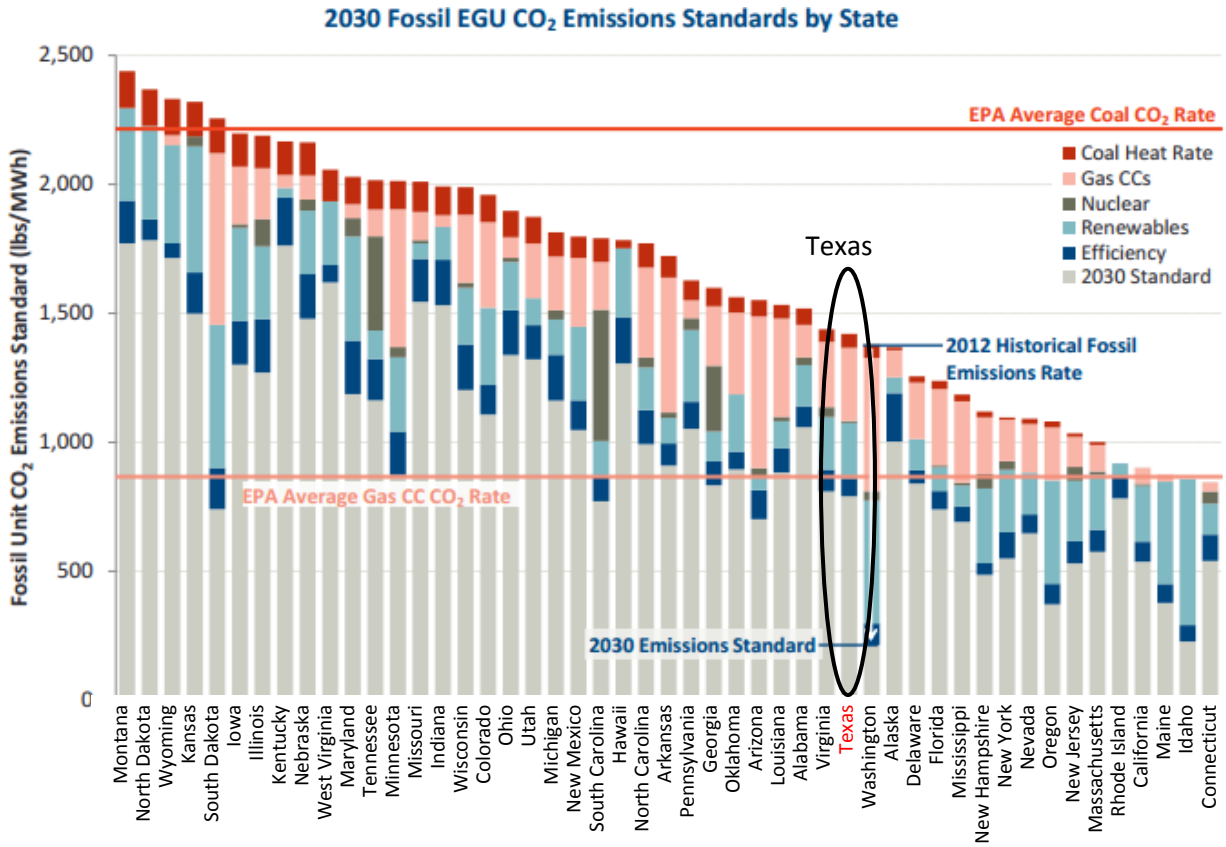
[5] The "other" category includes generation from a state's integrated gasification combined cycle and/or simple-cycle combustion turbines.

[6] It should be noted that the amount of nuclear power that can be included in the denominator is limited to what EPA terms "at-risk (AR)" or "under construction (UC)." "At risk" amounts to approximately 5.8% of historical nuclear generation, and "under construction" relates to only three facilities in Tennessee, Georgia, and South Carolina. Further discussion is offered in the "GHG Abatement Measures" TSD and the "Goal Computation TSD." http://www2.epa.gov/sites/production/files/2014-06/documents/20140602tsd-ghg-abatement-measures.pdf

	Baseline Emission Rate 2012	Interim Rate 2020-2029 Average	Final Rate 2030	Percent Change
Texas	1,298 lbs/MWh	853 lbs/MWh	791 lbs/MWh	-39%

The required reduction for each state is based on the makeup of the state's power generation; therefore, the applied building blocks are different for each state.



Building blocks 1-4 as recommended by EPA for each state to reach the 2030 CPP Standard.
Source: "Policy Brief: EPA's Proposed Clean Power Plan Implications for States and the Electric Industry." The Brattle Group, June 2014. http://www.adeq.state.ar.us/air/branch_planning/pdfs/carbon_pollution/epas_proposed_clean_power_plan-implications_for_states_and_the_electric.pdf

The building blocks used to calculate each state's goal are not meant to dictate a State's decision about the type of measures to adopt in its state plan. A State may use some, all, or none of the building blocks in designing its plan to meet the emissions reductions.

Major Plan Requirements and State Flexibility in Complying

EPA has outlined 12 major components of emissions reductions for a successful SIP. In general, these requirements are consistent with other SIP components addressed by the state in plans for other air pollutants. For a sufficient state plan, EPA has proposed the following general criteria:

a) A State plan must contain enforceable measures that reduce CO2 emissions from affected power plants.
b) Measures in the plan must be projected to achieve emission performance equivalent to or better than the applicable state-specific CO2 goal on a timeline equivalent to that in the emission guidelines.
c) Power plant CO2 emission performance under the State plan must be quantifiable and verifiable.
d) The State plan must include a process for State reporting of plan implementation (at the level of the affected entity), CO2 emission performance outcomes, and implementation of corrective measures, if necessary. (U.S. EPA, 2014b)

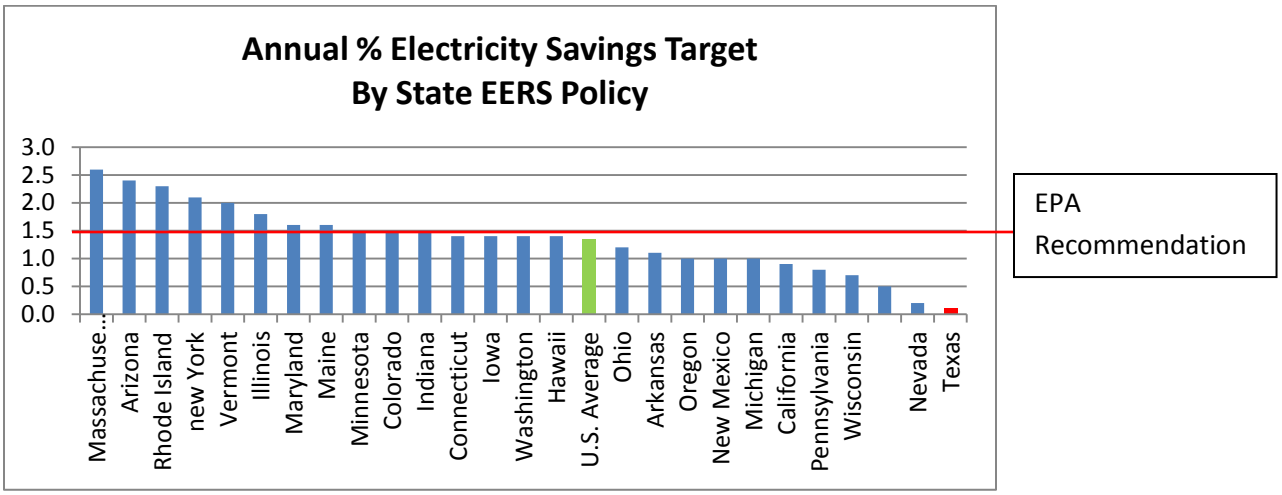
EPA conceived of two basic approaches a State could employ in its plan: the emissions limits approach and a portfolio approach. The emission limits approach, typically considered a "within the fenceline" approach, would focus on prescribing implicit or de facto carbon emissions limits on the power plants themselves. A State may apply a strategy such as building block 1, which mandates a certain heat rate improvement to increase efficiency and lower emissions. Other strategies beyond the conventional building blocks might include setting unit-specific emissions limits, which could be combined with a cap-and-trade program to allow compliance among all power plant units.

By contrast, the portfolio approach would include reducing carbon emissions in ways that do not directly impact the fossil-fueled power plant fleet. In a portfolio approach, methods such as building block 2 (natural gas), building block 3 (renewable energy), and building block 4 (end-use energy efficiency) could be included in the strategy mix (along with block 1) to achieve the State emissions rate goal. There could be a variety of others strategies devised by the states to mix and match the blocks or create other strategies so long as there are quantifiable, enforceable reductions in CO2.

Impacts and Opportunities for Texas

How Energy Efficiency Helps Meet the Goal

Increasing end-use energy efficiency could play a significant role in helping Texas reach the emissions reductions set by the EPA. In calculating each state's potential reduction, EPA assumed states will be able to achieve annual incremental savings of 1.5 percent electricity demand. This percent was based on the performance of the 10-12 states leading the U.S. in energy efficiency.



For the purpose of comparison, ACEEE estimated an average annual savings target by calculating each state's EERS savings over the years specified in the EERS policy. Source: ACEEE 2013 State Energy Efficiency Scorecard, p. 33.

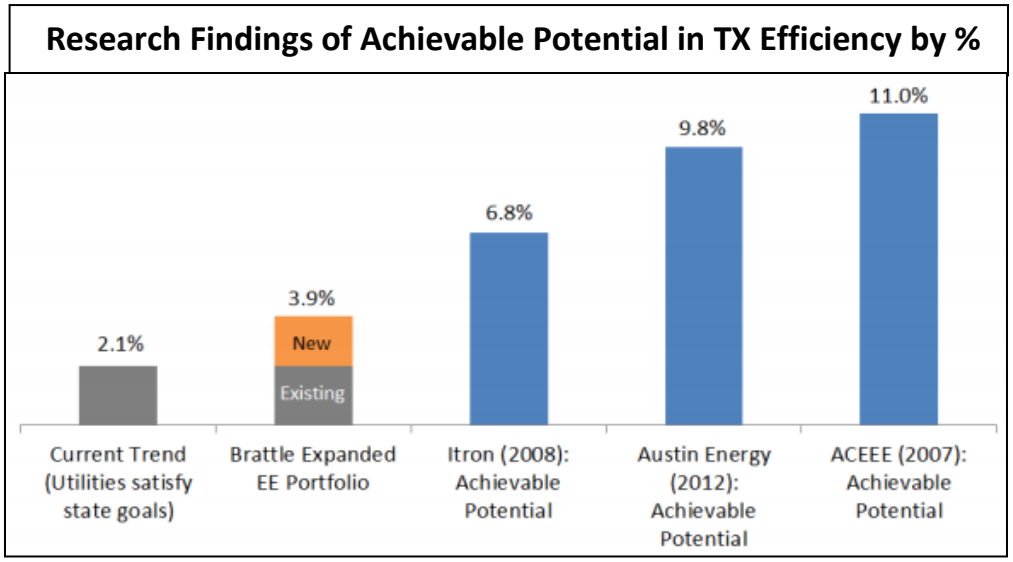
EPA has not specifically defined the methods to measure and verify a state's achievement of energy efficiency in the state plans, but the PUCT established a statewide EM&V system in 2012. The second year of data was published in September 2014 and showed the state's efficiency programs are highly effective, achieving $3.43 in benefits for every dollar spent and a cost of acquiring kWh of efficiency at less than $.02.[7]

The suggested efficiency saving of 1.5% would require an 8x increase from the current attainment of .19%. However, the total energy efficiency reductions achieved by 2030 would be equal to 9.9%. The last potential study done by the PUCT (in 2008) showed achievable potential of nearly 7%, and that was for the programs as they existed in 2007. Programs now are far larger and more sophisticated, and many technologies have come a long way since then (e.g. LED lighting).

Similarly, a more recent study (2012) for Austin Energy showed achievable potential of 9.8%, almost exactly the same number suggested by EPA.[8] Austin Energy, however, spends 5x per capita what the rest of the state does and the 9.8% was incremental to Austin's existing programs, suggesting the far smaller state programs would have significantly more achievable potential. An ACEEE study produced in 2007 showed 11% achievable potential statewide.[9]

[7] "Public Utility Commission of Texas Annual Statewide Portfolio Report for Program Year 2013—Volume I (Draft)." Tetratech, June 30, 2014, revised September 2014.
[8] "Austin Energy DSM Market Potential Assessment, Final Report." Prepared for Austin Energy by DNV KEMA Energy & Sustainability, Oakland, California June 25, 2012.
[9] "Potential for Energy Efficiency, Demand Response, and Onsite Renewable Energy to Meet Texas's Growing Electricity Needs," by Neal Elliott, Maggie Eldridge, et al., ACEEE, March 1 2007, http://www.aceee.org/research-report/e073.

The Brattle Group completed a potential study for the Texas Clean Energy Coalition in 2014. They looked at only three programs: residential AC, commercial lighting, and industrial pumps and found achievable potential of 1.8%, or nearly 20% of the EPA's suggested level from three programs alone.[10]

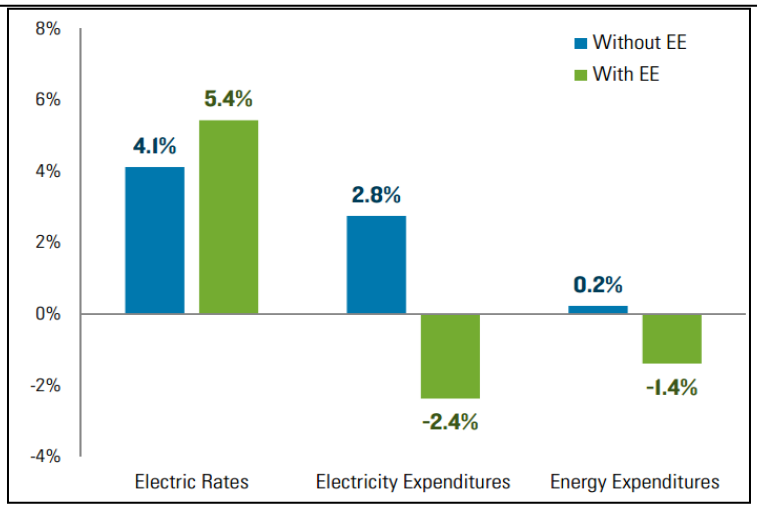


In all of these cases, the definition of achievable includes economic potential. In other words, all of these studies were quantifying not just what could be done, but what could be done in a way that returns economic benefits to all customers. The PUC's EM&V Report also address the cost-effectiveness of current energy efficiency programs, with a study by Tetratech demonstrating that every dollar spent on efficiency results in $3.43 in savings for ratepayers.[11] The cumulative impacts of efficiency reducing electricity use for Texas by 2030 would result in $5-$8 billion in avoided electricity purchases (depending on the cost of energy), with net savings to Texans of $2-$7 billion. Thus, not implementing energy efficiency to these levels actually increases customer bills.

While efficiency programs do cause electricity rates to go up, customers will use so much less energy that energy bills for Texans will actually go down. Keeping efficiency goals low artificially *increases* electricity bills for Texas.

[10] "Exploring Natural Gas and Renewables in ERCOT, Part III: The Role of Demand Response, Energy Efficiency, and Combined Heat & Power." The Brattle Group, June 3, 2014.
[11] See note 7.

National Impact of Including or Excluding EE on Energy Costs Under CPP



Calculated based on national cooperation, using the EPA's methodology in calculating benefits and their most conservative assumptions for nationwide change in electric rate, electricity expenditures and energy expenditures.
Source: "Remaking American Power, Preliminary Results." Rhodium Group, July 2014.

In meeting the energy efficiency goals, the state can be creative, so long as the goals are demonstrable and the savings can be measured and verified. If there is not an enforceable party (e.g., an electric generating unit for reducing stack emissions), the State would need to identify a backup plan in case anticipated savings did not materialize.

In facing deep reductions required for ozone precursors 15 years ago, Texas policymakers created the Texas Emissions Reduction Program, which has proved to be highly successful at cost effectively reducing emissions while keeping the economy humming. Texas can create similar innovative approaches in a State Implementation Plan for carbon. Some of the strategies Texas could consider that are not directly addressed within building bock 4 include:

- Locally enabled financing programs like PACE, so long as savings are reported and verified;
- Stronger building codes, so long as compliance efforts include performance testing;
- Expanded CHP programs;
- Aligning public building efficiency efforts with the state's existing requirements for most public entities to reduce usage 5% a year and report progress to the State;
- State appliance standards that exceed federal standards (Texas has higher plumbing standards already, to ensure water savings);
- Use of a dedicated fund to stimulate additional efficiency efforts (could be Texas emissions reduction program, or a new dedicated fund focused on CPP and carbon).

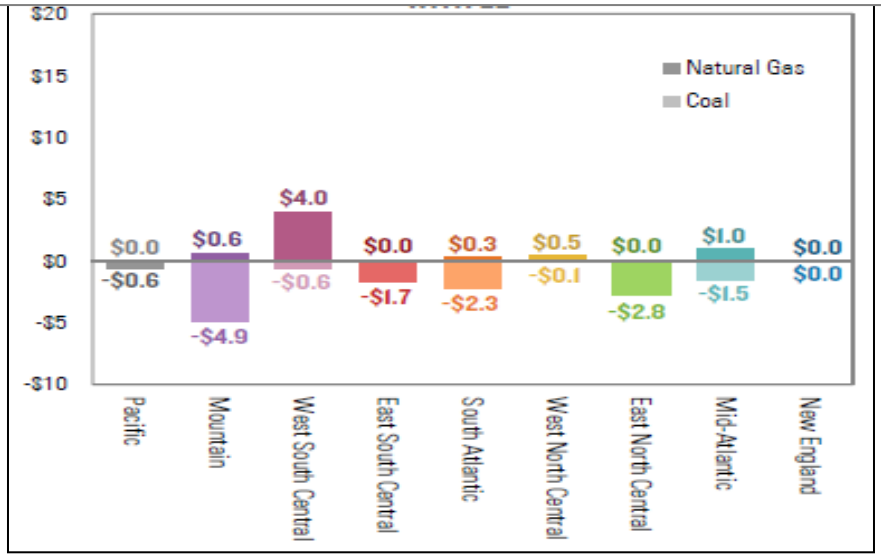
Getting the Rest of the Way There: Natural Gas and Wind

Natural Gas

In order for the state to reach a 70% capacity factor as recommended by EPA, natural gas production would need to increase from EPA's calculated baseline rate of 148,010,278 MWh to 230,873,298 MWh, which is a 56% increase over 15 years, or a little less than 3% per year.

The expansion of natural gas would have a huge impact on the state, for the gas industry, landowners, and other sectors of the economy related to the natural gas industry. Impact studies from the Rhodium Group demonstrate that revenue from natural gas production would increase by $4 billion in the West South Central as a result of the Clean Power Plan, much of which will occur in Texas.

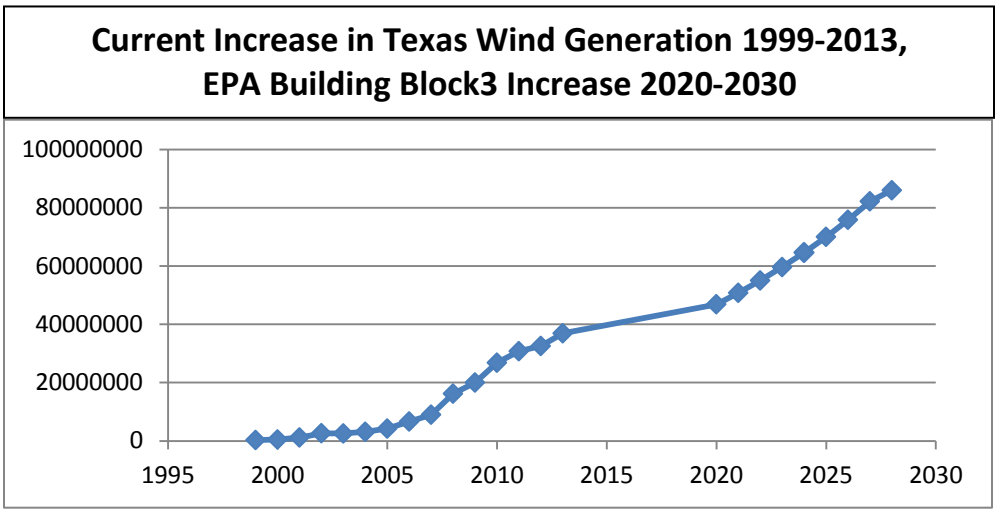
Change in Average Annual Production Revenue, 2012 Billion USD, 2020-2030



While annual production revenue of coal will decrease by $0.6 billion, change in energy dispatch to natural gas would cause production revenue to increase by $4 billion in the West South Central region. The above graph demonstrates impacts under a national cooperation model. We would expect similar geographic effects without national cooperation. Source: "Remaking American Power, Preliminary Results." Rhodium Group, July 2014.

Wind/Renewables

Building Block 3, increasing renewable energy, will mostly mean continued wind production in Texas. Wind generation would need to increase from around 36 million MWh reported in 2013 to 85 million MWh by 2030 in order to meet the recommendations in the Clean Power Plan. According to EPA, Texas could increase about 27% over the next 7 years, and then add 8% per year in order to meet that goal. Yet wind production in Texas which has actually been increasing by an average of 23% each year since 1999. Therefore, EPA's suggested rate (an average of about 7% per year) is slower than the historical trend for wind.



"Ramping up" to meet 2020 goal would only increase wind production by 27%. During the 2020-2030 compliance period, wind production would only increase by 8% per year.
Source: Data from EIA and ERCOT on wind generation per/year and EPA: http://www2.epa.gov/cleanpowerplantoolbox

Considering that the Competitive Renewable Energy Zones (CREZ) lines being built throughout West Texas are nearly complete, EPA's suggestion for the level of expansion of wind generation is likely low. The CREZ lines will allow Texas to grow to 18,000 MWs of installed wind capacity expanding the amount by 50%. This means Texas' wind generation will increase tremendously in the next few years and then could increase at a slower pace during the last 10 years of the CPP. Having this significant amount of wind to factor into the denominator of the emissions calculation *before 2020* (the first year included in the averaging from 2020-29 to achieve the interim goal) will help greatly with Texas' compliance.

Conclusion

Given the preponderance of court decisions dismissing state challenges to EPA's authority to regulate emissions, there is at least a high probability that the Clean Power Plan survives the courts. If it does, Texas must either create a plan, or, if it refuses to do so, the EPA is required by the Clean Air Act to create a Federal Implementation Plan.

The building blocks for natural gas and renewable energy merely continue existing trends. In fact, they actually suggest growth rates over the next 15 years that are less than what Texas has experienced in the past 15 years. The building block for energy efficiency suggests increases in energy efficiency which would benefit all Texans by lessening the amount of spending by $5-$8 billion annually by 2030. If Texas doesn't increase energy efficiency programs, policymakers are artificially driving electric bills higher, hampering competitiveness and economic growth.

Texas policymakers could create a plan that emphasizes existing trends toward increasing natural gas and renewable energy, and increasing the state's focus on using energy more productively and efficiently.