California Air Resources Board
CLEAN POWER PLAN PROPOSED RULE (111(d))
DISCUSSION PAPER
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Introduction

At the 2009 United Nations Climate Change Conference in Copenhagen, President Obama pledged to reduce the United States' greenhouse gas (GHG) emissions to 17 percent below 2005 levels by 2020. In 2013, the president introduced his Climate Action Plan (Plan), which is the Nation's roadmap for attaining the 2020 goal. As a part of the Plan, the President directed the United States Environmental Protection Agency (U.S. EPA) to develop regulations for electric generating units (EGU). EGUs are the largest single source of GHG emissions in the United States, accounting for about one-third of all domestic GHG emissions.

On June 2, 2014, U.S. EPA proposed the Clean Power Plan (proposed regulation) under section 111(d) of the Federal Clean Air Act. The proposed regulation can be found at: http://www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule. Under U.S. EPA's proposed regulation, carbon emissions from existing EGUs are expected to be cut by 30 percent below 2005 levels by 2030.

U.S. EPA is soliciting comments on the proposed regulation. The Air Resources Board (ARB), in collaboration with the California Energy Commission (CEC) and California Public Utilities Commission (CPUC), and in consultation with the California Independent System Operator (CAISO) have been working together to identify potential issues/concerns and will be providing written comments to U.S. EPA by the October 16, 2014 deadline. In addition, because of the interconnectedness of the western power grid, the proposed rule allows states the option to work together in developing compliance plans. ARB and state energy agency staff are currently exploring these opportunities for coordination with other western states that participate in the Western Electricity Coordinating Council (WECC) and/or Pacific Coast Collaborative. ARB and state energy staff are also having discussions with a broader coalition of states to promote support for U.S. EPA's effort and find common ground on issues that will support a rigorous federal target for emissions reductions while giving states flexibility to innovate as they improve existing programs and develop new ones.

The proposed rule under section 111(d) only applies to existing EGUs. New EGUs are subject to a separate rulemaking by U.S. EPA under section 111(b) of the Federal Clean Air Act. Many of these new, more efficient EGUs may, over time, displace existing dirtier plants regulated under 111(d). This may create an incentive in many states to increase the replacement rate as a result of the 111(d) rulemaking.

As a result, we are strongly encouraging U.S. EPA to ensure that 111(b) rules are as rigorous as possible to continue driving down emissions in the power sector. In particular, California has previously urged U.S. EPA to set distinct standards for subcategories based on a natural gas-fired power plant's operational profile (for example, baseload, conventional load-following, fast-start/ramping, and peaking) to ensure the lowest achievable emissions. California is encouraging U.S. EPA to pursue this approach in its final 111(b) rule. A copy of our comment letter can be viewed at: http://www.arb.ca.gov/cc/powerplants/111b_comment_letter.pdf.

Background

The proposed 111(d) rule, which would be codified under 40 CFR Part 60, Subpart UUUU, sets state-specific carbon dioxide (CO_2) emission limits for the energy sector as a whole. The limits were established by comparing CO_2 emissions from all subject EGUs to total electricity generation which includes zero or near-zero carbon renewables, avoided generation due to energy efficiency, and some nuclear power. The requirements are applicable to the following types of EGU units constructed on or before 1/8/2014: steam generating and integrated gasification combined cycle (IGCC) units with a base load rating greater than 73 MW (250 MMBtu/hr) and constructed for supplying one-third or more of its potential output and producing more than 219,000 MWh net on an annual basis; and stationary combustion turbines rated at greater than 73 MW that are supplying greater than one-third of their potential electric output, produces more than 219,000 MWh on a three year rolling average, and combusts more than 10 percent fossil fuel and more than 90 percent natural gas on a heat input basis on a three year rolling average.

The rate calculation includes fossil sector emissions in the numerator and total state energy production (including energy production from zero carbon and energy efficiency resources) in the denominator. The calculation is based on CO_2 emissions from affected units in pounds divided by state electricity generation from fossil-fuel fired power plants and specified low or zero emissions units such as nuclear and renewables, as well as energy savings from energy efficiency programs.

Under Section 111 of the Federal Clean Air Act, U.S. EPA sets emission targets for covered sources in each state based upon the degree of reduction achievable through the Best System of Emissions Reductions (BSER). U.S. EPA's analysis concluded that BSER for existing power plants was best represented by the effect of four sets of measures, called "building blocks." The four building blocks used were:

1) Increased energy efficiency at coal-fired plants: U.S. EPA assumed coal plants could increase efficiency and obtain a 6 percent heat rate improvement.

2) More effective use of existing natural gas-fired plants: U.S. EPA assumed that natural gas-fired combined cycle plants could operate up to 70 percent of capacity.

3) Increased renewable generation and retention of “at risk” nuclear generation: U.S. EPA assumed that renewable generation could be increased. For California, U.S. EPA used a WECC wide renewable energy average of 21 percent and a growth rate of approximately 6 percent per year. In addition, U.S. EPA assumed that six percent of a States’ nuclear capacity, operating as of May 2014, could be factored into the state performance goal.

4) Expand energy efficiency programs: U.S. EPA assumed that energy efficiency could ramp up to a 1.5 percent annual savings rate.

Although the emission targets set as a result of these calculations must be met by each state, the particular strategies which inform the building block calculations are not required elements of a state’s compliance strategy. The building blocks are only used to set a state’s target. States are free to use different approaches in creating their own plans as long as the interim and final 2030 emissions targets are achieved.

U.S. EPA set California’s interim goal (the average of years 2020-2029) at 556 lbs CO_2/MWh and the final goal at 537 lbs CO_2/MWh by 2030. This goal is rate-based: while the numerator counts emissions from covered facilities, the denominator also includes avoided generation resulting from energy efficiency and zero-carbon electricity.

CEC, in consultation with ARB and CPUC, performed a preliminary analysis to estimate the expected CO_2 rates in 2020, 2024 and 2030. Based on this analysis, we believe that using the current mix of energy and environmental programs being implemented within the State will bring us into compliance with the U.S. EPA proposed targets for California. In addition, U.S. EPA’s rule, as proposed, will further support existing state policies on energy and air quality.

States have the option to use either the rate-based goal or to convert the rate-based goal to a mass-based goal. If a state chooses to use a mass-based goal, the plan must be developed to identify what the mass-based goals will be and describe the analytical process used to determine the goal. U.S. EPA has proposed that a state can use a simple conversion based on the established state goals and the projected generation or use model runs to determine the mass-based goal. U.S. EPA is taking comment on how to calculate a mass-based goal. California is currently reviewing both rate and mass options and is taking input on which option to use.

The proposed regulation requires each state to submit a SIP-like plan by June 30, 2016. The proposed regulation allows for a single state plan or states can work together and submit a multi-state plan. The state plan can include existing state programs such as the Cap and Trade Regulation (under AB 32), and demand side reductions (energy efficiency (EE) and renewable energy (RE)).

States are required to include in their plan a list of measures and describe how these measures will result in compliance with the interim and final performance goals. States

are to include a “glideslope” that will show for every 2-rolling calendar years from 2020 to 2029 and for 2030 what the expected emissions will be to meet the interim and final goals. A state must include corrective measures in the plan as a backstop and implement these measures if the actual reported emissions are off by more than 10 percent from what was projected in the plan.

Plans must include the following: (1) A list of affected entities and their emissions; (2) A description of the plan approach and the geographic scope of the plan; (3) Identification of the emission performance level to be achieved from 2020-29 and 2030; (4) A demonstration that compliance will be achieved; (5) Emission standards for the affected entities; (6) A demonstration that each standard is “quantifiable, non-duplicative, permanent, verifiable, and enforceable with respect to an affected entity”; (7) Milestones and corrective measures, as necessary; (8) Identification of applicable monitoring, recordkeeping, and reporting requirements for affected entities; (9) Description of the process and schedule for state reporting to U.S. EPA; and (10) Certification that the plan was developed with through a public process.

Discussion

Overall, ARB and our state energy agency partners are supportive of the proposed regulation. Implementing the proposed regulation will reduce emissions of GHGs, criteria, and toxic pollutants providing both public health and climate benefits. In addition, the U.S. EPA has developed a balanced and flexible proposal that will allow states to build on existing programs and develop strategies that reflect individual state needs and goals.

There are a number of key considerations that are critical to ensuring a national program supports individual states progress in establishing and carrying out their own climate programs. These include:

1) Ensuring that compliance with the federal program complements compliance efforts now required for California State program. Entities participating in state programs that meet federal requirements should be able to comply with federal programs with minimal additional procedural hurdles, focusing energy on emissions reductions rather than process. In particular, federal enforcement requirements should ensure states and covered entities stay on track, while leaving room for state policy innovation going forward;

2) Supporting regional planning, ranging from region-wide agreements to targeted agreements on particular issues, to support integrated carbon reductions across grid regions. The final rule should recognize energy import and export relationships between states as they work together to ensure proper crediting of emissions reductions, encourage increased use of renewable energy and energy efficiency, and lay the groundwork for multi-state partnerships;

3) Balancing state policy-making autonomy with the need for accountability by providing clear tools for states to use in assessing programmatic level compliance using existing monitoring, verification, and reporting system requirements when possible;

4) Allowing sufficient time for states to transition to a cleaner utility sector with the ultimate goal of decreasing the average emission rate, and total emissions, of the fossil generating fleet on a national basis and bringing higher carbon states in line with more proactive states, such as California.

In developing the proposal, U.S. EPA had to find a balance between many different state policies, programs, and goals to come up with a program that would deliver GHG reductions, provide accountability and enforceability for state plans, allow states the flexibility to choose the mix of technologies and policies that work best for them, and provide the option for regional planning recognizing the interconnectedness of multi-state grids.

ARB will work with U.S. EPA towards the goal to ensure that the final regulation supports flexible state programs to encourage innovation, provides common accounting and measurement systems to support regional planning, and allows states to implement programs with appropriate federal oversight requirements.

ARB is seeking stakeholder input on several areas of particular interest on 111(d) as described below.

1. Balancing federal approval requirements with state flexibility

Under the Clean Air Act, states must be able to demonstrate that the plans submitted under section 111(d) are federally enforceable as a practical matter. However, under the statute, states are given a wide-latitude as to how they demonstrate compliance with the performance goals set by U.S. EPA. Recognizing this fact, it is important that U.S. EPA remain flexible, but also requires states to provide a plan that ensures reductions are achieved with appropriate reporting, and contingency measures if states fall short of projected goals.

Several different federal enforceability structures may be appropriate in section 111 plans and U.S. EPA proposed options in their proposal. ARB seeks stakeholder comment on these options.

(1) Baseline and complementary measures.

U.S. EPA's proposal, and prior guidance on state criteria pollutant planning under section 110 of the Federal Clean Air Act, suggest that certain state measures which are already in force under the status quo, or whose effects complement the effects of other federally-enforceable measures, may not themselves need to be federally enforceable (though discontinuing these policies may trigger plan revisions). ARB is considering

what state policies might appropriately be described as baseline or complementary measures.

(2) Using existing Cap-and-Trade regulations as the basis for meeting section 111(d) emissions limits.

California's economy-wide Cap-and-Trade program limits existing power plant emissions, because all these sources must hold and surrender Cap-and-Trade allowances consistent with their emission compliance obligation. Thus the program accounts for the effects of other policies, including energy efficiency and renewables. ARB is considering whether aspects of the Cap-and-Trade program could help ensure enforceability of section 111(d) limits and, if so, what sorts of analytic demonstration would be required to assure compliance.

(3) State commitment approaches.

U.S. EPA is exploring whether states can make enforceable state commitments to achieve emissions reductions from their programs without making the program themselves federally enforceable. For instance, California might commit, subject to federal law, to achieving certain reductions through the operation of its energy efficiency programs without making provisions of those programs themselves federally enforceable. Similar constructs have been used for plans under section 110, from at least California, Texas, and New York, and have been upheld by the courts. Compliance is monitored through regular reporting and contingency planning is used to ensure states don't get off track. This approach ensures continuous progress towards meeting federal targets, while giving states flexibility to innovate and improve programs. ARB is interested in whether this approach is appropriate here.

<u>Questions for discussion:</u>

Without limiting other topics, ARB solicits stakeholder feedback on the following:

1) Which enforceability mechanisms might be most appropriate for a California section 111 plan?

2) If ARB designates some programs as complementary or baseline programs, which state programs should these be, and which should be put forward as federally enforceable components of the plan?

3) What sorts of demonstrations can ARB use to show that its Cap-and-Trade program, combined with other state programs, will reliably produce compliance with the federal target under a range of best- and worst-case scenarios?

4) What components, if any, of the Cap-and-Trade program might be appropriate or inappropriate for federal enforcement? What are the benefits and costs of those arrangements?

5) If ARB uses state commitments to support any aspects of its plan, what sort of commitments (in terms of rigor of reduction, time, and program operation) are appropriate, and what data should ARB use to support these commitments?

6) What sorts of reporting, from both the state and covered entities, would be appropriate to ensure emissions reductions are met?

7) What sort of contingency and backstop measures should ARB consider building into the plan to ensure that it can respond to unexpected events?

2. Accounting for Renewable Energy and Energy Efficiency in Regional Planning

Under U.S. EPA's proposed rule, there are default rules for counting energy efficiency and renewable energy in state plans, though these rules may be adjustable through regional agreements. Under the default rules, states can claim credit only for renewable energy they consume and that is accounted for under their renewable policies; as a result, states exporting renewable energy may not receive credit for these exports without further agreements with importing states. A similar dynamic applies to energy efficiency. States can only take credit for the effects of demand reduction resulting from their state policies at EGUs within their borders. This means that states which import a portion of their power may not receive full credit for emission reductions resulting from their energy efficiency policies that reduce the need for imported power. At the same time, energy exporting states may not be able to claim credit for these emission reductions either. As a result, both of these default rules may not capture all incentives for energy efficiency and renewable energy development in areas, like the West, with many large export and import relationships.

These import/export relationships are particularly important in the West because there are numerous long distance power transfers in the region. California is particularly interested in working with our regional partners to explore joint compliance options and ensure that renewable energy and energy efficiency are accounted for across state lines to strongly encourage further investments. We will continue to work with U.S. EPA to ensure this type of regional planning will be approvable.

Questions for discussion:

1) How can regional agreements best incentivize low carbon power in exporting states?

2) How can accounting rules for renewables and energy efficiency support regional planning?

3) Can multi-state agreements expand opportunities for more cost-effective emission reductions?

4) Are there existing programs, such as renewable energy credits, that should be used to account for reductions across state lines?

3. Regional Planning Mechanics

Recognizing that energy regulation may differ significantly between states, California is exploring various approaches to regional planning, including large-scale regional plans and a more focused modular approach that would allow implementing specific elements in a modular fashion. Under this modular approach, states would develop a state-specific plan that could also include common plan elements between states. Such common elements might include, for instance, a common accounting system, which allocates compliance credit among the states, with the bulk of each state's plan then focused on state-specific measures. For instance, states might want to develop regional plans accounting for renewable energy and/or energy efficiency credits. The "module" would contain enforceable commitments and tracking provisions, and be submitted by each state as a common plan element between two or more larger plans, which would ensure no double counting of carbon reductions.

In order to enable states to carry out this type of regional planning, U.S. EPA will need to develop clear guidance on legal responsibilities, as well as common accounting and measurement systems between states. California will continue to work with U.S. EPA and our regional partners to further explore this option.

Questions for discussion:

1) What are some of the pros and cons of large scale regional plans versus a modular approach?

2) What types of elements (e.g. accountability, enforceability) should be included in any regional plan?

3) What sorts of specific issues must accounting and measurement systems address in order to support regional planning?

4) What if a state under a regional plan fails to deliver emissions reductions, how should the shortfall be addressed and by whom?

5) Plans typically are revisited over time. What should this process look like under a regional plan?

6) What legal designs might be available and approvable for a regional plan? Would, for instance, it be appropriate for states to separately adopt

complementary plan language, or would a single, more uniform, document be needed?

7) Under a regional plan scenario, should states be required to use the same compliance metric? If they do not, what mechanisms could be used to address any "seam" issues between states using different compliance systems?

4. Rate versus Mass Calculation Metrics

The proposed targets for each state are expressed as a rate (lbs CO_2/MWh). U.S. EPA is allowing states the option to show compliance using a mass-based approach.

ARB and energy agency staffs are currently exploring the pros and cons of using a rate versus mass target. Rate targets may have some advantages: California is unique in that policies are being implemented to greatly increase the deployment of electric vehicles and the infrastructure necessary to support them. In addition, some local air districts are looking at greater electrification of residential, commercial, and industrial sectors to minimize fuel combustion and its associated emissions. These policies are likely to result in the need for more generation capacity. Although some of this capacity will likely be served by new facilities not subject to section 111(d), some may come from existing facilities. A rate-based metric addresses this situation by providing some flexibility, allowing for growth in output while limiting carbon intensity.

On the other hand, the mass-based option would limit overall carbon emissions, consistent with California's larger climate goals, and would likely be easier to monitor and enforce given many of our existing climate programs are mass-based. Mass-based systems may also help better support regional planning, since ton-based accounting is a relatively straightforward way of addressing effects on emissions from power transfers across state lines. Mass-based accounting may also, as a result, help reduce the need for standardized monitoring and verification systems in regional planning. A careful analysis will be needed to determine the best approach for California.

U.S. EPA provided some guidance on converting rate-based targets to mass-based. However, the language, as proposed, leaves room for multiple interpretations. ARB staff has requested U.S. EPA to provide some specific examples of how they would perform this conversion. ARB is continuing to work with U.S. EPA on acceptable calculation methodologies to ensure that the resulting demonstration is fair and equitable, regardless of the form of the standard.

Questions for discussion:

1) The proposed regulation allows states the option of choosing a compliance metric. What are the pros and cons of each metric for California?

2) What approaches for converting between rate and mass systems are most appropriate for California?

3) Under a mass-based goal should states be allowed to grow the mass-based goal in future years to account for growth?

5. Stringency of Targets

As described above, in establishing each state's target, U.S. EPA used four building blocks. These building blocks included a number of general assumptions, projected growth of electricity demand, states' varying energy mixes, and cost-effective additionality of renewable energy and energy efficiency resources. Some of these assumptions and projections are based on a national or regional basis, instead of an individual state-by-state analysis.

For example, additional renewable energy resources identified in building block 3 of the proposal are based on a regional analysis of existing renewable portfolio standards (RPS). For the west, this means that California's existing state-mandated 33 percent RPS is undervalued in U.S. EPA's 2030 target for California, as many other western states do not have comparably aggressive RPS goals. Using U.S. EPA's current methodology, California is credited with a 20 percent RPS goal by 2030 to meet the proposed target of 537 lbs CO_2/MW-hr.

Questions for discussion:

1) Are there ways in which the proposed methodology could be revised to improve the accuracy, and rigor, of the state targets? What would, for instance, be the impacts of a state-by-state analysis of energy mix, anticipated load growth, and resource availability on the targets? Which revisions would produce the most beneficial results?

2) In the context of a California-only compliance plan, what are the pros and cons to increasing the stringency of California's target? What about a multi-state compliance approach?