EPA's proposed Clean Power Plan, 79 Fed. Reg. 34829 (June 18, 2014), includes a wide range of measures upon which EPA is seeking comments in order to finalize guidelines for states to use to develop plans to reduce CO2 emissions from fossil fueled electric generating units. The purpose of this paper is to offer some information regarding certain of those measures and their technical application. Nothing in this paper is intended to endorse the measures EPA selected, or the legal and practical viability of such measures as components of the final guidelines or any state plan.

Issue Paper: Emission Rate to Mass (Tons) Conversion in EPA's Proposed 111(d) Regulatory Guidelines

Background

Under the proposed EPA guidelines for 111(d) covering CO2 from "existing" fossil units, EPA has proposed emission rate goals for states starting in 2020 and gradually becoming more stringent until the final rate goal is achieved in 2030. The existing fossil emission rate goal is actually an "adjusted" emissions rate, with statewide compliance calculated by the following formula:

$$CO_2\,Emission\ Rate\left(\frac{lbs}{MWh_{(net)}}\right) = \frac{Ex.\,Fossil\ CO_2\ Emissions\ (lbs)}{Ex.\,Fossil\ Gen + RE + Incremental\ EE + Nuclear\ (MWh_{(net)})}$$

Notably, direct credit in the denominator of the formula is provided for: (1) all non-hydro renewable energy (RE) and new nuclear energy in MWh, (2) all incremental (post-2014) energy efficiency (EE) achieved in MWh and (3) 5.8% of existing nuclear energy in MWh.

EPA Proposed Rate to Mass Conversion Procedure

EPA provides the option for states to convert from a rate-based target to a mass-based (tonnage) target. Further, once the states tonnage limit is approved by EPA, then the state need only assure that there is compliance with the approved tonnage limit (and not the initial rate target) based on actual emissions from affected sources. EPA has noted in both in its technical support documents (TSD) and in oral comments that the acceptable approach for conversion:

(1) should use an economic modeling projection(s) of future utilization of existing fossil plants as well as the assumed level of EE and RE among other factors to convert from the rate limit to a tonnage limit and

(2) the emissions tonnage limit should be "at least as stringent" as EPA's rate-based goal in the proposed rule.

EPA has also noted that it would take comments from states regarding other acceptable approaches for conversion including the use of historic data in lieu of projections among other methodologies.

Reasons States May Want to Convert to a Mass-Based or Tonnage System

While many states may or may not decide that conversion from a rate target to a tonnage target makes sense for them, there are several reasons that a mass-based system may make more sense than a rate based system:

1. The ability to trade or even average emissions within state or with other states is much more straightforward to implement under a mass-based system than a rate-based system. It is no accident that all organized emissions trading markets for CO2 and greenhouse gases (e.g. RGGI,

California, and the EU-ETS) and most other markets for any other emissions or effluents are mass-based NOT rate-based.

2. Emissions trading provides for cost savings and generally the most cost-effective way of achieving the emission targets. Further, a mass-based system treats all compliance equally (and results in compliance choices based on the lowest $ per ton reduced) versus the EPA rate targets which provide "extra" credit for renewables and incremental energy efficiency and effectively less credit for gas switching as a form of compliance.

3. Emissions tonnage limits allow for full credit for existing coal and other fossil unit retirements, while a rate target does NOT. For example, West Virginia and Kentucky are states which get their generation almost entirely from existing coal units. Hence, coal retirements in these states only change the existing fossil rate slightly, while on a tonnage basis existing plant CO2 emissions would actually be reduced much more significantly.

4. Emissions tonnage limits do NOT need (and we would argue SHOULD NOT) include taxes, auctions or other added costs to electricity customers. Nor do limits need to include complicated allowance allocation formulas. A simple allocation to generators based on historic emissions should work.

Problems with EPA's Proposed Approach for Converting from a Rate to a Mass-Based System

There are several problems/limitations with EPA's proposed approach for converting from rate to tonnage limits. The required analysis is complex and heavily reliant on key economic assumptions regarding future EE, load growth, renewables, power plant lifetimes, nuclear re-licensing, natural gas prices to name just a few. Further, it will not only be affected by the individual state assumptions but also be heavily affected by the compliance actions of other nearby states, particularly those within the same power pool. The complexity and the time consuming nature of this process is problematic enough. However, the lack of assurance that the conclusions of the analysis will be found acceptable by EPA means that many states may forgo the opportunity for interstate emissions trading and more cost-effective in-state trading.

Potential Additional Options for States for Rate to Mass Conversion

Based on discussions and meetings with EPA, we determined that there are several additional potentially viable conversion options that states should consider proposing to EPA depending on their individual state situations:

(1) **Option 1 - EPA Puts State by State Specific Tonnage Limits in Final Rule** - EPA provides numerical tonnage limits in the final guidelines which EPA has determined based on its own projections are equivalent to the state rate-based goals. States could then "opt" for these limits in lieu of the rate limits. These presumptive EPA limits would have the advantage of being clear and unassailable, though it is quite possible that some/many states would disagree with them since they would be based on EPA's assumptions rather than the states' own estimates.

(2) **Option 2 - States Allowed to Calculate Tonnage Limits Based on the EPA Building Block Assumptions Used to Determine the Emission Rate Requirements** - An individual state could develop numerical tonnage limits in the final guidelines using the EPA "building block" methodology and assumptions used to develop the emission rate limits. This would essentially use the same compliance rate formula noted in the Background section but solve for CO_2 tons

given the rate requirement and the MWh assumed. In short, it would equal the (State Emission Rate Goal) X (Fossil MWh + Renewable MWh + Incremental Energy Efficiency MWh + New Nuclear MWh + 5.8% of Existing Nuclear MWh). This would have the merit of being consistent with how the state rate limits were calculated and set (and therefore arguably "equivalent"). Further, it would give proper credit for renewables and energy efficiency that EPA assumed in establishing the emission rate requirement in the first place. It would also allow for more robust crediting for emission reductions from retirements. There are however two variants to how the renewable energy, nuclear and energy efficiency blocks could be applied:

a. The first variant would be to simply apply the building blocks as proposed by EPA to occur as part of BSER using 2012 baseline data (i.e. assume the state would hit its target levels for RE, EE and not have any nuclear retirements). This would in affect "codify" the effects of the building blocks as proposed. The disadvantage of this approach is that EPA developed the rate limit assuming a lot more renewables and energy efficiency than many states are likely to ultimately be able to achieve/implement. As such, EPA might make this tonnage limit conversion "conditional" on achieving and enforcing the EPA renewable/EE assumptions, which would make the option unattractive for many states. On the other hand, given that EPA established the rate limit for each state using an assumed amount of EE and RE, it can be argued that it is completely consistent to establish a tonnage target using the same EPA assumptions without having any conditions placed on this tonnage limit.
b. The second variant would have states propose levels of achievable RE and EE to be met as part of the SIP and following the same calculations as before. While this would allow for states to incorporate more modest RE and EE goals, it would increase the stringency of the cap relative to option 1 as more reductions would have to come directly from measured emissions. It would also likely require the RE and EE targets to be codified and enforced within the SIP, which would likely require state legislation. However, this approach might be more amenable to receiving EPA approval.

Under either of these approaches another option or variant would be for a state to propose an alternative historic baseline for calculation of the emission tonnage targets. One possibility would be to use recent average historical generation and emissions at existing fossil plants (e.g., 2010-12). However, in some states, there might need to be advantage to use the most recent historic data (e.g. 2013 or 2014) for the most recently added "existing" fossil units. Another possibility, for states that are projecting increasing utilization of existing fossil generation, would be to use a forecasted projection for generation in the calculation. The disadvantage in using an alternative baseline methodology is that it may result in emission limits that are considered "less stringent" than the rate final guidelines by EPA and thus could be viewed as not equivalent. However, use of an alternative baseline might be justified as being more applicable to the Best System of Emission Reduction (BSER) determination for a specific state given the fluctuations that occur in generation and emissions year over year.

Finally, it must be noted that all of the alternative methodologies for converting from a rate limit to a tonnage limit will be affected significantly to the extent that a state gets a change in its emissions rate limit incorporated in the final rule (likely due to overly aggressive or unrealistic application of the some of the building blocks in EPA's proposed rule). Ultimately, state specific analysis needs to be done to determine what options could/would work the best for an individual state.