

Conversion of Rate-Based NSPS Goals to Mass-Based Goals

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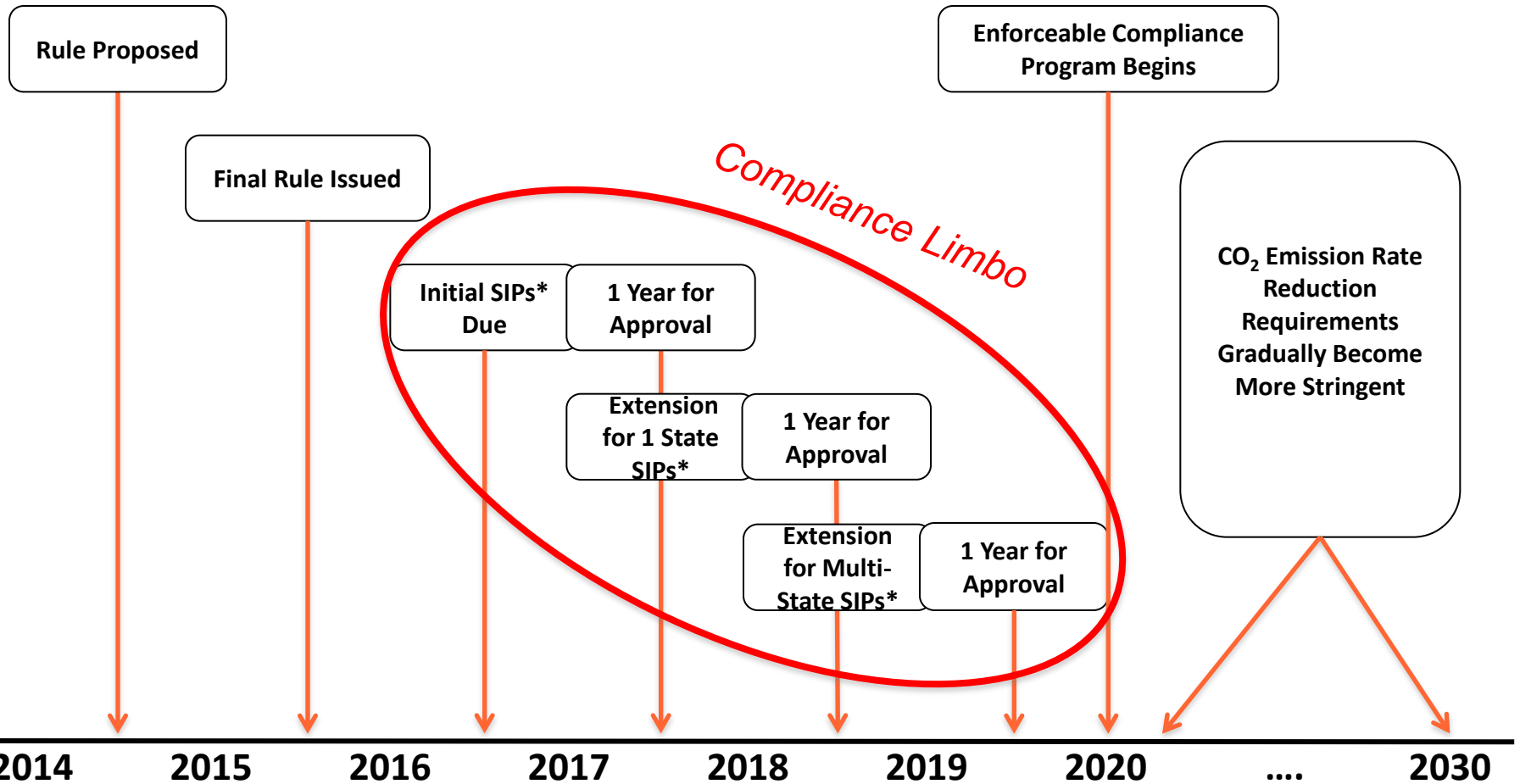
Development of State Goals

- ***Goals are based on 2012 EGU data (aka “the baseline”) NOT the 2005 emission levels EPA used in press release.***
- ***EPA developed state emission rate goals using four “building blocks” for its determination of the Best System of Emission Reduction (BSER).***
 1. ***Heat Rate Improvements (HRI)***
 2. ***Redispatch of Natural Gas over Coal***
 3. ***Renewable Energy (RE) / Nuclear Energy***
 4. ***Energy Efficiency (EE)***
- ***Each building block is used to estimate the potential emission reduction possible with regards to an individual state’s emission rate.***

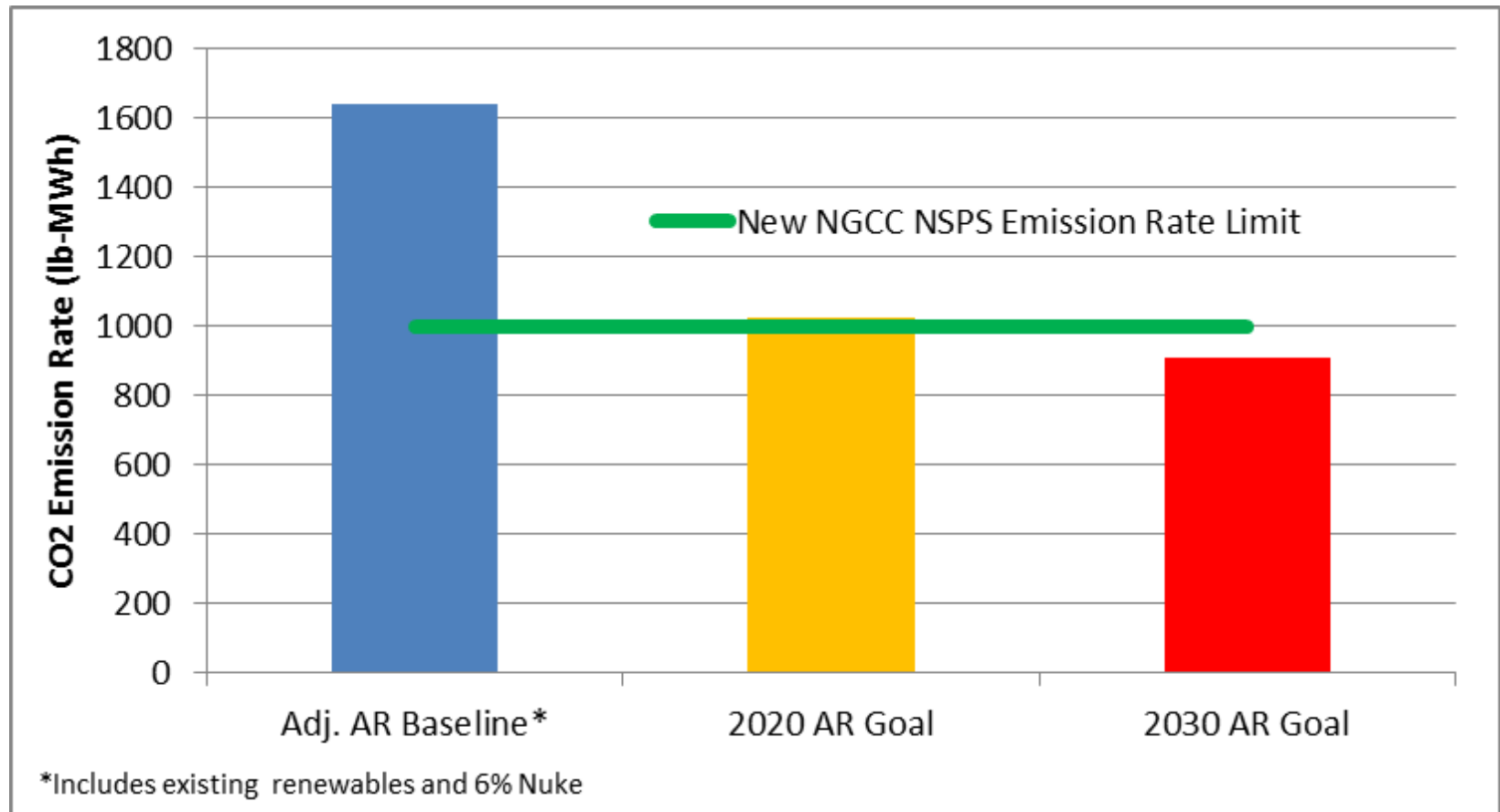
Key Assumptions in Building Blocks

- ***BB #1 Heat Rate***- EPA assumes that all coal generators can improve their heat rate by 6% at a cost of \$100/kW.
- ***BB #2 Gas Dispatch***- assumes “existing” natural gas combined cycle (NGCC) units increase output to a 70% capacity factor, resulting in an equivalent reduction in coal unit utilization.
- ***BB #3 RE***- assumes renewable portfolio standards in all states; effectively results in 13% national RPS by 2030, although regional AR requirement is 7%.
- ***BB #4 EE***- assumes states can ramp annual energy efficiency levels to 1.5% of sales at a cost of ~8.5 to 9.0¢/kWh.

Proposed EPA 111(d) Regulatory Timeline



Arkansas Emission Goals



Arkansas Summary

Impact of EPA's Building Blocks for Arkansas BSER vs 2012:

- ***37% - Reduction in state emission rate by 2020***
 - ***1028 lb-CO₂/MWh***
- ***45% - Reduction in state emission rate by 2030***
 - ***910 lb-CO₂/MWh***
- ***64% - Reduction in coal generation due to increased dispatch of natural gas by 2020***
- ***140% - Increase in renewable generation by 2029, equivalent to 7.2% of total generation***
- ***10.3% - Cumulative reduction in electricity use through energy efficiency measures by 2030***

The Proposed Goals are an Adjusted Emission Rate

$$CO_2 \text{ Emission Rate} \left(\frac{\text{lbs}}{MWh_{net}} \right) =$$

Ex. Fossil CO₂ Emissions (lbs)

Ex. Fossil Gen + RE + Incremental EE + Nuclear (MWh_{net})

(Non – Emitting Sources)

- **According to EPA statements, states may potentially also opt to include “new” gas combined cycle units in the rate calculations.**
- **NO credit for early action prior to 2012 and limited credit for coal retirements after 2012.**

Numerator: EPA only includes emissions from existing fossil units (coal, combined cycle, oil and gas steam). Peaking units excluded.

Denominator: Existing fossil, non-hydro renewable and some nuclear generation (i.e. new nuclear + 6% of existing nuclear) plus avoided generation from energy efficiency (EE) measures.

Reasons to Convert to Mass-Based System

- **Simplicity** - Emissions trading (intrastate or interstate) is simpler to implement under a mass-based system.
 - All organized emissions trading markets for CO2 (e.g. RGGI, California, EU-ETS) and most other markets for emissions are mass-based NOT rate-based.
- **Cost Effectiveness** - Emissions trading is generally the most cost-effective way of achieving the emission targets.
- **Retirement Credits** - Emissions tonnage caps gives full credit for coal and other fossil unit retirements, rate target does NOT.
- **Less Expensive than Rate Caps** - EPA's Adjusted Emission Rate targets are more expensive to meet (than equivalent mass targets) because they cross-subsidize renewables and energy efficiency.
- **Important FIRST to get EPA to revise rate targets upward and move back compliance deadlines due to flaws/problems with EPA Building Blocks for AR.**

Potential Mass-Based Emissions Trading in AR

- ***Emissions tonnage limits do NOT need to (and we would argue SHOULD NOT) include taxes, auctions or other added costs to electricity customers.***
- ***Simple Emission Reduction Credit (ERC) allocation to generators based on reductions achieved below historic emissions would work best since most of AR's existing CO2 emissions are regulated (cost of service) or part of electric cooperatives:***
 - ***Easier delegation of responsibility.***
 - ***Ensures customers ONLY pay for the cost of emission reductions in their rates and no more.***
- ***Details of such a plan could be worked out after mass-based goals are established.***

EPA's Proposal on Rate to Mass Conversion

- ***EPA has proposed that states have the option of using mass-based system for compliance.***
- ***But wording of technical support document on rate to mass conversion is ambiguous and likely unworkable.***
- ***Suggests detailed modeling of baseline, rate equivalent and state plans scenarios to develop equivalent and acceptable mass targets.***
- ***No clear guidance on acceptable modeling parameters, though EPA is in the process providing clearer guidance.***

Flaws with EPA Guidance

- **Required modeling analysis would be complex and reliant on key uncertain, economic assumptions.**
 - ***E.g. load growth, EE, renewables, power plant lifetimes, nuclear re-licensing, natural gas prices***
- **Outcome also heavily affected by compliance actions of other nearby states, particularly those within the same power pool.**
- **Lack of clear guidance on details of modeling provides little assurance that the analysis will be found acceptable by EPA.**
- ***Absent more streamlined or simpler process, many states may forgo the opportunity for mass-based emissions trading.***

Other Uncertainties

- ***Role of New Gas Generation***
 - ***If new NGCC can be used for compliance, it could help lower overall emission rate and costs to comply under rate requirement.***
 - ***However, new generation counted against a mass goal would hinder/ make mass compliance more expensive.***
- ***Unclear which renewables “count” under rate-based rule (e.g. located and/or procured in state vs. procured from out of state).***
 - ***Mass-based system would implicitly count ALL renewables to the extent they reduced fossil generation.***

Potential Mass-Based Goal Options

■ *EPA Determines Goal*

- *Pro: Clear and Unassailable***
- *Con: May be Unattainable***

■ *States Determine Goal*

- *Pro: Allows Flexibility in Application of Outside-the-Fence Programs***
- *Con: More Susceptible to Challenge***

EPA Sets Mass Goal

- ***If based on “current” EPA building block assumptions would be very problematic.***
 - ***E.g. EPA’s modeling projects 2020 AR CO2 emissions under CPP are 54%-58% below baseline.***
- ***Highly dependent on actions within other states and assumed power flows.***
- ***EPA’s model does not have required sensitivity to in-state reliability needs.***
- ***EPA’s building blocks are based on flawed assumptions.***
- ***Bottom-up approach could also be possibility based on BAU projection.***

State Sets Mass Goal Using EPA Formula

- ***Simplified approach could determine mass goal by reconfiguring EPA's state adjusted emission rate formula and "solving" for mass using the following elements:***
 - ***Projected levels of generation/emissions under BAU (could be based on IRPs/ load projections).***
 - ***State assumed levels of renewables and EE.***
- ***Goal based on in-state projections would help ensure state remains energy self-sufficient.***
- ***Without codification of the renewable and EE targets EPA might disapprove of mass goal.***
 - ***Likely would require state EE and RE legislation.***

Conclusions

- ***Current EPA guidance on rate to mass conversion is insufficient to allow option to be workable.***
- ***Several simplified options for conversion are available.***
- ***The best option will be dependent on ultimate stringency of program and level of “equivalency” acceptable to EPA.***
- ***Further technical guidance from EPA is expected soon and will provide greater insight into potential paths forward.***