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Overview of the Final Clean Power Plan Rule – EPA CAA 111(d)

Presented to: Michigan Energy Optimization Collaborative

October 20, 2015

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October 20, 2015

On August 3, 2015, the EPA released the Clean Power Plan Final Rule to regulate CO2 emissions from existing power plants.

2014

- EPA Issues Proposed Rule (June 15th)
- Comment period on proposed rule

2015

- EPA Issues Final Rule (August 3rd)
- EPA Issues proposed M&V guidance document for public comment
- EPA Issues proposed federal implementation plan
- Litigation expected

2016 -2018

- State implementation plans due September 6, 2016 (2017 or 2018 with 1 or 2 year extension)
- Ongoing litigation expected

2022-2029

- CPP Compliance period begins in 2022
- Likely creation of new regional trading mechanisms, expect continuation and likely expansion of RGGI and CARB cap-and-trade

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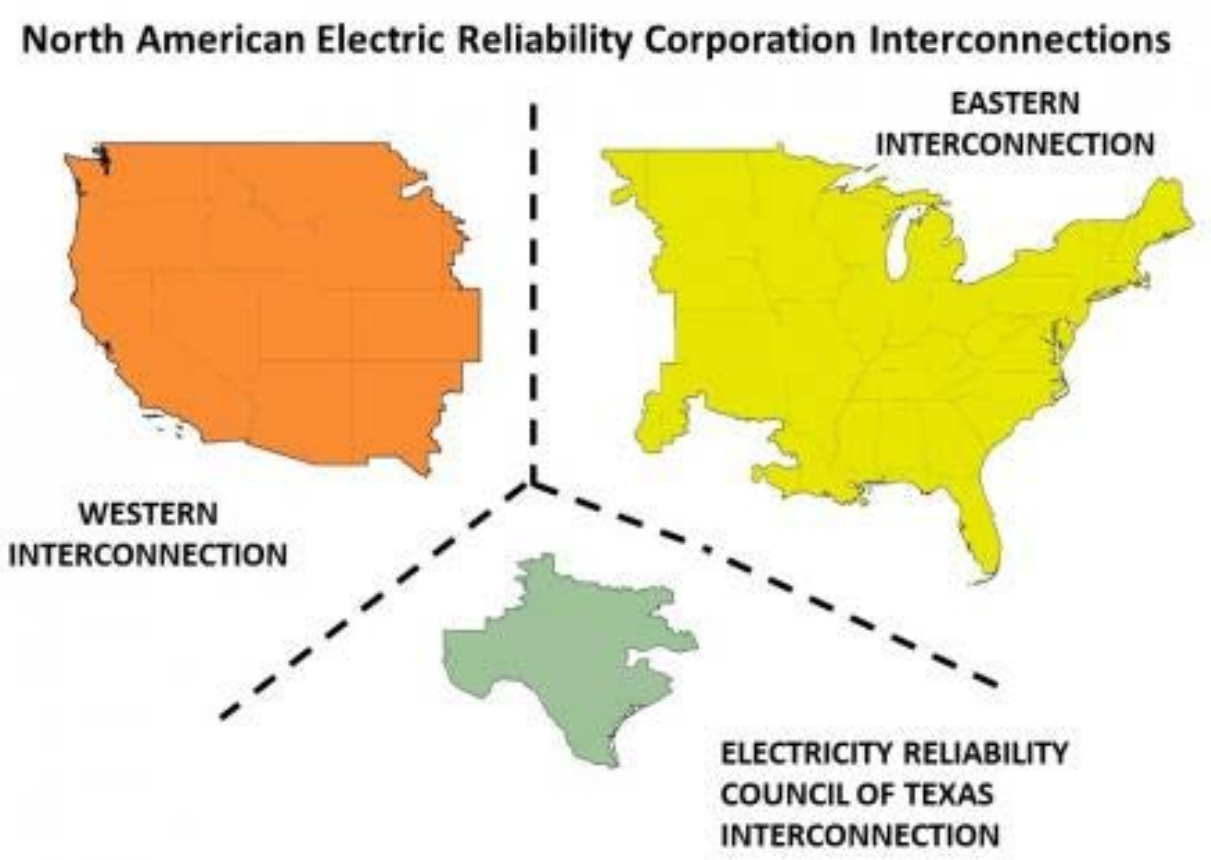
In a change from the proposed rule, EPA established Building Block 1 (BB1) and BB3 goals based the characteristics of NERC regions.

** NERC regions are not a constraint to regional CPP compliance plans*



Source: EPA, 2015

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EPA used three building blocks to calculate state emission targets and define the Best Strategy for Emissions Reductions (BSER, *CAA term*).

Heat Rate Improvements

- Eastern Interconnection: 4.3%
- Western Interconnection: 2.1%
- ERCOT: 2.3%

Optimize Dispatch to Lower Emitting NGCC from Coal

- 75% Net Summer Capacity Factor for NGCCs

Renewable Energy

- State goals based on historical capacity growth across the Eastern, Western, and ERCOT
- Nuclear was removed

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Basics of the CPP Rulemaking

- **The Clean Air Act §111(d) (CAA) is the enabling legislation for the CPP**
  - §111(d) is unique in the CAA because it offers the administrator latitude over existing sources
  - The Clean Air Act is highly prescriptive in nature, well tested, and the agency's technical discretion is wide

- CO_2 is not recognized in the CAA as a Hazardous Air Pollutant and there is no National Ambient Air Quality Standard (NAAQS)
  - The Agency is supported by existing precedent and the field has become increasingly ripe for CO2 emissions regulation

- Key Distinction: Prescribed emissions control strategies are held to different standards in the Clean Air Act (*E.g. Maximum Achievable Control Technology, Best Available Control Technology, Best Practicable Control Technology, Best Strategy for Emissions Reductions…*)
  - Under §111 the agency must consider cost and feasibility
  - Strategies also must be 'adequately demonstrated'

- The Supreme Court has generally interpreted the Clean Air Act as a technology forcing statute
  - 1970 Legislative history – Congress was concerned that industry would resist CAA standards by claiming cleanup was impossible.

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Basics of the CPP Rulemaking (*Continued*)

- **The Building Blocks frame the agency's Best Strategy of Emissions Reduction (BSER) and are not a required prescription**
  - The building blocks ≠ state specific least cost planning
  - Likely that some or all of the building blocks will be used in most state plans

- **Compliance format: states submit compliance plans (*not* SIPs, which are defined in Sec. 110 of the CAA) that are reviewed and approved by the agency**
  - States may develop multi-state, collaborative plans
  - States may develop programs that allow trading among affected EGUs

- **Should a state choose to not develop a CPP implementation plan, the agency has the authority to develop a Federal Plan for that state**
  - On August 3, 2015 the EPA released a proposed Federal Plan for public comment
    - EPA's Federal Plan includes model CO2 trading rules

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Energy Efficiency (EE) was removed from EPA's BSER in the Final Rule but EE is still considered a viable compliance strategy by the EPA.

- EE was removed from the final CPP to narrow the BSER to supply-side emissions reductions strategies
  - EPA's authority over emissions sources has long been interpreted to not extend "beyond the plant fence"

- EPA's BSER defines state emissions reduction quantities, but does not prescribe a mandatory reduction strategy
  - EE has long been among the most cost effective clean 'supply' resources and will remain competitive in both rate and mass based plans

Evaluation, Measurement, and Verification

- **For states that design a rate-based plan**, M&V of EE is required and the EPA has issued EM&V Guidance for Demand-Side EE for public comment
  - Document draws from the Uniform Methods Project
  - *Note:* under a rate-based approach, emissions reductions from EE are not measured or discounted based on the Electric Generating Units (EGU) they affect

- **For states that design a mass-based plan**, M&V of EE is not required* because mass emissions reductions may be directly measured at the affected units

  **** This does not preclude state Public Service Commission EM&V requirements or suggest EE is not an available compliance mechanism***

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EPA EM&V *draft* Guidance for Demand-Side EE – the EPA is currently accepting public comment on the draft EM&V guidance.

EPA EM&V Guidance

- **EM&V is required for EE deployed in a rate-based plan, while EM&V isn't required for mass-based plans** (e.g., emission reductions are measured at the source for mass-based).
- **Guidance includes:** baseline definitions and applicable EM&V methods, the appropriate use of industry-standard protocols and guidelines, and other topics for successfully quantifying and verifying savings for purposes of generating emission rate credits (ERCs) and adjusting an emission rate.
- **EM&V Guidance:** methods, savings metrics and baselines, reporting timeframes, deemed savings, independent factors affecting consumption and savings, reliability, avoiding double counting, useful life and persistence of savings, T&D savings adders, interactive effects

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EM&V and the CPP

- Heat rate improvements
- Fuel switching to a lower carbon content fuel
- Integration of renewable energy into EGU operations
- *Combined heat and power*
- *Qualified biomass co-firing and repowering*
- *Renewable energy (new & Capacity uprates)*
  - *Wind, solar, hydro*
- *Nuclear generation (new & capacity uprates)*
- ***Demand-side EE programs and policies****
- *Demand-side management measures*
- *Electricity transmission and distribution improvements*
- Carbon capture and utilization for existing sources
- Carbon capture and sequestration for existing sources

EM&V Required to generate ERCs in rate-based plans

* *Focus of EPA's Draft EM&V Guidance*

Source: EPA Final CPP Rule

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Overview of the Clean Power Plan – EM&V and Rate vs. Mass Approaches

Type of Approach		Role of EE/RE in State Plan	How States Can Advance EE/RE	EM&V Req'd?	Considerations
Emission Standards	Mass	EE reduces cost, EE/RE lowers CO_2 emissions but re not enforceable or written into the state plan	•Allocate CO_2 allowances for EE/RE (e.g. through a set aside) •Auction allowances, use $ for EE/RE •Secure matching allowances for solar, wind and low-income EE from Clean Energy Incentive Program (CEIP)		• Unlimited flexibility w/EE implementation • EM&V generally not required for CPP purposes, except for CEIP and set asides specifically created to meet the leakage
	Rate	Explicitly written into state plan; Used to generate ERCs and directly adjust reported CO_2 emissions rate of affected EGUs	•Include EE/RE ERC tracking, trading and insurance provisions in the state plan •Issue ERCs for quantified and verified MWhs from eligible EE/RE measures •Secure matching ERCs from CEIP for solar, wind, low-income EE		• EMV Plans and M&V reports required • E/RE is explicitly traded & credited • Trading-ready facilitate access to Energy Credits
State Measures	State Documen-tation Based on Mass	Explicitly included as supporting material for state plan – enforceable under state law; State EE/RE policies and measures can be used to help affected EGUs meet mass goal	•Implement state EE/RE policies and programs (e.g., EEPS, RPS, building codes) that are enforceable under state law, either to meet goal or in conjunction with federally enforceable limits •Secure matching allowances from CEIP for solar, wind and low-income EE		• Projection of EE/RE impacts required and EGU CO_2 performance required • EM&V Plan for EE/RE measures must be included as supporting material for state plan • Backstop emission standards for affected EGUs

Source: EPA Final CPP Rule

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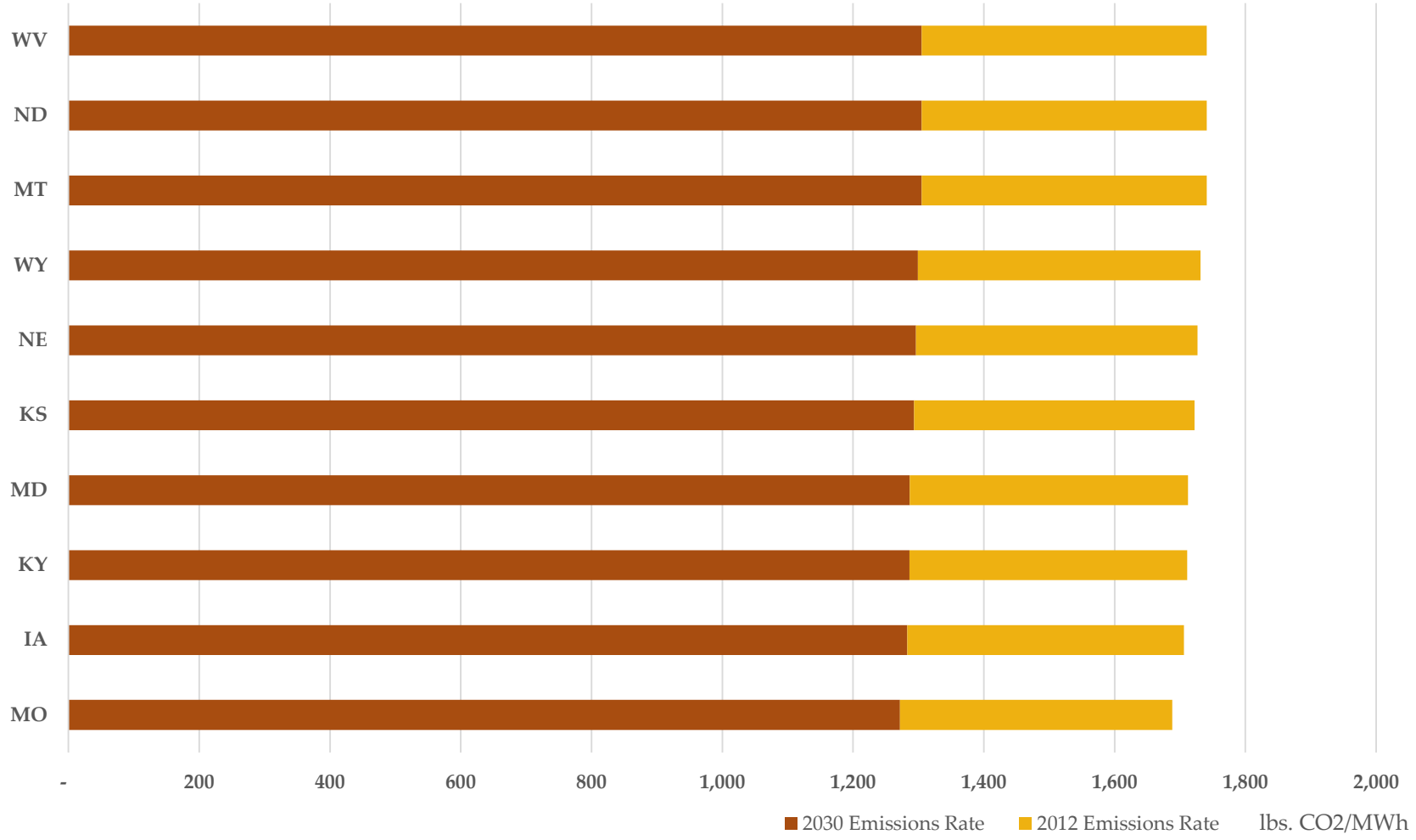
Based on the EPA's Rate Reduction Goals (lbs. CO2/MWh), below are the Top 10 States with the largest reduction goals.



Data Source: EPA TSD *CPP Emission Performance Rate Goal Computation,* Appendix 5

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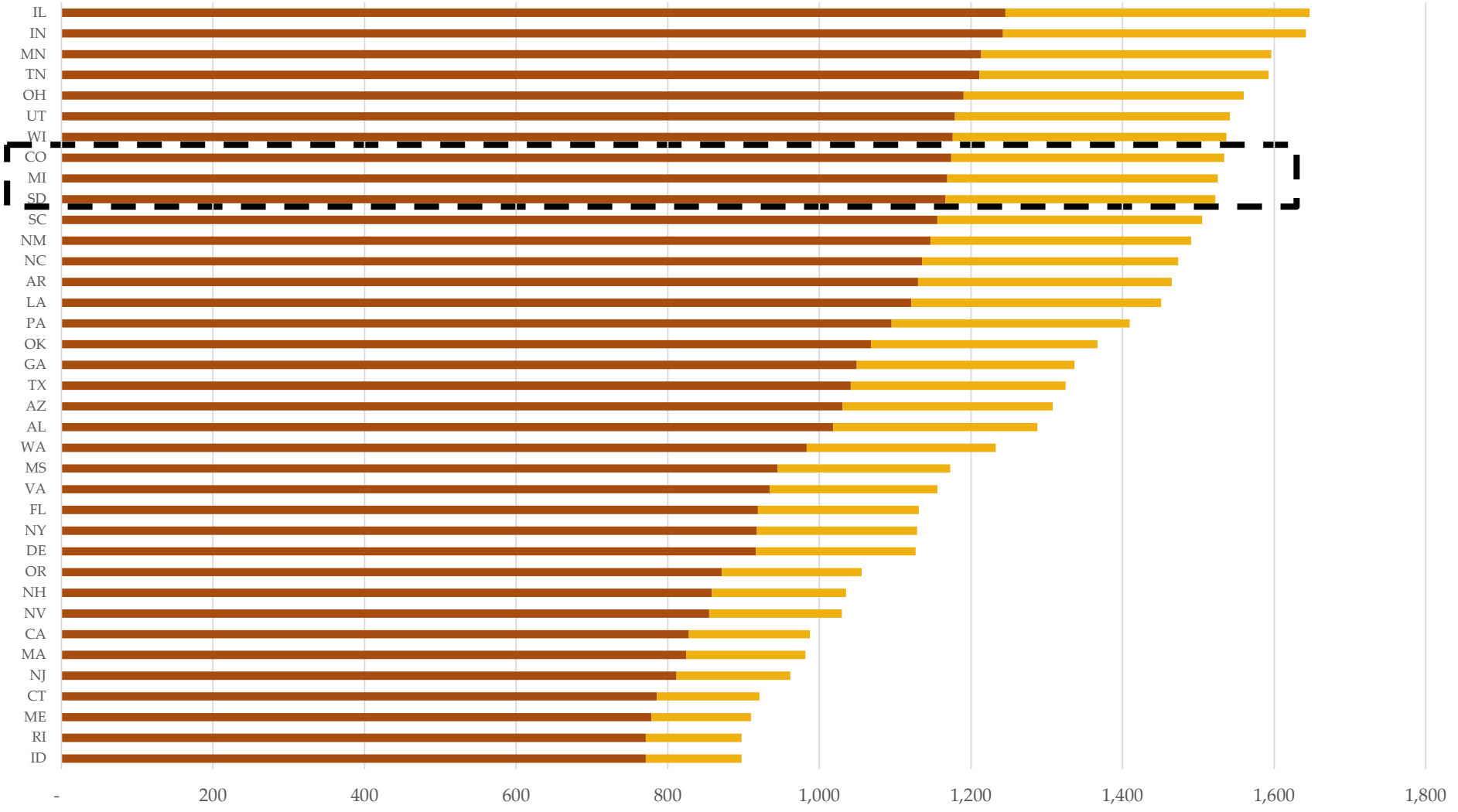
Based on the EPA's Rate Reduction Goals (lbs. CO2/MWh), below are the remaining 40 states' reduction goals.



Data Source: EPA TSD *CPP Emission Performance Rate Goal Computation,* Appendix 5

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Key Changes from the Proposed Rule

- **Changes to the Building Blocks**
  - **BB1 Heat Rate Improvements:** Removed 2% heat rate improvement margin from equipment upgrades and calculated heat rate improvement percentages by analysis of each NERC region, rather than on a national basis – results in overall reduction in BB1 goals
  - **BB2 Optimized Dispatch:** Bases utilization ramp-up of NGCC plants on their net summer capacity, as opposed to nameplate capacity
  - **BB3 Renewable Energy :** No longer uses regional RPS goals as basis for RE expansion, but rather bases BB3 on historical RE deployment patterns and economic potential identified through modeling projections of each NERC region. RE technologies used to quantify BB3 include: onshore wind, utility-scale solar PV, concentrating solar power, geothermal, and hydropower.
  - **Energy Efficiency:** Formerly BB4, EE was removed from the BSER but is still an eligible compliance strategy

Key Changes from the Proposed Rule (*Continued*)

- **"At Risk" Nuclear Removed from the Final Rule**
  - Under-Construction Nuclear may contribute to state goals, a significant departure from the proposed rule
  - Uprates at existing plants may also contribute to goals

- **Select Adjustments made to 2012 Baseline Year**
  - 2012 was used as the baseline year in the proposed and final rule for emissions reductions calculations

  - In response to comments, adjustments were made to the 2012 baseline year data to ensure representativeness:
    - **Account for annual variation in the hydrologic cycle**; 2012 was an outlier year for snowpack in Idaho, Maine, Montana, Oregon, South Dakota, and Washington
    - **Adjustment to Minnesota's baseline** to account for the 2012 outage of a major coal steam EGU
    - **Adjustment to account for fossil units coming online during 2012**; unit output of select EGUs raised to a more representative annual operating level

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Key Changes from the Proposed Rule *(Continued)*

- **Biomass Treatment Refined**
  - Biomass is still an acceptable renewable energy source under the final rule, however EPA has narrowed their approach and included additional reporting requirements
    - **Qualified Biomass Definition:** A Biomass Feedstock that is demonstrated as a method to control increases of CO2 levels in the atmosphere.
    - **Reporting Requirements:** States must adequately demonstrate that such biomass feedstocks or feedstock categories appropriately control increases of CO2 levels in the atmosphere and that the state can adequately monitor and verify sustainability practices

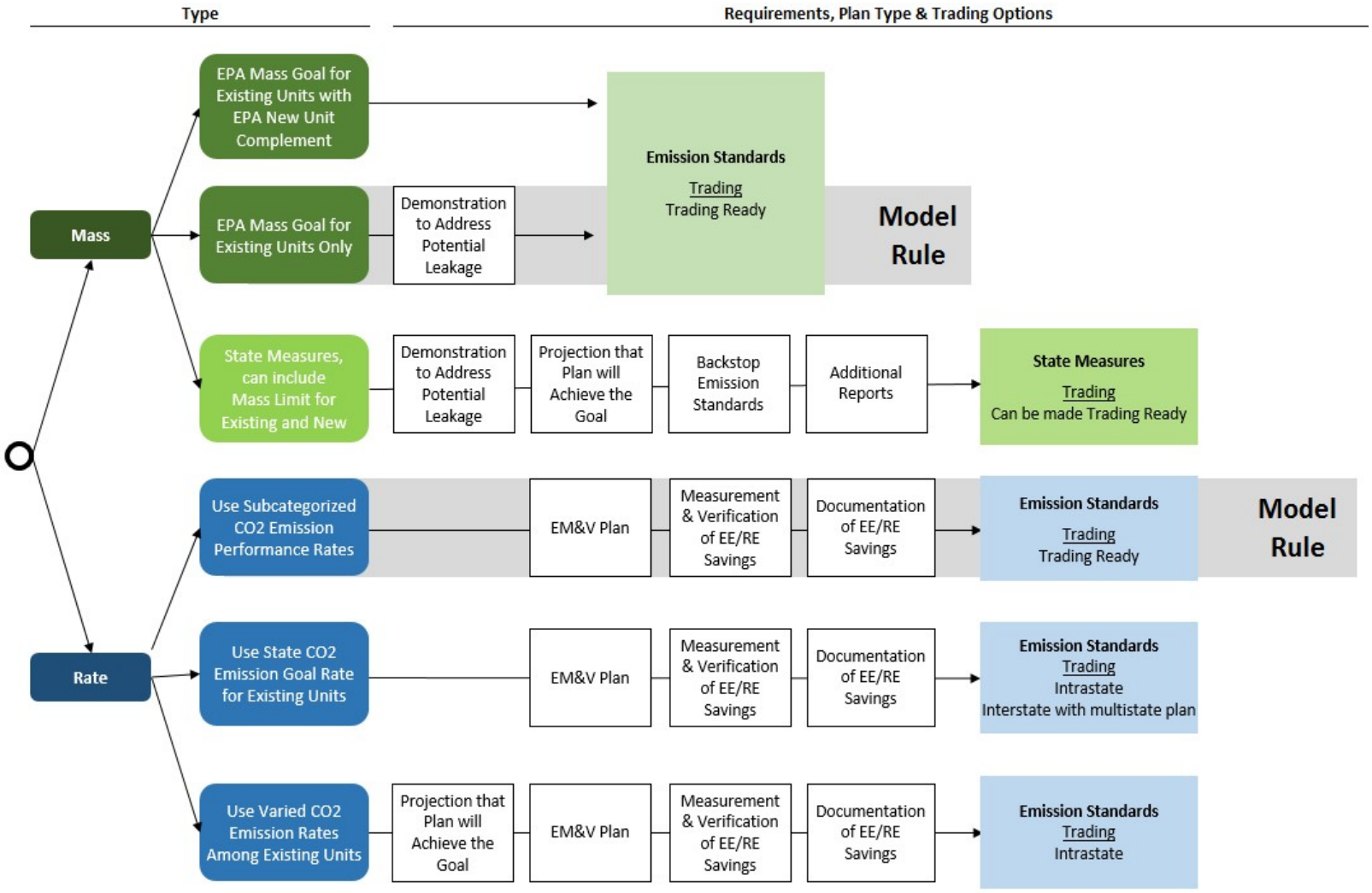
- **Reliability "Safety Valve" for individual EGUs**
  - Reliability-critical affected EGU or EGUs may be granted a 90-day window in which they are not required to meet the state emissions standards, and this will not affect final performance toward state goals
  - For use in situations in which an immediate, unforeseen, emergency situation threatens reliability

Definition of an Affected EGU:

- **EGUs affected by the final Clean Power Plan must:**
  - Be grid tied
  - Be capable of selling >25MW
  - Have a base load rating greater than 250 MMBtu/hr heat input of fossil fuel

- **Exceptions Include:**
  - Units subject to new source performance standards as a result of commencing modification or reconstruction
  - EGU currently and always has been subject to a federally enforceable permit limiting net-electric sales to one-third or less of potential output
  - Flexible units that have historically limited the use of fossil fuels to 10% or less of their annual capacity factor
  - CHP units that are subject to a federally enforceable permit limiting, or have historically limited annual net electric sales to 219,000 MWh or less
  - Commercial or Industrial Solid waste incineration units that are subject to new source performance standards
  - Municipal waste combustor unit subject to 40 CFR 60.50b-60.59b

Key Considerations for State Plan Submissions: Compliance Pathways under the Final CPP



Source: EPA

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Key considerations of leveraging EE and EM&V

- **EM&V for demand-side EE is well established**
  - Several decades of experience, with refinements along the way
  - Well-established protocols and guidelines
  - Overseen by PUCs, SEOs, and other implementing agencies and authorities
  - Many large firms, hundreds of individual practitioners
  - Training and certification programs
  - Rich library of published reports and publicly available data and technical resources

- **EPA's approach to the draft guidance:**
  - Leverage existing protocols and procedures that are widely used
  - Strike a reasonable balance between EM&V rigor and accuracy, and evaluation costs and effort
  - Avoid excessive interference with EM&V practices that are already robust, transparent, and working well
  - Anticipate and support the continued evolution of EM&V into the future

Source: EPA Final CPP Rule

Key Considerations for State Plan Submissions

- **Emissions Rate Targets:** Statewide emission performance goals represented as an adjusted output-weighted-average, lbs. CO2/Net MWh from all affected EGUs
- **Emissions Mass Targets:** Statewide emission performance goals represented as an adjusted output-weighted-average, total tons CO2 from all affected EGUs

States may submit plans according to two types of plan approaches:

1. **Emissions Standards Approach:** Federally enforceable emissions standards imposed directly on affected EGUs
   - Available for both rate and mass approaches

2. **"State Measures Approach":** Comprised of various measures implemented by the state that are not federally enforceable but result in the affected EGUs meeting the requirements of the rule's emissions guidelines
   - **A state measures plan *must also* include a backstop of federally enforceable standards on affected EGUs that fully meet emissions guidelines—this would be triggered only if the state measures fail to result in the affected EGUs achieving required reductions on schedule**
   - Available only for mass plan approaches

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Key Considerations for State Plan Submissions (*Continued*):

- **Trajectories and Interim Goals**
  - EPA has established three interim goal periods: 2022-24, 2025-27, 2028-29, as well as an interim goal for the 2022-2030 compliance period
  - States may use an emissions reduction trajectory that differs from the trajectory defined by the three interim goal periods if the overall interim goal is met on average over the compliance period, and the final goal is achieved in 2029
- **Progress Tracking and Reporting**
  - **Plan Requirements:** "State plans must contain requirements for tracking and reporting actual plan performance during implementation, which includes reporting of CO2 emissions from affected EGUs."
    - States must require all affected EGUs to monitor and report hourly CO2 emissions and net energy output on a quarterly basis
      - As a practical matter, many EGUs are familiar with these monitoring and reporting requirements for NOX and SO2 through EPA's Emission Collection and Monitoring Plan System (ECM)

Key Considerations for State Plan Submissions (*Continued*):

- **Progress Reporting and Tracking** *(Continued)*
  - **Rate Based Plans:** Emissions performance is defined by an average CO2 emission rate for affected EGUs representing cumulative CO2 emissions over the course of each reporting period divided by cumulative MWh energy output, with rate adjustments for qualifying measures, such as RE and DSM
  - **Mass Based Plans:** Emissions performance is defined by total tons of CO2 emitted by an affected EGU over the reporting period
- **State Progress Reporting:** States must submit a report to the EPA containing the emissions performance comparison for each reporting period no later than July 1 following the end of each interim goal period
- **Carbon Leakage:** Under a mass-based plan, EPA identified a potentially perverse incentive whereby new sources, *not regulated by the CPP*, may have an incentive to increase generation as a substitute action for reducing emissions at affected EGUs
  - *As a result, leakage must be satisfactorily addressed in state mass-based plans*
- **"Trading Ready":** States may design plans that contain features necessary and suitable for their affected EGUs to engage in trading with other states without developing a multi-state plan or formal arrangement

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Clean Energy Incentive Program (CEIP):

- **The CEIP is an optional program that incentivizes Renewable Energy and Energy Efficiency investments set to deliver results prior to the start of the CPP compliance period in 2022 and following submission of a State Plan.**
  - The CEIP was not present in the proposed rule, CEIP is an additional flexibility mechanism to facilitate achievement of emissions reductions
  - Under the CEIP, states may generate early action Emissions Reductions Credits (Rate-based plans) or Emissions Allowances (Mass-based plans)
  - EPA will match early action ERCs or Emissions Allowances up to 300MM short tons of CO2
  - ERCs or Allowances may be used for compliance by an affected EGU with its emissions standards and are fully transferrable prior to use
  - Qualified Resources:
    - RE: Grid tied, solar and wind technologies
    - EE: Quantified and verified savings implemented in low-income communities
    - Generate or save MWh in 2020 and/or 2021