Overview of EPA's Final Clean Power Plan Rule




Governor's Energy Summit

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Carbon Dioxide Emission Standards for Power Plants Under CAA §111

EPA is taking three actions that reduce carbon dioxide (CO_2) emissions from the electric power sector:

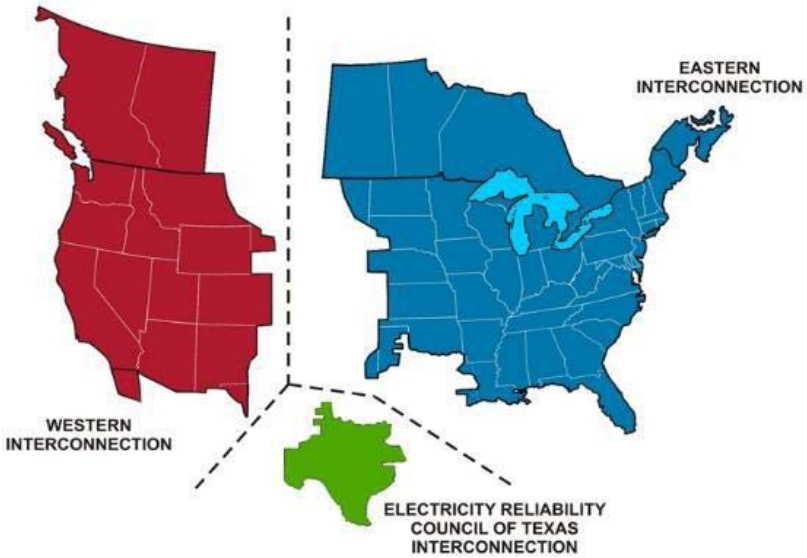
- New Source Performance Standards (NSPS): CO_2 Emission Standards – new, modified and reconstructed EGUs - **FINAL**
- **Clean Power Plan (CPP) – existing sources – [electricity generating units (EGU)] - FINAL**
- Federal Plan (FIP) proposal and proposed model trading rules
- Correctly incorporated, the model trading rules can be "presumptively approvable" as part of a state plan to comply with the CPP

Best System of Emission Reduction (BSER) Building Blocks

- BB1: Heat rate improvements at existing coal units based on historical optimal performance vs 2012 heat rate: Eastern Interconnect 4.3%, Western 2.1%, ERCOT 2.3%
  - Use 2012 baseline instead of 2002-12 data
  - Do not explicitly add separate equipment upgrades as proposed
- BB2: NGCC 75% capacity factor based on net summer capacity
  - Phased in
  - Limit 22% increase first year; 5% ea. subsequent yr. vs. previous
- BB3: Incremental renewable energy based on historical growth and updated cost and availability data
  - Phased in
  - EIA AEO 2015 shows RE increase >70% 2013-2040
- EPA maintains that blocks 2 and 3 are severable from each other; concedes that block 1 is **not** severable from blocks 2 and 3

BSER Applied on Interconnection Basis

- 1st: BB1 Heat rate improvements at coal units
- 2nd: BB3 Incremental renewable energy, displacing fossil steam and NGCC generation
- 3rd: BB2 Increase NGCC generation to substitute fossil steam generation
- Calculate emission performance rate for fossil steam and NGCC units
- For each year, select least stringent performance rate



Source: https://www.e-education.psu.edu/drupal6/files/geog469/images/NERC_Interconnection_1A.jpg

Building Block 3 - RE

- Quantifying BB3 modified to incorporate historical deployment patterns for RE technologies as well as the economic potential identified through modeling projections.
- RE technologies used to quantify BB3 generation levels are onshore wind, utility-scale solar PV, concentrating solar power (CSP), geothermal and hydropower.
- Generation levels are expressed in terms of incremental, rather than total, RE generation
- Generation levels are quantified for each of the three BSER regions – the Eastern, Western, and Texas Interconnections

Category Specific Emission Performance Rates

Based on least stringent across interconnects:

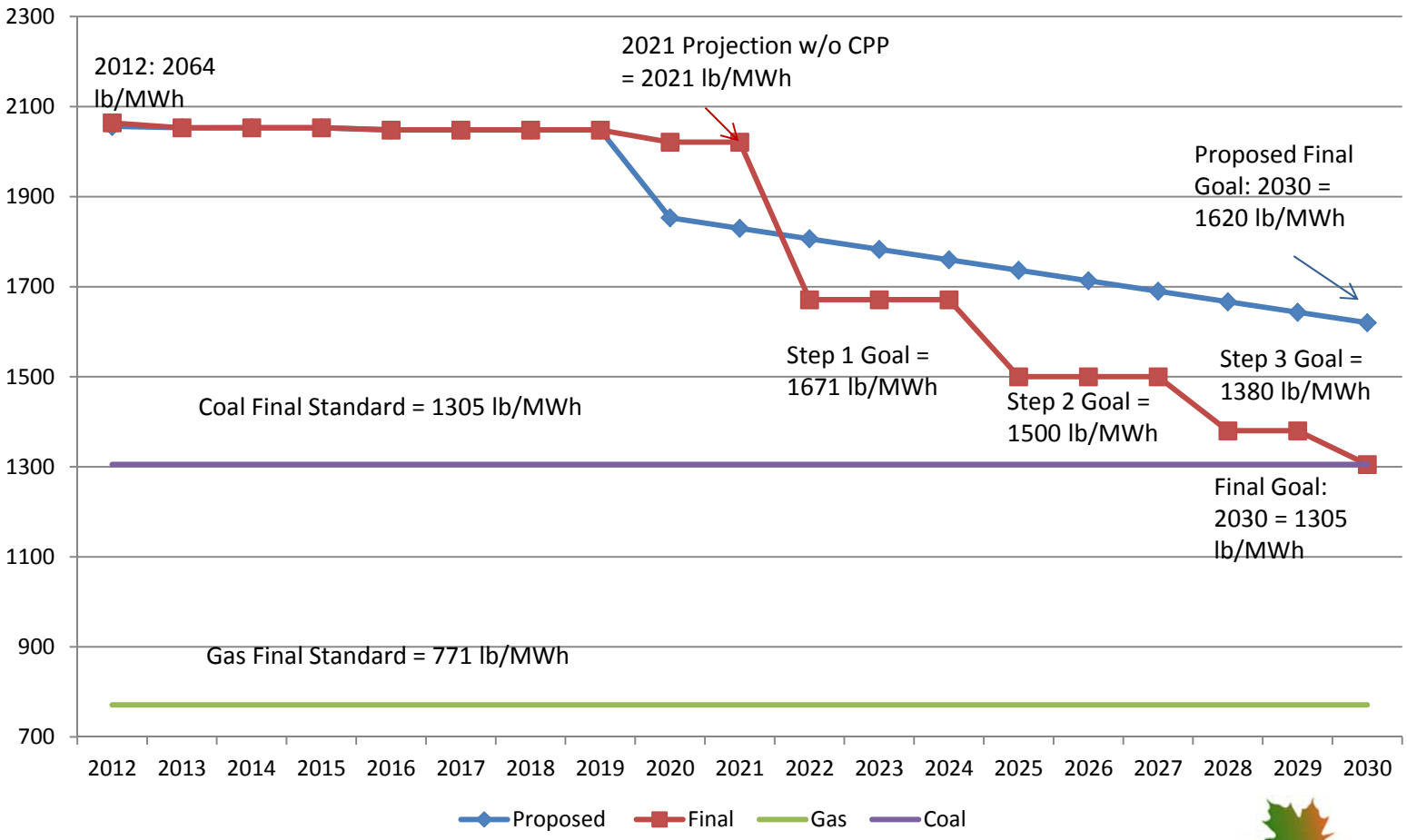
- Same for all states

2030 Final Rate	Fossil Steam	NGCC
	lbs/MWh Net	lbs/MWh Net
Eastern	**1305**	**771**
Western	360	690
ERCOT	237	697

Alternative blended state rate based on 2012 generation mix: % fossil steam and % NGCC generation... Montana, North Dakota and **West Virginia** all get the highest rate ~100% coal generation = 1305 lb/MWh

WV's Clean Power Plan Rate Goals (Proposed & Final)

(lb CO2/MWh-net)



Calculation of CO_2 Emission Rate

$$CO_2 emission\ rate = \frac{\sum M_{CO2}}{\sum MWh_{op} + \sum MWh_{ERC}}$$

Where:

CO_2 emission rate = Rate used to determine compliance

M_{CO2} = CO_2 mass in pounds

MWh_{op} = Total net energy output over compliance period

MWh_{ERC} = Emission Reduction Credit (ERC) replacement generation

Properly documented Renewable Energy (RE) and/or Demand-side Energy Efficiency (EE)

Example: ERCs needed for John Amos

- Assume John Amos generation = 2012 generation = 12,969,046 MWh
- 2012 CO2 Emissions = 13,060,997 short tons
- Assume 2% HRI = 2% reduction in 2012 CO2 emissions = 12,799,777 tons = 25,599,554,708 pounds
- 2012 Wind generation in WV = 1,286,024 MWh

Compliance Period	Compliance Rate (lb CO2/MWh)	Required MWh ERCs
2022-2024	1671	2,350,855
2025-2027	1500	4,097,324
2028-2029	1380	5,581,356
Final	1305	6,647,471

Mass-Based Goals

EPA calculates mass-based state goal for existing sources

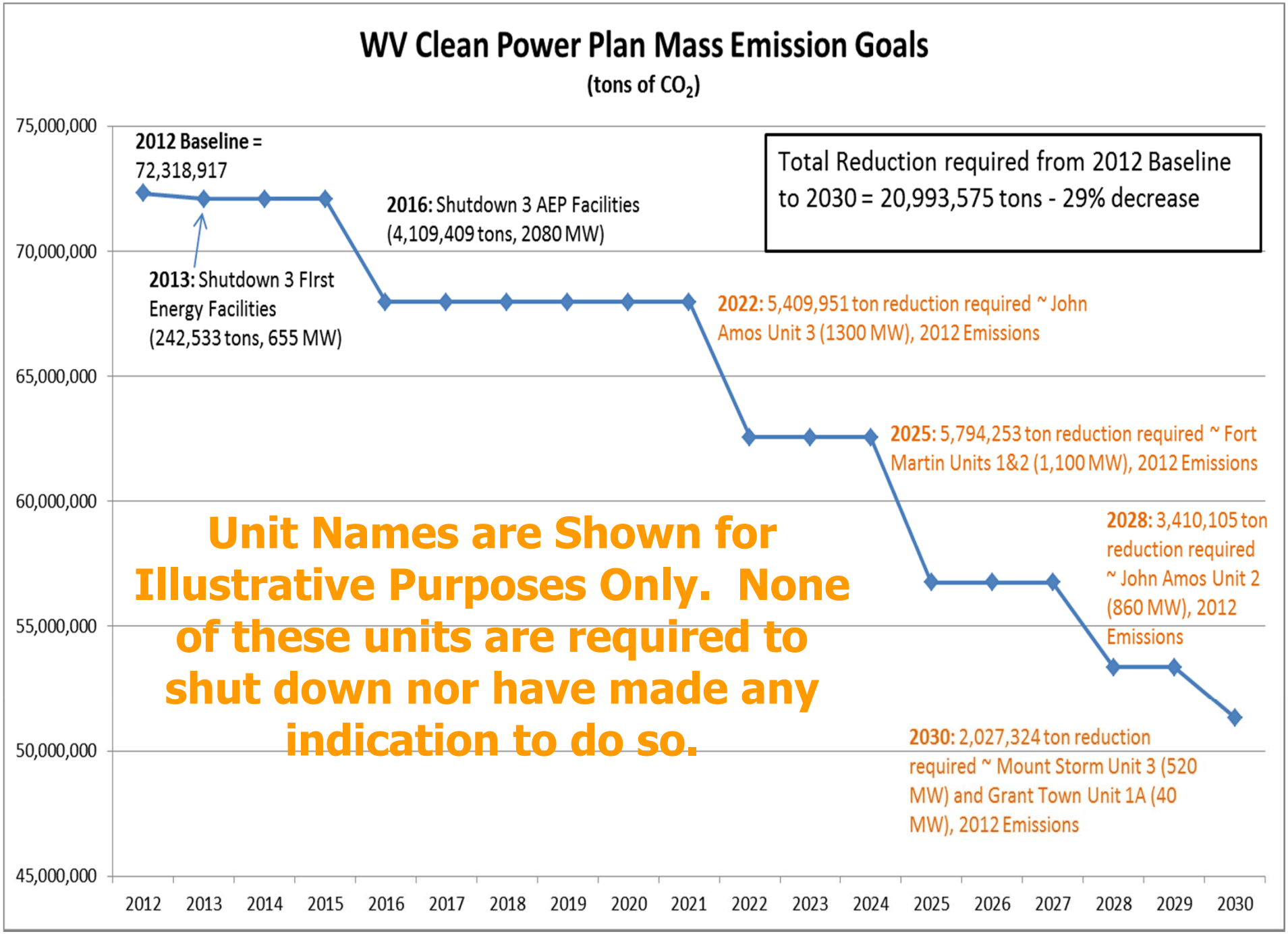
- New methodology

2 components

- Emissions from meeting blended rate goal
- Ability to expand output through unutilized BB3 RE
  - Not all RE quantified under BB3 utilized because performance rate based on least stringent rate
  - Accounts for load growth based on unutilized BB3 RE

New source complement

- AEO 2015 generation growth and NSPS emissions rate for new NGCC


WV Clean Power Plan Mass Emission Goals
(tons of CO_2)
75,000,000
70,000,000
65,000,000
60,000,000
55,000,000
50,000,000
45,000,000
2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030
2012 Baseline = 72,318,917
2013: Shutdown 3 FIrst Energy Facilities (242,533 tons, 655 MW)
2016: Shutdown 3 AEP Facilities (4,109,409 tons, 2080 MW)
Total Reduction required from 2012 Baseline to 2030 = 20,993,575 tons - 29% decrease
2022: 5,409,951 ton reduction required ~ John Amos Unit 3 (1300 MW), 2012 Emissions
2025: 5,794,253 ton reduction required ~ Fort Martin Units 1&2 (1,100 MW), 2012 Emissions
2028: 3,410,105 ton reduction required ~ John Amos Unit 2 (860 MW), 2012 Emissions
2030: 2,027,324 ton reduction required ~ Mount Storm Unit 3 (520 MW) and Grant Town Unit 1A (40 MW), 2012 Emissions
Unit Names are Shown for Illustrative Purposes Only. None of these units are required to shut down nor have made any indication to do so.

Mass-Based Plans and Leakage

If trading is allowed, mass-based plans need to demonstrate they have addressed risk of leakage to new sources in state plan

<u>3 options available to states</u>

- Include new units under mass limits with new source complement
- Use an allocation method, e.g. output based allocation, that counteracts leakage (EPA proposed approach in FIP)
- Other methods demonstrated by state to prevent leakage

Clean Energy Incentive Program: Eligible Resources

Wind or Solar that:

- Commences *construction* after the state plan is submitted
- Generates metered MWh of electricity during 2020 or 2021

Energy Efficiency that:

- Is located in a "low-income community"*
- Commences *operation* after the state plan is submitted
- Reduces MWh of demand during 2020 or 2021

**EPA is taking comment on how to identify a low-income community in the federal plan*

Clean Energy Incentive Program: EPA Matching Allowances/ERCs

Wind and Solar

- For every 2 MWh of generation, the state must grant 1 credit (allowance), and the EPA will grant 1 credit (allowance)

Energy Efficiency in Low Income Communities

- For every 2 MWh of avoided generation, the state must grant 2 credits (allowances), and the EPA will grant 2 credits (allowances)

Model Rule Highlights

- EPA proposed two model trading rules (Federal Plan)
- New rate-based trading option
- New units excluded from rate-based approach
- EPA lays out requirements for ERCs, includes liability rule
- Mass-based approaches must address leakage to new units

Has the Rate v. Mass Comparison Changed?

Rate

- New rate-based trading ready option (in proposed model rule)
- Requirements for the "credit desk," i.e. process and infrastructure needed to process ERCs – rate-based credits
- New NGCC plants may not earn credit under a rate-based approach
- Single-rate approach (analyzed under the proposal) still available

Mass

- Mass-based emissions "budget" for each state, as well as "new source complements"
- Mass-based states must address leakage by (1) covering new NGCC units, (2) through allocation method or (3) by other means
- EPA says costs are significantly lower under mass
- Process, rules and infrastructure needs are less burdensome than under rate

Who to Regulate? Two Options.

Emission Standards

- Regulate only owners and operators of covered power plants
- Similar to traditional Clean Air Act programs

State Measures and Federal Backstop

- Initially, state relies on “state measures” to achieve the state mass-based goal
- Federally enforceable backstop kicks in if the state measures don’t perform
- States have to develop two programs

Trading?

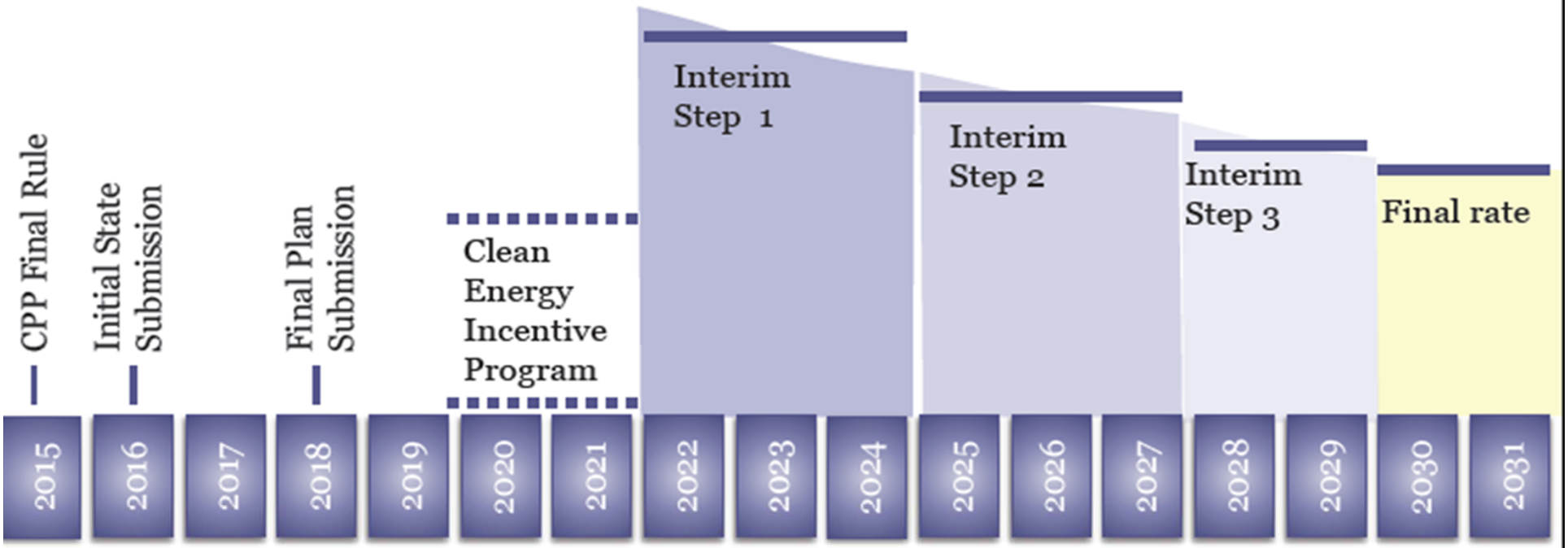
Allow Trading?

- Trend among stakeholders in favor of trading to lower costs and safeguard reliability
- EPA is proposing to make trading easier through model rules states can adopt that are "presumptively approvable"
- Mass-based trading plans must address potential leakage to new units
- EPA offers "new source complements" that add to the number of tons in a state's mass-based limit/budget

Allow Interstate Trading?

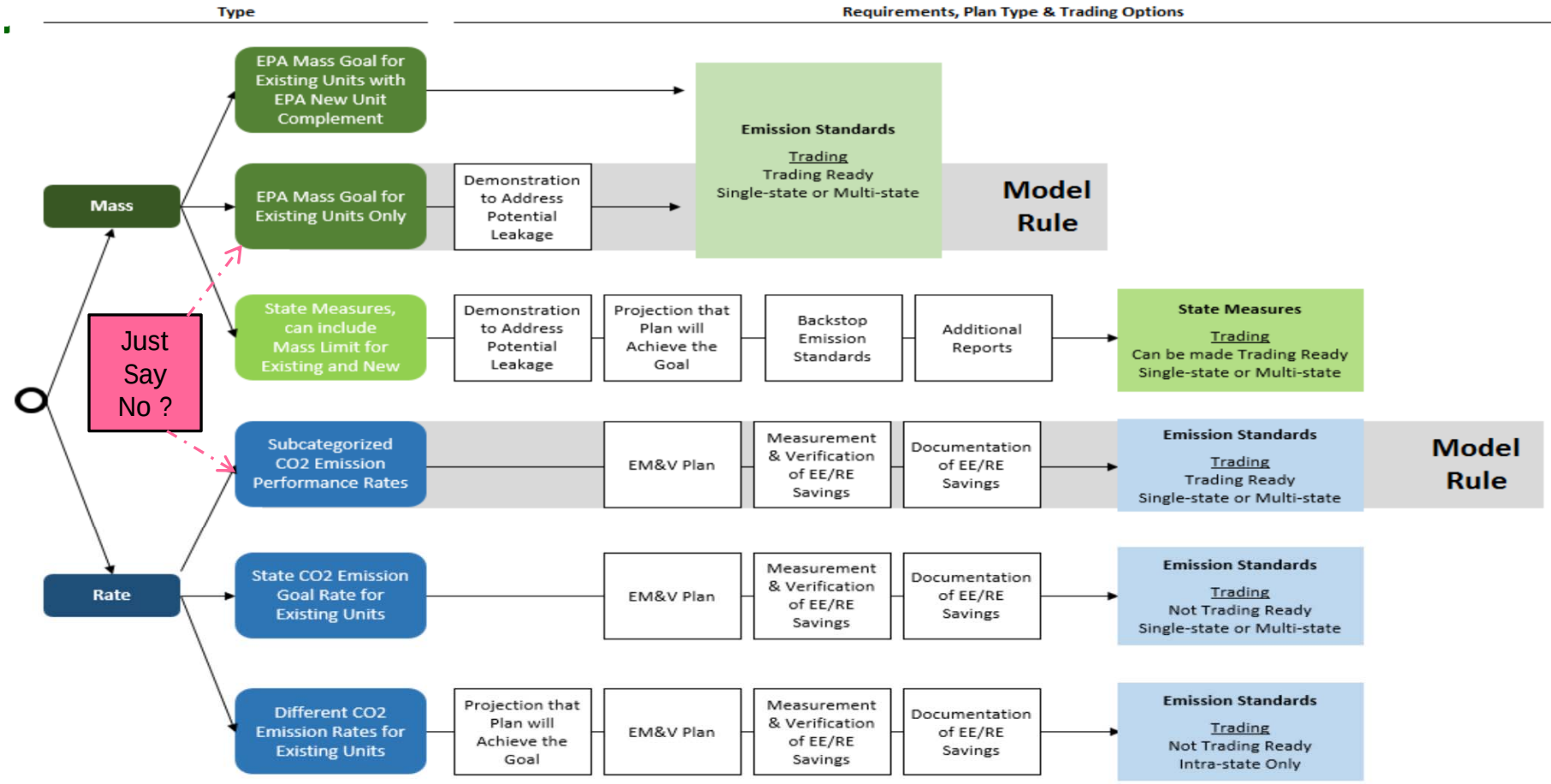
- "Trading ready" concept is popular, in part because it keeps the state's options open to allow utilities and generators to access tons or credits in another state
- State can decide to "switch on" trading when it is ready
- EPA endorsed this concept in the final rule

CPP Compliance Timeline



- EPA is encouraging early action in 2020-2021
- Interim compliance period pushed back 2 years to 2022
- Three interim steps
- Two year compliance periods for final goal

FLOWCHART of STATE PLAN APPROACH OPTIONS



WV Mass-Based Goals under proposed Federal Plan

Compliance Period	Statewide Mass Goal	Output-Based Set-Aside	RE Set-Aside	CEIP Set-Aside
Interim Period 1 (2022-2024)	62,557,024	0	3,127,851	3,506,890
Interim Period 2 (2025-2027)	56,762,771	0	2,838,139	
Interim Period 3 (2028-2029)	53,352,666	0	2,667,633	
Final Period (2030-2031, every 2 years thereafter)	51,325,342	0	2,566,267	

Initial Submittal: September 6, 2016

1. Approach(es) & Geographic Scope(s)

- States may list multiple options under consideration

2. Explanation of why state needs an extension

- For example, needing extra time for the state's legislative approval process, stakeholder engagement, or consideration of multi state plans.

3. Public Engagement Demonstration & Plan

- Certification of a hearing

**Plus a non-binding statement of intention to participate in CEIP if the state wants to preserve the option to participate*

Final Plan: September 6, 2018

Plan Approach & Geographic Scope

Inventory of Affected EGUs and Emissions

Demonstration that Plan will Meet Emission Guidelines

No projection required if state adopts the EPA specified:

1. differentiated rate,
2. state blended rate,
3. state mass goal, OR
4. state mass goal plus new source complement

Monitoring, Reporting & Recordkeeping Requirements

- For the state & for affected EGUs

Timeline and Programmatic Steps between 2018 and 2022

- Progress report due July 1, 2021

Description of Public Participation & Certification of a Hearing

Supporting Documentation & Technical Material

- Legal authority (legislation/regulation)
- Technical Documentation – incl. quantifiable, non-duplicative, permanent, verifiable, and enforceable.

2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031

Questions?

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