



IOWA DEPARTMENT OF NATURAL RESOURCES

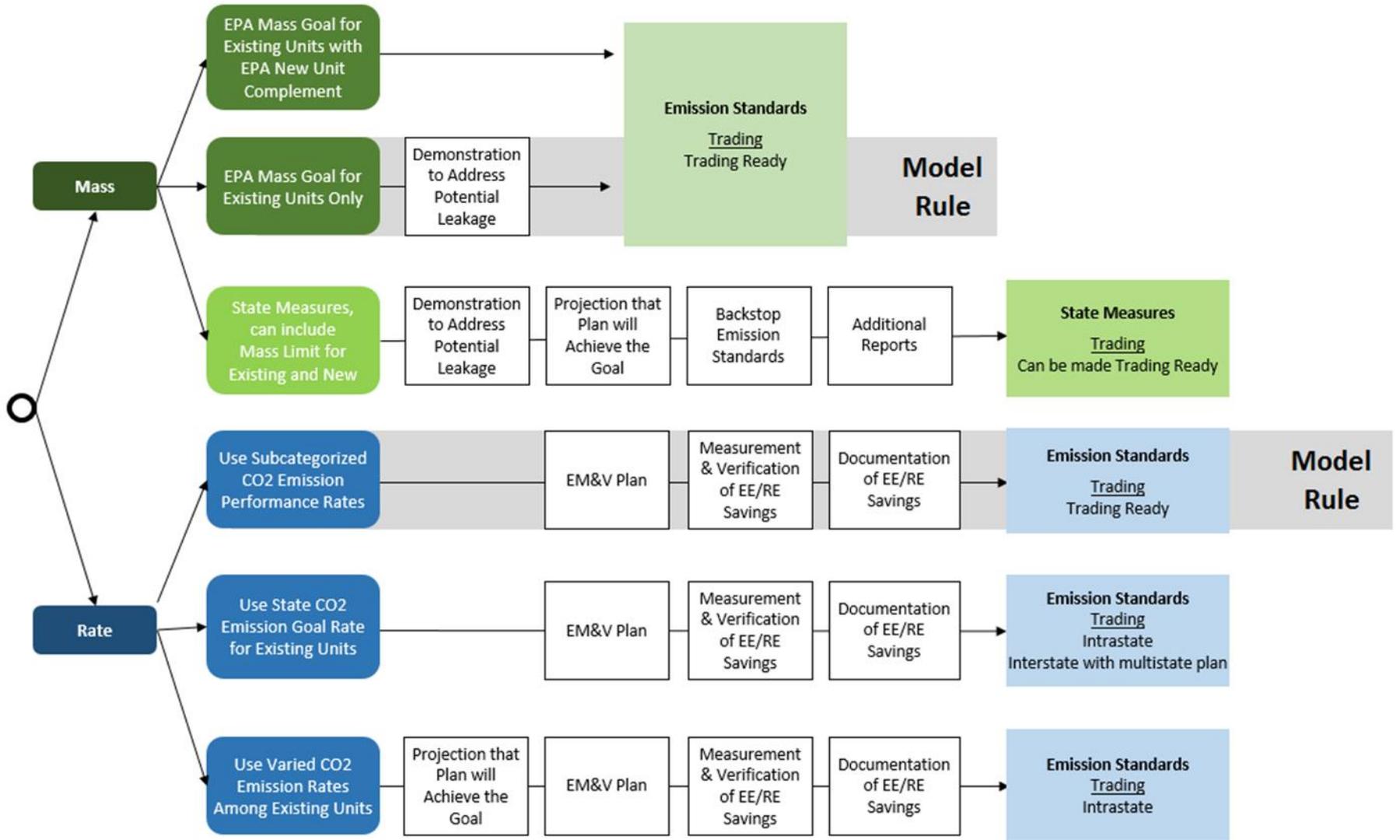
LEADING IOWANS IN CARING FOR OUR NATURAL RESOURCES

EPA's Proposed Federal Plan and Model Trading Rules

Stakeholder Meeting
Iowa DNR Air Quality Bureau
November 16, 2015

Proposed Federal Plan and Model Rules

- On August 3, 2015, EPA proposed a 111(d) federal plan and model trading rules for both mass and rate. EPA is accepting comments until January 21, 2016.
- EPA will not finalize the federal plan until a state fails to submit a state plan. EPA will finalize the same type of federal plan (rate or mass) for each state that fails to submit a federal plan or submits a plan that is not approvable.
- EPA has indicated they will finalize the model rules in mid-summer 2016.
- The model trading rules could be adopted by states as is, partially adopted, or used as a template for state plans.
- EPA is also accepting comments on several components of the Clean Energy Incentive Program (CEIP) that are included in the proposed federal plan.



Presentation Goals

1. Identify components of the proposed federal plan and proposed federal model trading rules that stakeholders may wish to comment on.
 - EPA is taking comment on virtually all design elements of plan and model trading rules.
2. Better explain the proposed model rules and identify components that Iowa may potentially include in a state plan:
 - A state plan that includes an EPA proposed model trading rule is presumptively approvable;
 - States may choose to adopt portions of a model trading rule but redesign other portions (Example – allocation of allowances);
 - States may choose to use one of the model trading rules as a template for their state plans;
 - States may use one of the federal model trading rules as the backstop in a state measures mass-based plan.

Audience Discussion Questions

- If the State of Iowa were to submit comments, what should they focus on?
- What are your thoughts on the proposed allowance set-asides?
- What are your thoughts on how retirements are proposed to be treated?

<<OPEN DISCUSSION>>

- Scenarios
- What are some of the characteristics of a rate-based plan that would drive you towards rate?
- What are some of the characteristics of a mass-based plan that would drive you towards mass?

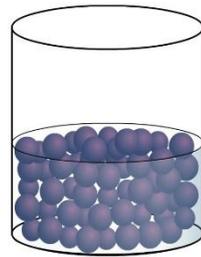
MASS

pp. 65011-65032 and pp. 65060 – 65090 (Part 62 Text) of the 10/23/15 Federal Register Notice

40 CFR 62 Subpart MMM – Mass Model Trading Rule

- State Emissions Budget = Total number of tons of CO₂ that can be emitted during a compliance period (2 or 3 years).
- Allowances are distributed one compliance period at a time:

1 allowance = 1 short ton CO₂



= allowed tons ("allowances")

- After each compliance period, affected electrical generating units (EGUs) must surrender allowances equivalent to the tons of CO₂ emitted during the compliance period.

Annual State Mass-based Emission Budgets – Total Pool

(annual amounts in short tons CO₂)*

These are annual values, so for a 3-year compliance period, you would multiply the number of allowances by 3; for a 2-year compliance period, multiply by 2.

State	Interim period			Final Period
	Step 1 2022-2024	Step 2 2025-2027	Step 3 2028-2029	2030-2031 and thereafter
Iowa	30,408,352	27,615,429	25,981,975	25,018,136
Illinois	80,396,108	73,124,936	68,921,937	66,477,157
Kansas	26,763,719	24,295,773	22,848,095	21,990,826
Michigan	56,854,526	51,893,553	49,106,884	47,554,064
Minnesota	27,303,150	24,868,570	23,476,788	22,678,368
Missouri	67,312,915	61,158,279	57,570,942	55,462,884
Nebraska	22,246,365	20,192,820	18,987,285	18,272,739
South Dakota	4,231,184	3,862,401	3,655,422	3,539,481
Wisconsin	33,505,657	30,571,326	28,917,949	27,986,988

When are Allowances Distributed & Remitted?

- EPA will allocate allowances to affected electrical generating units (EGUs) for each multi-year compliance period by June 1st preceding the beginning of the compliance period.
 - First allocation is June 1, 2021 for the 2022 – 2024 compliance period;
 - Next allocation is June 1, 2024 for the 2025 – 2027 compliance period, and so on.
- Affected EGUs must remit allowances (a.k.a. “True-up”) by May 1st of the year following the end of the compliance period.
 - First true-up is May 1, 2025 for the 2022 – 2024 compliance period;
 - Next true-up is May 1, 2028 for the 2025 – 2027 compliance period, and so on.
- If a EGU doesn’t hold enough allowances at the true-up deadline:
 - Will need to remit 2 allowances within the next year for every 1 allowance it was short;
 - Additional Clean Air Act penalties may apply.

§62.16240, §62.16325, §62.16340, §62.16375

How Does EPA Propose to Calculate the Allocations to Affected EGUs?

- The total allowance pool (minus any set-asides) will be distributed to affected EGUs based on historical generation from 2010 – 2012.
- Five-step calculation for each state:
 1. Identify annual net generation for each affected EGU from 2010-2012.
 2. Determine the average generation value for each affected EGU by averaging all (non-zero) 2010-2012 generation.
 3. Sum the average generation values to obtain the state’s “Total Average Historical Generation.”
 4. Divide each affected EGU’s average generation by the state’s total average generation.
 5. Multiply each EGU’s share of the state’s total average generation by the state’s total allowance budget (minus the set-asides) to determine how many allowances each EGU gets.
- A state operating under the federal plan, may propose its own allocation scheme as long as the state’s approach addresses leakage and includes the Clean Energy Incentive Program (CEIP) [pp. 60515-60516](#)

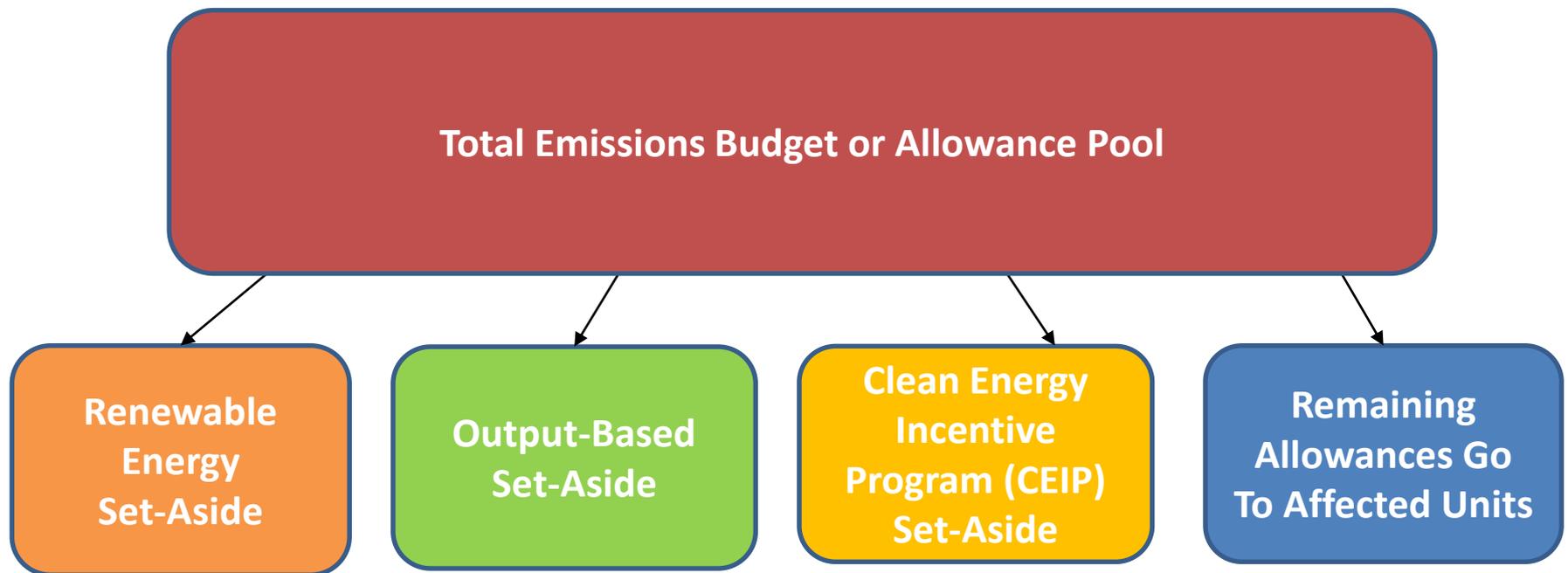
Alternate Calculation Methods

- EPA is taking comment on several other alternate methods of calculating the allowance distributions:
 - Use generation, but differentiate between steam units and natural gas combined cycle (NGCC) units
 - Multiply historic steam EGU generation by the steam emission goal
 - Multiply historic NGCC EGU generation by the NGCC emission goal
 - Based on historical heat input
 - Based on historical emissions
 - Auction
 - Allocate a portion of allowances to load-serving entities (LSE) rather than affected EGUs

pp. 65016-65019

Allowance Set-Asides

- EPA proposes that 3 “Set-Asides” of allowances be reserved from the state’s annual allowance budget (or pool) prior to allocation.
- These are like “bonuses” for increasing renewable and NGCC generation, as well as energy efficiency savings.



Set-Asides, CEIP, and Allowances Proposed for Iowa (tons)*

These are annual values, so for a 3-year compliance period, you would multiply the number of allowances by 3; for a 2-year compliance period, multiply by 2.

	Interim period			Final Period
	Step 1 2022-2024	Step 2 2025-2027	Step 3 2028-2029	2030-2031 and thereafter
Total Pool/Budget	30,408,352	27,615,429	25,981,975	25,018,136
Renewable Energy Set- Aside	1,520,418	1,380,771	1,299,099	1,250,907
Output-Based Set-Aside	0	492,510	492,510	492,510
CEIP Set-Aside	2,191,183	0	0	0
Allowances Direct to Affected EGUs	26,696,752	25,742,148	24,190,366	23,274,719

Renewable Energy Set-Aside

- The Renewable Energy Set-Aside is 5% of the each state's total allowance budget (or pool).
 - Iowa = **1,520,418 short tons** in 2022-2024 compliance period
- It helps address leakage by incentivizing renewables over building new gas units.
- Applicants must apply to EPA to request allowances from the set-aside.
 - Apply by June 1 of year prior to the generation year for which the set-aside allowances are requested.
 - Based on **projection** of the project's annual renewable energy generation in MWh.
- The number of allowances awarded will be published by December 1 of the year prior to the compliance period; 30-day comment period.

§62.16240, §62.16245

Renewable Energy Set-Aside

- Eligibility for renewable energy set-aside allowances:
 - Must be on-shore **utility scale** wind, solar, geothermal power, or **utility scale** hydropower.
 - Must be a resource that increased new installed electrical generation nameplate capacity, or new electrical savings measures installed or implemented after January 1, 2013.

and

- Located in a mass-based state for which the set-aside has been allocated;
- Connected to, and delivers energy to or saves electricity, on the electrical grid in the contiguous United States; and
- Must not have received emission rate credits (ERCs) for any period of time for which it receives set-aside allowances.

§62.16245

Output-based Set-Aside

- Begins with the Step 2 Interim Period (2025 – 2027).
- Mitigates leakage by incentivizing increased generation from existing NGCC.
- Iowa = **492,510 short tons** annually
 - Calculation is based on a state’s 2012 NGCC capacity – see *Allowance Allocation Proposed Rule TSD* in CPP Toolbox
- Only awarded to NGCC units if:
 - The affected EGU’s average capacity factor in the preceding compliance period must have been above 50 percent based on net summer capacity and net generation
 - Located in the mass-based state for which the allowance is requested.
- The number of allowances awarded will be published by November 1 of the year prior to the compliance period; 30-day comment period on calculations.

[§62.16240](#), [§62.16245](#)

Clean Energy Incentive Program (CEIP) Set-Aside

- EPA will participate in the CEIP on behalf of any state operating under the federal plan.
- Fewer types of projects are eligible for the CEIP under a federal plan versus a state plan:
 - Metered on-shore wind power
 - Metered solar power
 - Demand-side energy efficiency in low-income communities
- Must commence construction (RE) or implementation (EE) after September 6, 2018 for states under federal plan.
- Total allowance pool of 300 million short tons of CO₂ emissions for all states, regardless of whether they are under federal or state plan.
 - Iowa = **2,191,183 short tons** annually
- Same award rates under both state and federal plans – 1 MWh add'l. credit for every 2 RE MWh generated, 2 MWh add'l. credit for 1 MWh EE savings. **§62.16231**

Surpluses, Over-Subscription, Banking and Borrowing

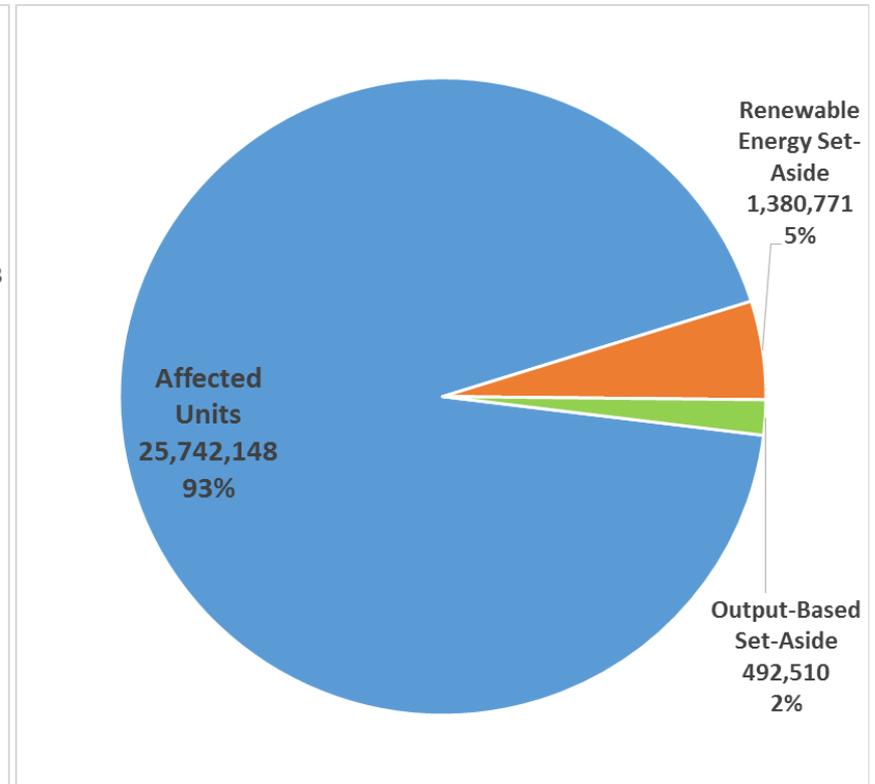
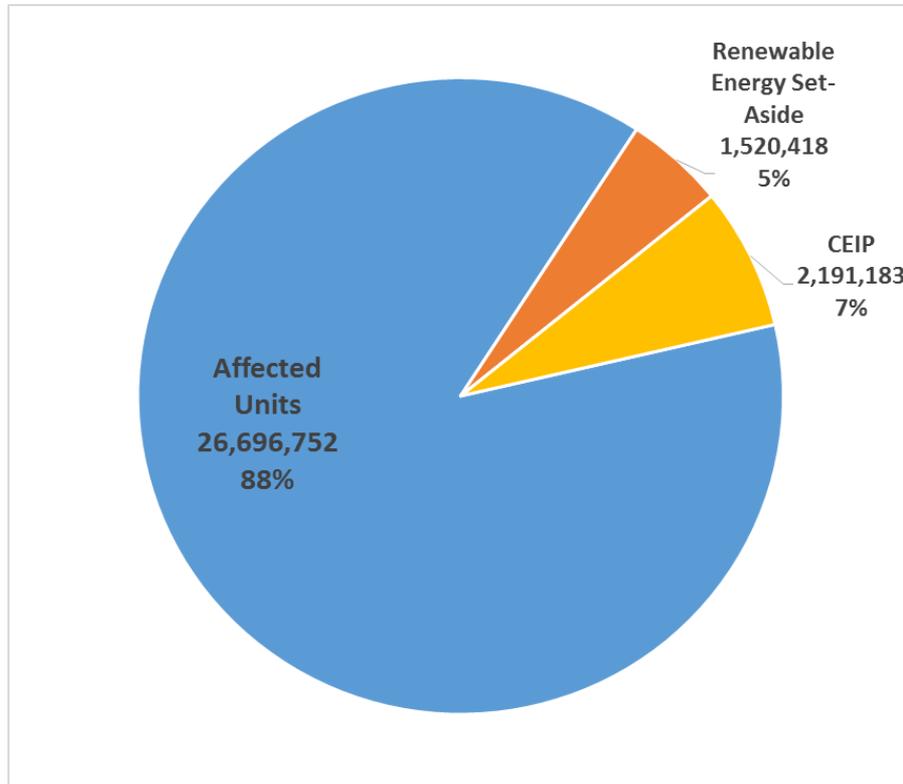
- Surplus renewable energy and output-based allowances will be distributed in a pro rata fashion to affected EGUs (i.e. RE set-aside that no one applies for).
- If the generation eligible for the output-based set-aside exceeds the set-aside limit (aka over-subscribed), the set-aside will be allocated to eligible generation on a pro-rata basis.
- The proposal does not discuss what happens if the renewable set-aside is over-subscribed.
- Extra allowances **may** be banked for use in any future period.
- Allowances **may not** be borrowed from a future compliance period.

[§62.1240](#), [§ 62.16350](#), pp. 65011-65012, p. 65022

EPA's Proposed Annual Allocations for Iowa under the Proposed Mass Trading Rule

2022-2024

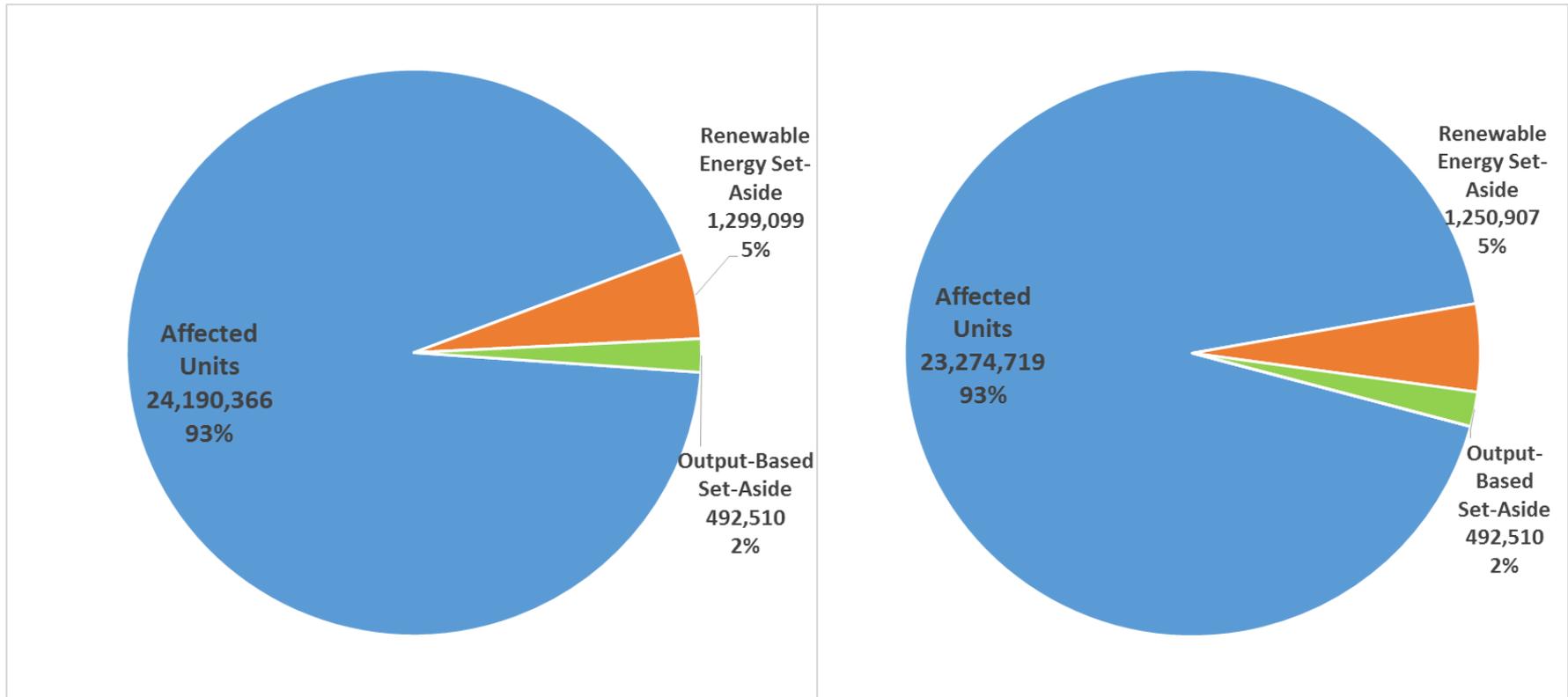
2025-2027



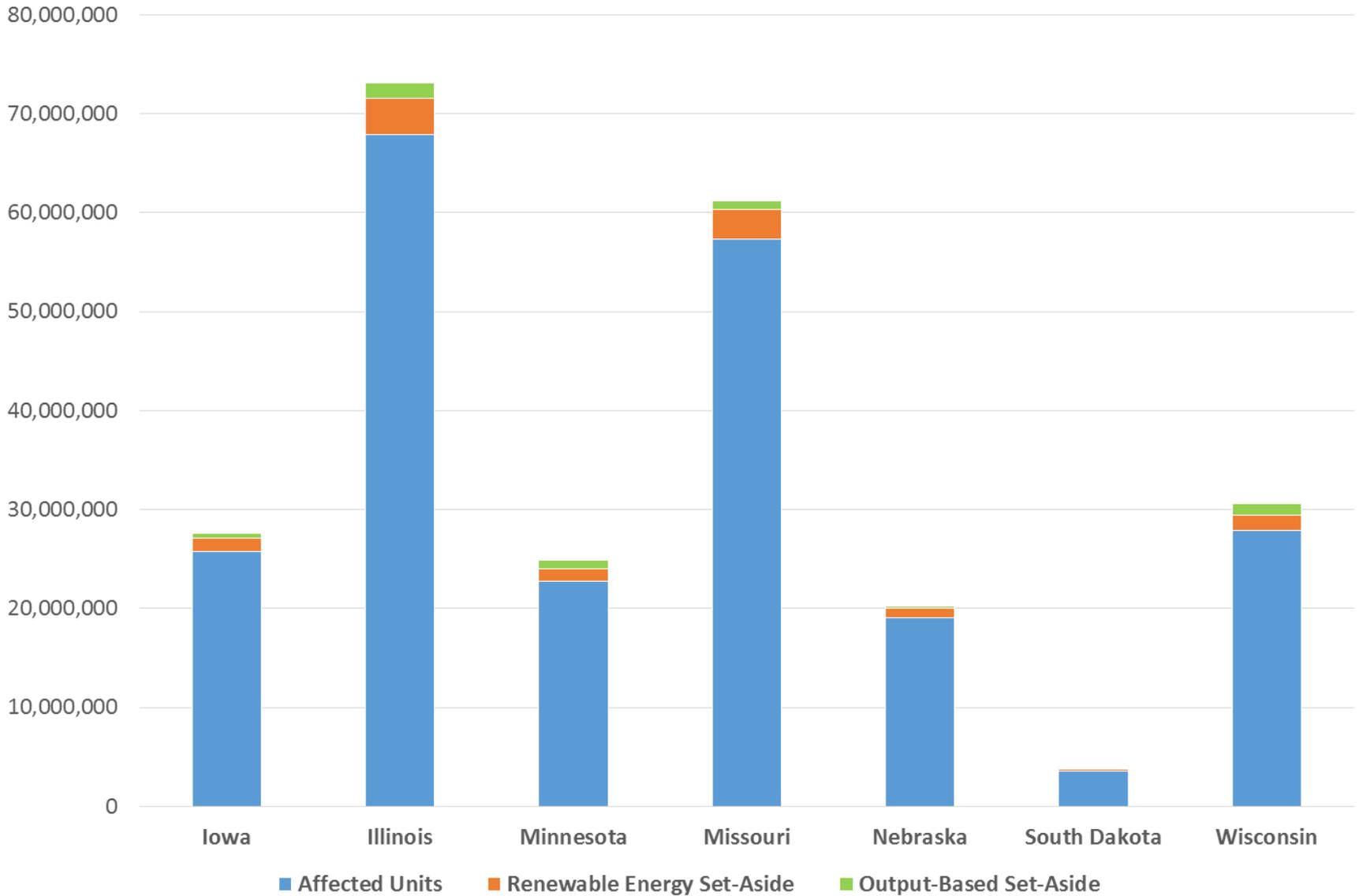
EPA's Proposed Annual Allocations for Iowa under the Proposed Mass Trading Rule

2028-2029

2030-2031 and subsequent periods



Proposed Annual Allocations (tons) 2025 - 2027



How Retirements Are Treated

- If an affected EGU which is provided an allocation does not operate for 2 consecutive years, then the EGU will not be allocated any allowances in the next compliance period for which allowances have not yet been recorded and for all subsequent compliance periods.
- The allowances that would have been awarded will be allocated to the renewable energy set-aside.
- The same procedure will be used for any affected EGU that is modified or reconstructed such that it is no longer subject to 111(d).

Example: An EGU operating 1960-2021, but shuts down in November 2022.

- It will receive allowances on June 1, 2021 for the 2022 – 2024 compliance period.
- It should have extra allowances to sell before the May 1, 2025 true-up.
- It will not be awarded any allowances on June 1, 2024 for the 2025 -2027 compliance period, or any compliance period after that.
- The allowances it would have received go to the RE set-aside. [§62.16240](#)

Key Mass Trading Rule Takeaways

- EPA has proposed addressing leakage by including three allowance set-asides in the model mass trading rule.
- If a state adopts EPA's model mass trading rule into its state plan as written, that portion of the state's plan is presumptively approvable.
- However, states have the flexibility to design their own allocation methods in a state-designed plan, as well as opt out of the CEIP.
- The methods used to allocate allowances will be a critical portion of any mass-based state plan.



Questions on the Proposed Mass Trading Model Rule?



RATE

pp. 64989-65011 and pp. 65090 – 65115 (Part 62 Text) of the 10/23/15 Federal Register Notice

40 CFR 62 Subpart NNN – Rate Model Trading Rule

- Each affected EGU must meet a rate-based emission standard. The federal plan uses the subcategory rates:

	Performance Rates (lbs./MWh)			
Technology	2022-2024	2025-2027	2028-2029	Final Rate
Steam	1,671	1,500	1,380	1,305
NGCC	877	817	784	771

- EGUs either need to emit at or below their rate-based emission standard, or need to acquire emission rate credits (ERCs) to achieve compliance.
- An ERC is a tradable compliance unit representing one MWh of electric generations (or reduced electricity use) with zero associated CO₂ emissions.

Who Can Emission Rate Credits (ERCs) be Issued To?

- Under the proposed federal plan, ERCs will be issued by EPA to four types of entities:
 1. Affected units that perform at a rate below the applicable rate-based emission standard;
 2. Affected NGCC units for all generation (represents shifting generation from steam to NGCC per Building Block 2);
 3. New or up-rated nuclear generation;
 4. Renewable energy providers that meet certain criteria.
- EPA is taking comment on a potential fifth entity type:
 5. Low- and zero-emitting non-BSER* measures.
- The responsibility for the validity of the ERC rests with the affected EGU.

pp. 64990 – 64991

Renewable Energy Resources Eligible to Receive Emission Rate Credits (ERCs) Under a Federal Plan

- Resources installed or implemented after January 1, 2013.
- Only generation or energy savings starting in 2022 qualifies.
- Connected to the electrical grid.
- Fewer resources are eligible to receive ERCs under the federal plan than in a state plan.

Eligible Resources in a Federal Plan	Non-Eligible Resources in a Federal Plan, but Eligible in a State Plan	
Geothermal	Carbon Capture & Sequestration	Qualified Biomass
Hydro	Combined Heat and Power	Transmission & Distribution
Nuclear	Demand-side Energy Efficiency	Waste-to-Energy
Solar	Distributed Generation	Wave & Tidal
Wind	International Renewables	

How Many ERCs do I need to Comply?

- The number of ERCs generated or needed for surrender by an affected EGU is based on the actual CO₂ operating emission rate of the EGU compared to the emission standard.

$$ERCs = \frac{(EGU \text{ Standard} - EGU \text{ Operating Rate})}{EGU \text{ Standard}} * EGU \text{ Generation}$$

If the answer to the equation is a negative number, that indicates that ERCs will need to be acquired to comply.

- **Example: A steam EGU operating in the second compliance period.**
 - It is subject to a 1,500 lbs. CO₂/MWh standard.
 - Its emission rate during the compliance period is 2,000 lbs./MWh.
(2 billion lbs. of CO₂ emitted and 1 million MWh electricity generated)

$$ERCs = \frac{(1,500 - 2,000)}{1,500} * 1,000,000 = -333,334$$

= 333,334 ERCs needed to comply

How Many ERCs do I Need to Comply?

- **Example: A NGCC EGU operating in the final compliance period.**
 - It is subject to a 771 lbs. CO₂/MWh standard.
 - Its emission rate during the compliance period is 850 lbs./MWh.
(850 million lbs. of CO₂ emitted and 1 million MWh electricity generated)

$$ERCs = \frac{(771-850)}{771} * 1,000,000 = -102,464$$

The EGU needs to acquire 102,464 ERCs to comply with the emission standard.

Gas-Shift or GS-ERCs

- Building Block 2 of the BSER* determination in the 111(d) Emission Guidelines describes shifting generation from steam EGUs to NGCC EGUs because NGCC EGUs generate electricity at a less carbon-intensive rate.
- Building Block 2 describes NGCC EGUs operating at 75% capacity.
- **Incremental Generation** = Every hour of electricity generated by an NGCC EGU beyond its 2012 baseline
 - NGCC generation in Iowa was at 12% capacity in 2012
- For every hour of incremental generation, there is a corresponding emission reduction in the power system. EPA proposes to award credits for this.
 - For every hour that an NGCC EGU generates electricity, it will also generate partial credit associated with the shift from fossil steam to NGCC. This will be called a **Gas-Shift ERC or GS ERC.**

[pp.64991](#)

Gas-Shift or GS-ERCs

- NGCC plants can earn GS-ERCs that they can sell to steam plants.
- NGCC plants cannot use GS-ERCs for their own compliance. They must use “regular” ERCs for their own compliance.
- In general, NGCC plants will both earn GS-ERCs and purchase “regular” ERCs.

Gas-Shift or GS-ERCs

The number of GS-ERCs that a NGCC unit generates is a combination of 3 factors:

1. The GS-ERC Emission Factor

This represents how much better an individual NGCC's emission rate is compared against the fossil steam standard.

$$GS - ERC \text{ Emission Factor} = 1 - \frac{NGCC \text{ Emission Rate}}{Steam \text{ Standard}}$$

2. The Incremental Generation Factor

This represents the distribution for the increased NGCC Generation across all NGCC generation.

$$Incremental \text{ Generation Factor} = 1 - \frac{Regional \text{ 2012 NGCC Baseline}}{75\% \text{ NGCC Regional Capacity}}$$

3. The NGCC Unit's Generation

Incremental Generation Factor			
2022 - 2024	2025- 2027	2028- 2029	2030- 2031
0.22	0.32	0.28	0.26

Gas-Shift or GS-ERCs

- These three factors join together to make the following equation to calculate the number of GS-ERCs generated by a NGCC unit:

$$GS-ERCs = NGCC\ Generation * Incremental\ Generation\ Factor * GS-ERC\ Emission\ Factor$$

Example: A NGCC unit with an emission rate of 850 lbs./MWh in 2030. It will generate the following GS-ERCs:

$$GS - ERC\ Emission\ Factor = 1 - \frac{NGCC\ Emission\ Rate}{Steam\ Standard}$$

$$GS - ERC\ Emission\ Factor = 1 - \frac{850}{1305} = 0.35$$

$$GS-ERCs = 1,000,000 * 0.22 * 0.35 = 77,000\ GS-ERCs\ earned$$

- The NGCC unit can then sell these ERCs to steam units. They can not use them for their own compliance.
- **Note: the numbers the EPA uses in its example on p. 64993 are incorrect. The correct values are listed in the *Gas-Shift ERC TSD* in the CPP Toolbox.**

pp. 64991-66494

The ERC Issuance Process

1. Project applies for eligibility to the “Credits Desk.”
 - Requires 3rd party verification
2. Credits Desk says no or yes it’s eligible.
3. Project submits application for ERCs, including measurement & verification of # of ERCs generated.
 - Requires 3rd party verification
4. Credits Desk issues ERCs.
5. ERCs are bought, sold and transferred.
6. Affected EGUs surrender ERCs for compliance by November 1 of the first year following the compliance period.
 - ERCs may be banked for future years.



Credits Desk

§62.16445, 62.16545

Trading

- Both the proposed federal plan and model trading rules are “trading ready.”
- Trading between states that are not under the Federal Plan or using the model rules as written requires linkage.
 - Good topic for future stakeholder meetings.
 - Refer to the Final 111(d) Emission Guidelines:
 - Sec. 8.J.3 – “Multi-State Coordination: Mass-Based Emission Trading Programs” starting on p. 64892
 - Section 8.K.4 – “Multi-State Coordination: Rate-Based Emission Trading Programs” – starting on p. 64910

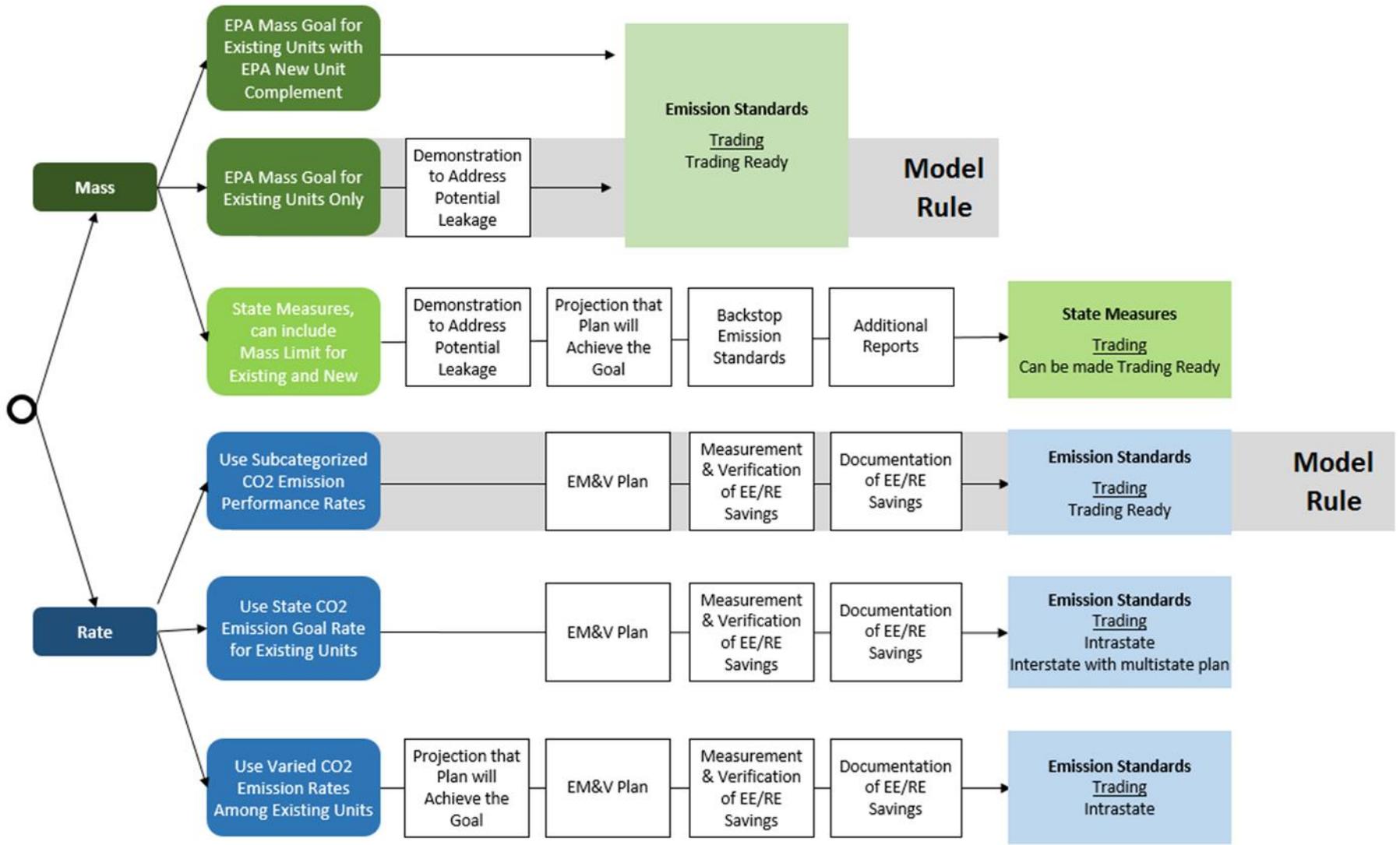
What We Didn't Cover

- Tracking Systems
- Requirements for:
 - Designated Representatives
 - Evaluation Measurement and Verification (EM&V)
 - More robust for rate trading than mass trading
 - Monitoring, Recordkeeping and Reporting
 - Reporting, Notification and Submission
- Processes for adjusting allowances and ERCs:
 - Revocation of Eligible Resources
 - Error Corrections
 - Suspensions
 - Misstatements

Key Rate Trading Rule Takeaways

- Rate-based trading is a newer concept that introduces new ideas such as ERCs, gas-shift ERCs, etc.
- If a state adopts EPA's model rate trading rule into its state plan as written, that portion of the state's plan is presumptively approvable.
- Fewer resources qualify for ERCs in the proposed federal plan and model rate trading rule than in the final emissions guidelines. However, states have the flexibility to determine what types of resources are eligible to earn ERCs in a state-designed plan, as well as opt out of the CEIP.
- Leakage does not need to be addressed in a rate-based plan.





Questions on the Proposed Rate Trading Model Rule?



For More Information

Marnie Stein
111(d) Project Manager
Marnie.Stein@dnr.iowa.gov
515-725-9555

DNR Website:

www.iowadnr.gov/111d

EPA Clean Power Plan Website:

www2.epa.gov/carbon-pollution-standards

EPA CPP Toolbox:

www2.epa.gov/cleanpowerplanttoolbox

Audience Discussion Questions

- If the State of Iowa were to submit comments, what should they focus on?
- What are your thoughts on the proposed allowance set-asides?
- What are your thoughts on how retirements are proposed to be treated?

<<OPEN DISCUSSION>>

- Scenarios
- What are some of the characteristics of a rate-based plan that would drive you towards rate?
- What are some of the characteristics of a mass-based plan that would drive you towards mass?

Follow-up From September: Using Existing Wind to Comply in a Rate-based Plan

Hypothetical Example:

A coal-fired unit emits 230,000,000 pounds of CO₂ during the compliance period, generates 100,000 MWh of net electricity and needs to meet an emission standard of 1,150 lbs/MWh.

- The EGU's operating rate = $\frac{(230,000,000 \text{ lbs.})}{(100,000 \text{ MWh})} = 2,300$

$$ERCs = \frac{(EGU \text{ Standard} - EGU \text{ Operating Rate})}{EGU \text{ Standard}} * EGU \text{ Generation}$$

$$ERCs = \frac{(1,150 - 2,300)}{1,150} * 100,000$$

$$ERCs = -100,000$$

If the answer to the equation is a negative number, that indicates that ERCs will need to be acquired to comply.

The unit needs 100,000 ERCs to comply with the 1,150 lbs./MWh standard.

Using ERCs to Achieve Compliance

What if our hypothetical EGU had added 20% wind in 2007?

- 20% wind = 6 MW * 8760 hrs/yr * 0.38 capacity factor = approx. 20,000 MWh
- Assume that the wind displaced generation and emissions from coal.
- The EGU's operating rate = $\frac{(230,000,000 \text{ lbs.} * 0.80)}{(100,000 \text{ MWh} * 0.80)} = 2,300$

$$ERCs = \frac{(1,150 - 2,300)}{1,150} * 80,000$$

$$ERCs = -80,000$$

The unit needs 80,000 ERCs to comply with the 1,150 lbs./MWh standard, where it would have needed 100,000 ERCs if it hadn't added the wind in 2007.