The Clean Power Plan:
Key Choices in the Proposed Model Rules and Federal Plan(s)

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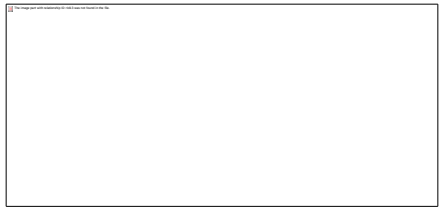

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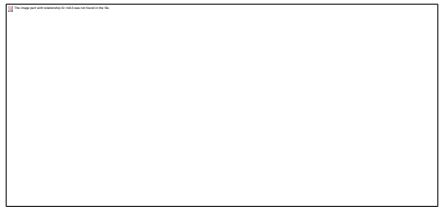
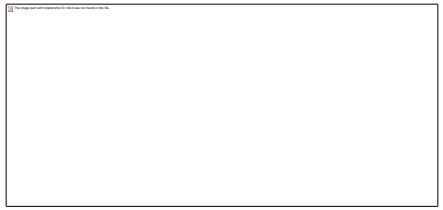


Agenda

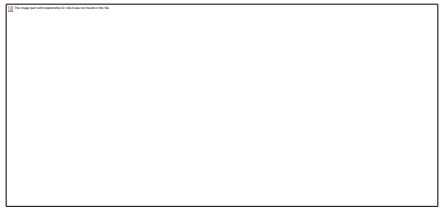
- Brief Overview
- Mass-Based Model Rule
  - Key Policy Choices
- Rate-Based Model Rule
  - Key Policy Choices
- Cross-cutting Issues



Overview

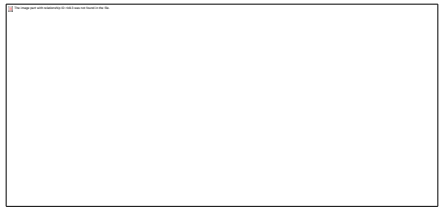
- EPA proposed mass- and rate-based model rules and federal plans, which would implement the model rules with some differences
- EPA intends to finalize both model rule(s) before the first state submission in September.
- EPA currently intends to finalize a single approach for the federal plan (mass or rate) and to not finalize a federal plan unless/until applying it to a state.

MASS-BASED MODEL RULE & FEDERAL PLAN



Mass-Based Model Rule & Federal Plan

- Covers Existing Units Only
- Implements a Mass-Based Trading System
  - Is “Trading Ready”



Mass Based Trading Basics

Affected Units




= X tons?

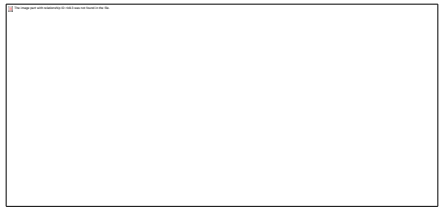
Policy creates # of allowances in each compliance period = total emissions budget

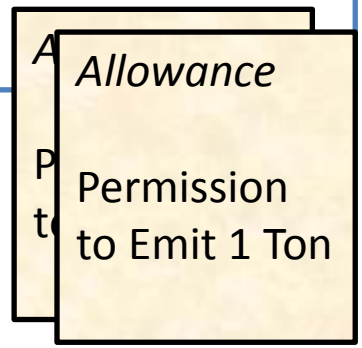
1 allowance = 1 (short) ton of emissions

Establish tracking system & method of getting allowances into market

To comply: Affected units measure their emissions in each compliance period

Must surrender 1 allowance for every ton emitted

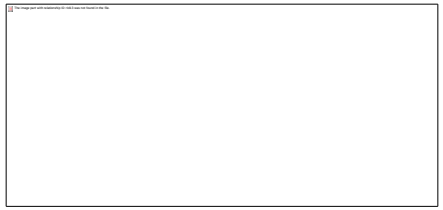




Mass-Based Model Rule & Federal Plan

- **Budget?**
  - EPA-defined **existing units only** interim and final budgets
- **What trades?**
  - 1 allowance = 1 short ton
- **Allowances Accepted for Compliance?**
  - Issued by a state (or EPA) with a similar, approved, trading ready plan
- **Tracking?**
  - EPA *Allowance Tracking and Compliance System*
- **Allowance Allocation?**
  - Most allowances allocated to EGUs based on historic *generation* 2010-2012
  - Three set-asides for Clean Energy Incentive Program, Output Based Allocation to NGCC,* Renewable Energy*

**part of leakage demonstration*

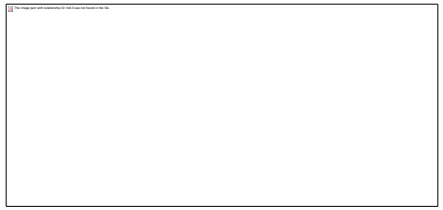


Allowance Distribution in Mass-Based Plans

States have discretion to distribute allowances, so long as leakage is adequately addressed.

Some possible goals for allowance distribution:

- Protect or benefit ratepayers/consumers
- Fairly distribute regulatory obligation
- Encourage specific outcomes or activities (e.g. encouraging certain plants to run or investments in energy efficiency, renewable energy)



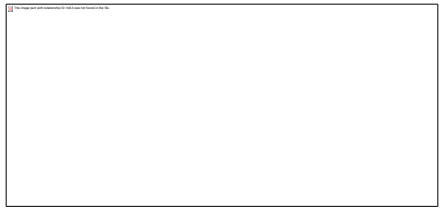
Mass: Alternative Ways to Distribute Allowances

Common Options	Rationale	Examples
ALLOCATE FOR FREE		
* **"Grandfathering"**: Given to all emitters based on historic emissions (or generation)	Political buy-in for owners of initial emitting assets	Early yrs of EU ETS Other pollutant ETS (acid rain) Nox (heat input)
* **Output-based (updating):** Given free to emitters in proportion to their ongoing generation levels	Mitigate leakage to uncapped sources	NOx trading program California C&T for (trade-exposed) industrial sectors
* **Setasides** for targeted activities (e.g., renewables, energy efficiency) or populations (rate-payers), price containment	Way to finance, e.g., low carbon investment, lessen burden on rate-payers	Waxman-Markey bill provisions Cal. Set aside for LSE's on behalf of ratepayers CA and RGGI cost containment reserves
COMPETITIVE AUCTION		
Government auction with targeted proceeds to types of households, investments,…	Address disproportionate impacts Finance low carbon investment	RGGI poor household EE VA NOx
Government auction with use of revenues to **reduce taxes**	Fiscal reform Political buy-in	British Columbia (carbon tax, not ETS)

*** CPP proposed federal plan has dimensions of these options**

Mass Allowance Allocations

- EPA proposes that states could replace EPA allowance allocations in a federal plan through a partial submittal
- If EPA is distributing allowances, they propose to do this primarily based on each affected EGU's share of historical (2010-2012) generation ("grandfathering")
- EPA is taking comment on other distribution options: future generation, heat rate, historic emissions, delivered to Load Serving Entities, auction, etc.*



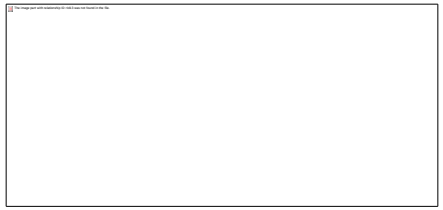
Set-Asides in Model Rule/Federal Plan

1. Clean Energy Incentive Program

2. Updating output-based allocation set-aside to address leakage

3. RE set-aside to address leakage
   - Requests comment on an energy efficiency set-aside

EPA requests comment on all aspects of the set asides, including the theory and rationale underlying these set asides other possible set-asides to address leakage including an energy efficiency set-aside.

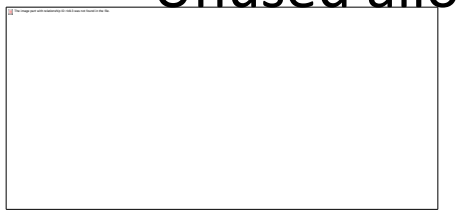


Proposed Updating Output-Based Allocation Set-Aside for Existing NGCC

- Size of set-aside for each state = 10% of the adjusted baseline NGCC capacity in the state * hours in a year * 1030 lbs/MWh-net (NGCC new source standard)
- ~7% of final budget for Arkansas

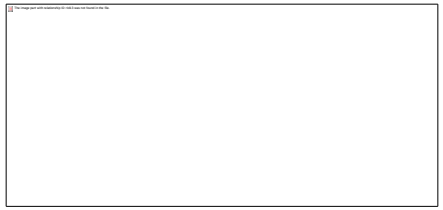
Allowances to existing NGCC unit	**=**	**Net Generation over 50%**	*****	**1030 lbs/MWh-net**

- Lagged accounting
- If not enough allowances, distributed pro-rata
- Unused allowances return to primary pool



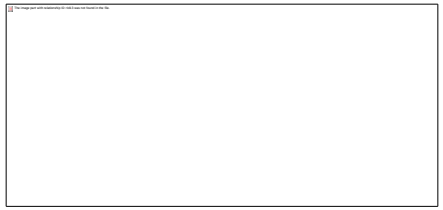
Proposed Updating Output-Based Allocation Set-Aside for Existing NGCC

- Key parameters:
  - Size of the set-aside?
  - Which EGUs should be eligible? (Only existing affected NGCC? Also steam? Also zero emitting resources?)
  - What generation should be eligible (marginal, all)?
  - Timing?
  - Allocation rate?



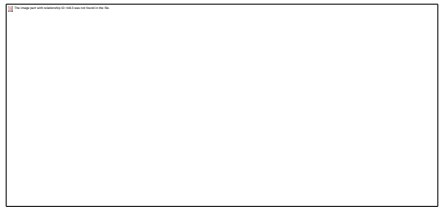
Proposed Renewable Energy Set-Aside

- Size of the set-aside for each state = 5% of allowances in every compliance period (requests comment on 1-10%)
- Eligible projects are the same as for ERC issuance in a federal plan (on-shore wind, solar, hydro, geothermal with a revenue quality meter)
- The EPA is taking comment on inclusion of demand-side EE, CHP WHP, biomass, and incremental nuclear*

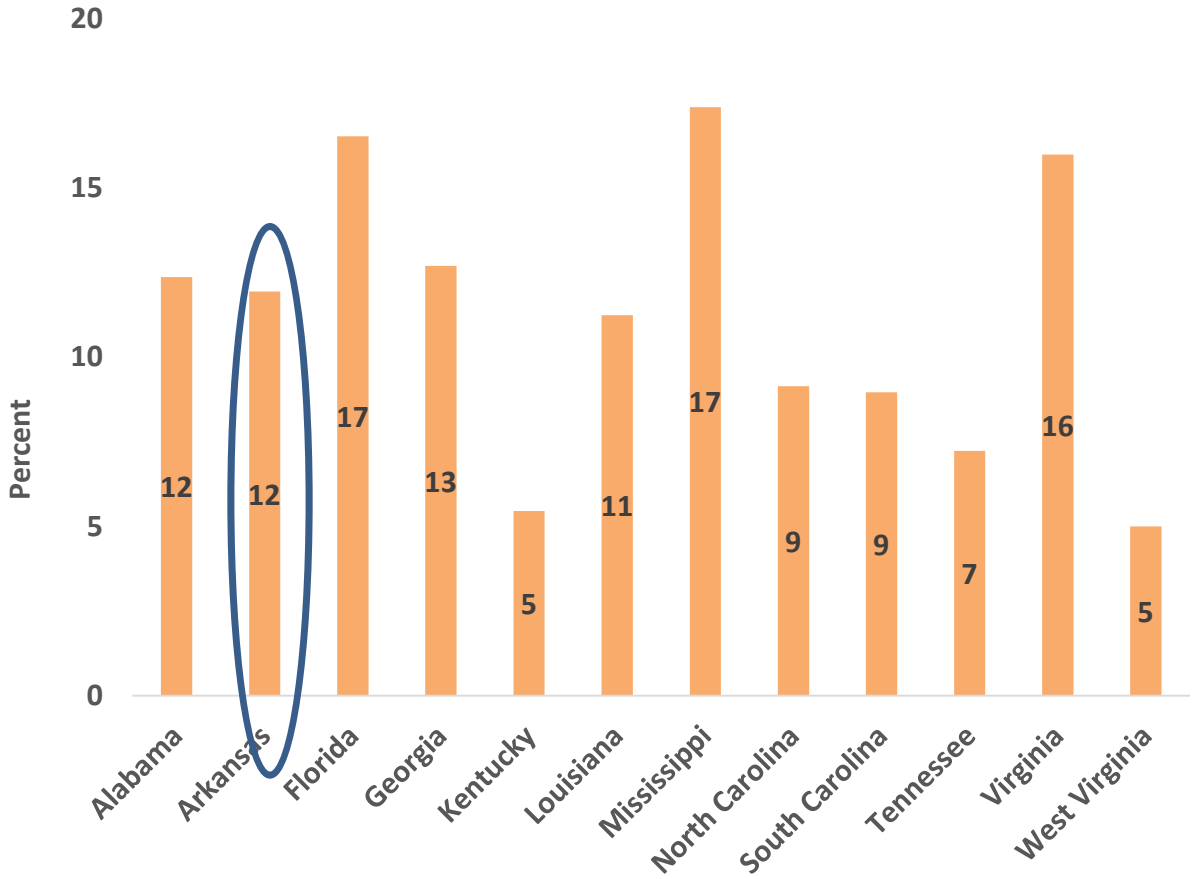


Proposed Renewable Energy Set-Aside

- Key parameters:
  - Size of the set-aside?
  - Which resources should be eligible?
  - Timing?
  - EMV requirements?



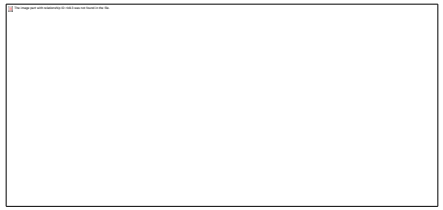
Size of Set-Asides to Address Leakage as Percentage of Final State Budgets



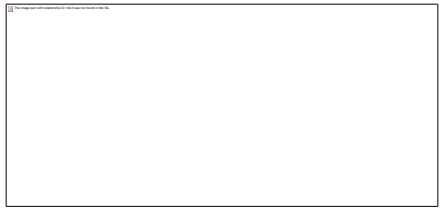
- Renewable energy set-aside comprises 5% of allowances in every period
- Updating OBA set-aside is fixed based on 10% of adjusted baseline NGCC capacity
- Nationally, total allowances in the set-asides range from 5-31% of state budget

Compliance

- EPA proposes to track allowances using its existing Allowance Tracking and Compliance System (ATCS)*
- If an EGU falls short, must surrender 2 allowances for every 1 allowance they are short
- Allowances can be banked with no restrictions*
- Allowances cannot be borrowed

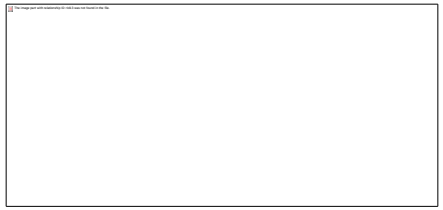


RATE-BASED MODEL RULE & FEDERAL PLAN



Rate-Based Model Rule & Federal Plan

- Applies Subcategorized Rates
- Implements a Rate-Based Trading System
  - Is “Trading Ready”



Rate Based Trading Basics

Affected Unit

Measure:
lbs of CO_2 & output (MWh)

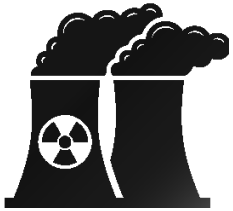
Lbs/MWh = unadjusted rate

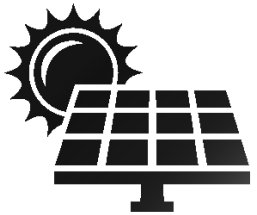
Below standard → Earn ERCs
Above standard → owe ERCs

$

ERCs

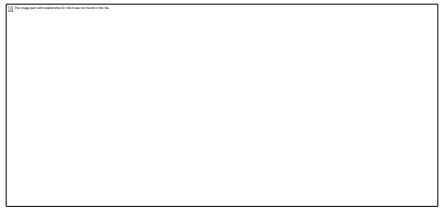
ERC Eligible Resources





Rate-Based Model Rule

- **Rate?**
  - EPA-defined **subcategory-specific** interim step and final rates
- **What trades?**
  - 1 ERC = 1 MWh with zero emissions
- **ERCs Accepted for Compliance?**
  - Issued by a state (or EPA) with a similar, approved, trading ready plan
- **Tracking?**
  - EPA *Allowance Tracking and Compliance System*
- **ERC Issuance?**
  - By the State (or EPA) to:
    1. Affected units that beat their rate
    2. All existing gas units (Gas-Shift ERCs to be used by steam)
    3. Nuclear, Renewables & Energy Efficiency with third party verification

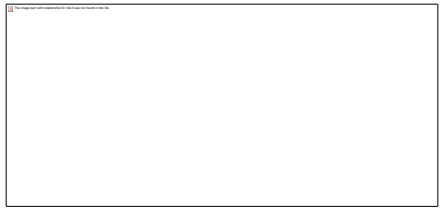


Emission Rate Credits (ERCs)

Key ERC provisions in the proposed model rule/federal plan:

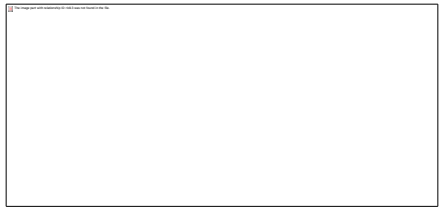
- **Gas-Shift ERC Equation** – that would be used in a federal plan or could be used by a state (model rule)

- **Zero emitting resources –** that would be issued credits by EPA in the event of a rate-based federal plan
  - **EM&V requirements** – for zero emitting resources
  - Draft guidance also has a comment deadline of Jan. 21



Gas-Shift ERCs

- Intended to incentivize the shift from steam to NGCC that is part of the best system of emission reduction
- As proposed, awarded on a partial basis to **all generation from existing NGCC**
- More efficient (lower emitting) NGCC units earn more credits as proposed

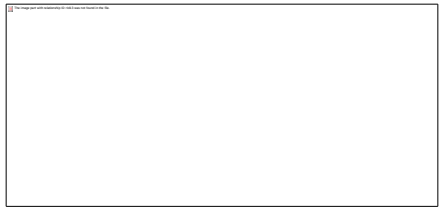


Gas Shift-ERC Equation

GS-ERCs = NGCC Unit Generation * Incremental Generation Factor * GS-ERC Emission Factor

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

EPA Calculated Incremental Generation Factors by Compliance Period			
Period 1: 2022-2024	Period 2: 2025-2027	Period 3: 2028-2029	Final
0.22	0.32	0.28	0.26



Zero-Emitting ERCs

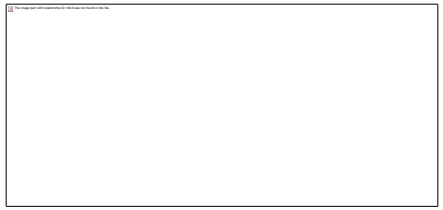
Federal Plan proposal*

- Wind
- Solar
- Geothermal
- Hydropower
- New/uprate nuclear

- *With data from a revenue quality meter*

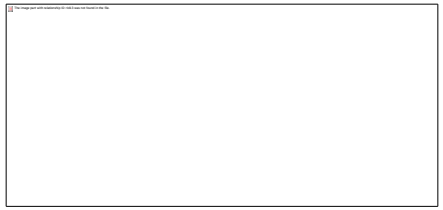
Model Rule proposal

- All wind
- All solar (including distributed)
- Geothermal
- Hydropower
- Qualified biomass*
- Wave
- Tidal
- Waste-to-energy
- New/uprate nuclear
- Non-affected combined heat and power*
- Demand-side energy efficiency/ demand-side management

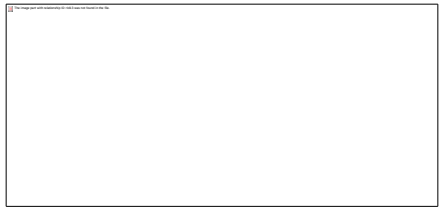


Compliance

- Similar to mass-based plans, the proposed penalty is 2 ERCs for every 1 ERC that an EGU failed to hold
- There is unlimited banking of ERCs.
- Borrowing of ERCs from the future is not allowed.



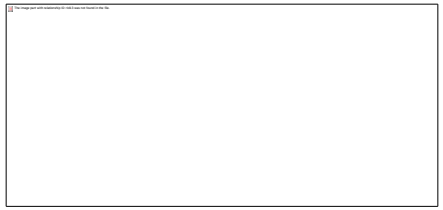
CROSS-CUTTING ISSUES



Scope of Trading with Federal Plan

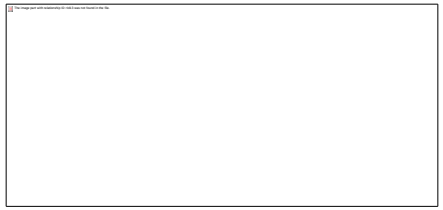
Current proposal is that any states with a federal plan could trade with states using the EPA tracking system.

Alternatively could also allow trading with states using a linked tracking system



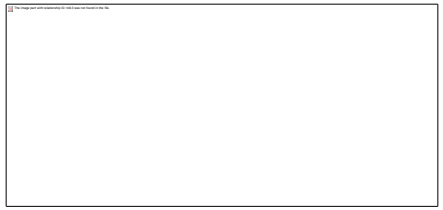
Clean Energy Incentive Program

- Both the Federal plan and model rules include the CEIP
- Any state could opt out of CEIP in the model rule, but not the federal plan as proposed
- EPA wants to maintain stringency for the state-portion of ERCs, similar to pulling forward allowances in a mas-based plan
  - *Has requested comment on how to do this in rate-based federal plan/model rule, including retiring ERCs or adjusting the targets*



Treatment of Biomass

- Specify a list of pre-approved biomass fuels eligible for ERCs (rate) and/or allowance set asides (mass)?
- Create process for adding additional feedstocks?
- Process for EGUs to demonstrate feedstock complies and other EM&V requirements?



Thank you

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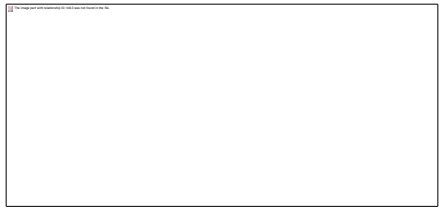
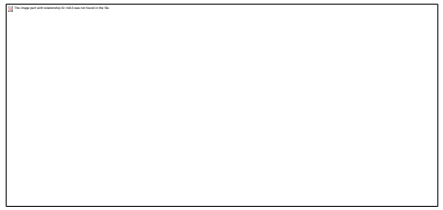
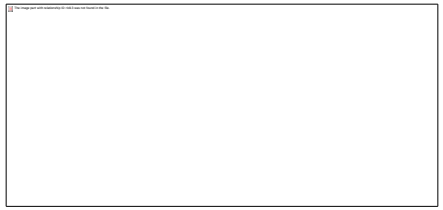


APPENDIX SLIDES



GS-ERCs: EPA's Primary Proposal

- ***All*** **NGCC MWhs generate *partial* GS-ERCs**
  - "The EPA is proposing to reflect the emission reductions of BB2 **by crediting all NGCC generation on a pro-rata basis that reflects expected incremental NGCC generation to 75 percent capacity.** This means that for every hour that an NGCC generates electricity, it will also generate a partial credit associated with the generation shift from fossil steam to NGCC units." (at page 132 of proposed federal plan)
  - "The collective sum of the GS-ERCs generated realizes the amount of emission reductions described in BB2 when 75 percent capacity is achieved." (at page 133)



GS-ERCs: EPA's Primary Proposal

GS ERCs = NGCC Generation x Incremental Generation Factor x GS-ERC Emission Factor

1 **GS ERC Emission Factor** = 1 – (NGCC Emission Rate/Steam Standard)

2 **Incremental Generation Factor:** *Calculated by EPA for each compliance period.*

= 1 – (Regional 2012 NGCC Baseline/75% NGCC Regional Capacity for Least Stringent Region)

Proposed Incremental Generation Factors			
2022-4	2025-7	2028-9	2030-1 →
0.22	0.32	0.28	0.26

3 **NGCC Generation:** Unit's total net energy output for the year

GS-ERCs: EPA's Primary Proposal

GS ERCs = NGCC Generation x Incremental Generation Factor x GS-ERC Emission Factor

1 **GS ERC Emission Factor** = 1 – (**NGCC Emission Rate**/Steam Standard)

2 **Incremental Generation Factor:** *Calcul[illegible] for each compliance period.*

= 1 – (Regional 2012 NGCC Baseline/75% NGCC [illegible]al Capacity for Least Stringent Region)

EPA requests comment on whether the unit's emission rate should be used (as proposed) or if it should be calculated based on the least stringent region's baseline 2012 average emissions rate. This would simplify the calculation, but not reward better performing NGCC.

GS-ERCs: EPA's Primary Proposal

EPA is requesting comment on using the least stringent region for all regions versus making these calculations region-specific.

IF the least stringent region is used, EPA is requesting comment on whether the "least stringent region" should change by compliance period, change each year, or stay the same.

2 **Incremental Generation Factor:** *Calculated by EPA f[illegible] compliance period.*

= 1 – (Regional 2012 NGCC Baseline/**75% NGCC Regional Capacity for Least Stringent Region**)

Proposed Incremental Generation Factors			
2022-4	2025-7	2028-9	2030-1 →
0.22	0.32	0.28	0.26

3 **NGCC Generation:** Unit's total net energy output for the year

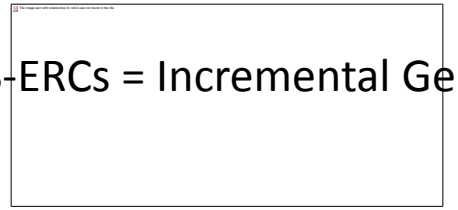
EPA Requests Comment on Alternative Ways to Account for GS-ERCs

1. GS-ERCs are only generated **for generation above a threshold capacity**, using 2012 as a baseline such than any generation above 2012 capacity earns GS-ERCs.

Two options for the baseline:

1. Individual unit's 2012 generation
2. Apply 2012 baseline capacity from least stringent region to all NGCC units

In this case, the formula would be:



GS-ERCs = Incremental Generation x [(Steam Standard – NGCC Emission Rate)/Steam Standard]

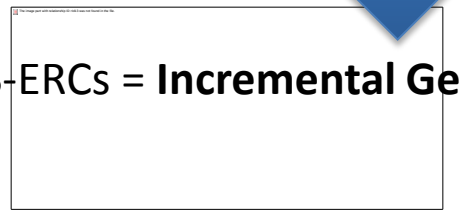
EPA Requests Comment on Alternative Ways to Account for GS-ERCs

1. GS-ERCs are only generated **for generation above a threshold capacity**, using 2012 as a baseline such

EPA thinks only drawback of this approach is that it allows units to earn credit for replacing one unit's NGCC generation with another unit's NGCC generation

2. A[illegible]y 2012 baseline capacity from least stringent r[illegible]on to all NGCC units

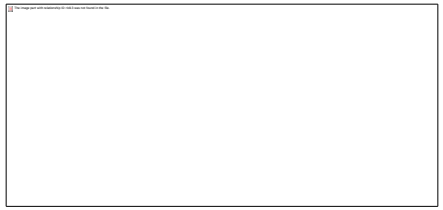
In this case, th[illegible]ula would be:



GS-ERCs = **Incremental Generation** x [(Steam Standard – NGCC Emission Rate)/Steam Standard]

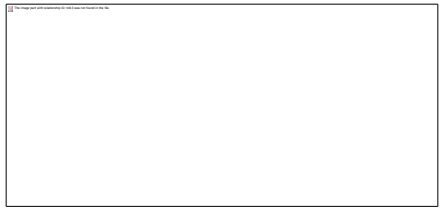
GS-ERCs Continued

- EPA also requests comment on whether GS-ERCs are necessary to maintain the integrity of the rate-based trading proposal.



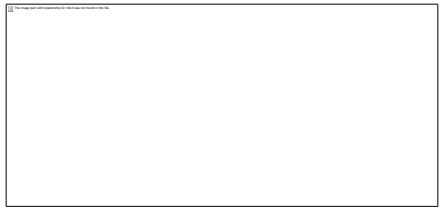
Output Based Allocation:

"The EPA is proposing a set-aside approach referred to as **output-based allocation,** which provides targeted allocations of a limited portion of allowances to existing NGCC units **as a means of mitigating leakage**. The EPA believes that this proposed set-aside would reduce incentives for generation to shift away from EGUs covered under mass-based plans to new unaffected EGUs. We seek comment on all aspects of this proposal and its underlying rationale." (page 271)



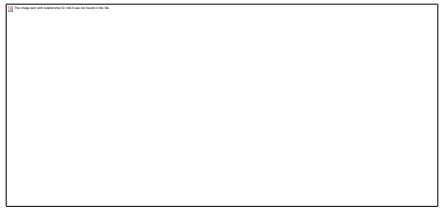
OBA: The Main Proposal

- Beginning with the **second** compliance period, a portion of **total allowances in each state** would be allocated to existing NGCC units based, in part, on **their level of generation in the previous compliance period**.



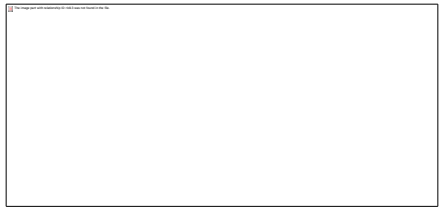
OBA: Main Proposal

- "Key Parameters to be Identified"
  - Which affected EGUs receive the allocation?
  - Timing of set-aside allocation procedure?
  - Allocation rate(s)?
  - Size of the set aside



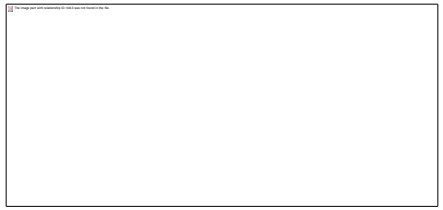
OBA Main Proposal:

- Which affected EGUs receive the allocation?
  - EPA proposes only affected NGCC units should receive the set-aside allowances.
  - EPA proposes these allowances would only be allocated to eligible units that **exceed 50 percent capacity factor** on a net basis over the compliance period, and **only for the portion of generation that exceeds 50 percent CF** (to target marginal generation)



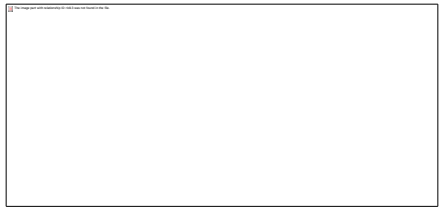
OBA Alternate Options:

- Which affected EGUs receive the allocation?
  - EPA recognizes effect of the set-aside incentive could be improved by targeting allowances with the greatest difference in their incentive to generate relative to new units outside the cap. (Comments on how?)
  - EPA also requests comment on extending OBA to affected steam units OR to zero-emitting resources (nuclear or renewables). And how to design such a set-aside.



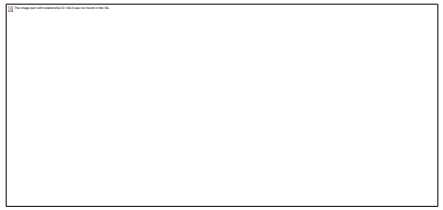
OBA Main Proposal

- Timing of the allocation procedure?
  - EPA is proposing a **lagged accounting procedure** such that allowances earned in the first interim compliance period would be allocated in the second interim compliance period and so forth.
  - No specific alternative approaches identified.



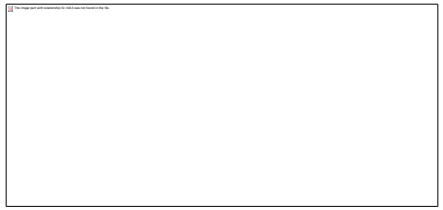
OBA: Main Proposal

- Allocation rate(s)?
  - EPA proposes to set the allocation rate equal to the 111(b) standard for new generation (1,030lb/MWh-net)
  - Specifically, an additional MWh of generation would earn the EGU allowances equal to 1,030lb/MWh-net)



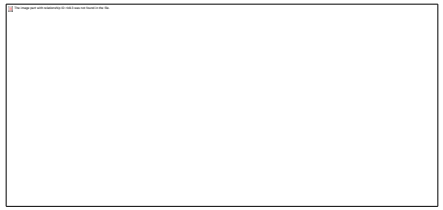
OBA: Alternate Proposals

- Allocation rate(s)?
  - EPA requests comment on other allocation rate(s)
    - Such as: the expected emission rate of new NGCC units, the historic average rate for NGCC units, or the NGCC or steam performance rates specified in the CPP.



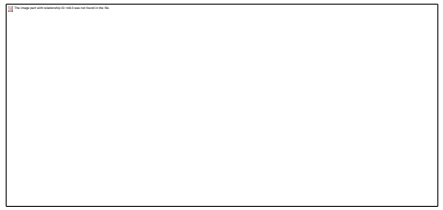
OBA: Main Proposal

- Allocation rate(s)?
  - The EPA proposes to calculate capacity factor based on the **previous compliance period's net generation and the net summer capacity of the unit.** (Would require affected EGUs to report net summer capacity to EPA or use of EIA data which is at the generator, not affected EGU, level).



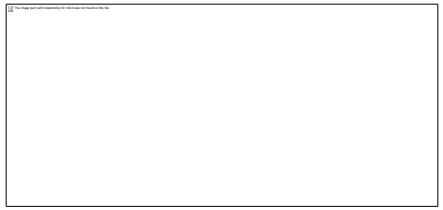
OBA: Alternative Proposals

- Allocation rate(s)?
  - Alternatively, EPA requests comment on whether **“maximum load value”** (already reported to EPA) **is a reasonable proxy** for net summer capacity.
  - Nameplate capacity?
  - Other approaches?



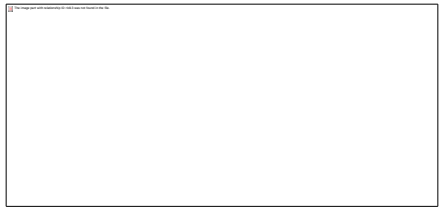
OBA: Main Proposal

- Size of the set-aside?
  - EPA proposes to **fix the size of the set aside before the start of the program** and **not change the size thereafter.**
  - EPA would set the initial size based on **increasing utilization to a 60 percent CF** to limit the size of the set aside and make remaining allocations available to the primary pool.



OBA: Main Proposal

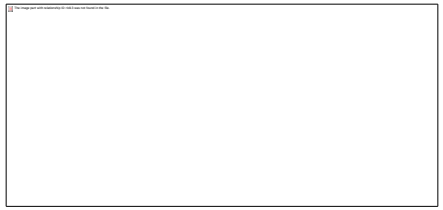
- Size of the set-aside?
  - EPA proposes to calculate based on:
    - Using the **2012 baseline data for CPP EGs**, the set-aside would equal 10 **percent of the NGCC capacity in the state** multiplied by **the hours in the year** multiplied by the **allocation rate of the set aside**
    - Takes comment on the proposed capacity data for determining the size and alternate sources of data
    - State OBA set asides would **stay the same size** as the **mass goals decrease over the glide path**.



OBA: Main Proposal

How to allocate the set-aside?

- IF there is **more eligible generation than allowances** in the set-aside, EPA proposes to distribute on **a pro-rata basis**.
- If there is **less eligible generation than allowances,** EPA proposes to **return the unused allowances to the main pool**.

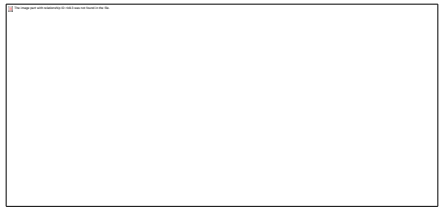


RE Set Aside:

- EPA proposes to create a **set-aside for RE** in states covered by the federal plan. Takes comment on whether to extend the set-aside to **EE** or **CHP.**
- **Developers of RE projects** could apply to receive set-asides based on **projected generation.**
- The set-aside is **expected to address concerns regarding leakage by lowering the marginal cost of production.**

RE Set Aside:

- EPA proposes the size of the set-aside would be equal to **5 percent of the state's total pool of allowances**
  - But takes comment on sizes ranging from 1 to 10 percent.
- EPA proposes the size of the set-aside would grow, because allowances that **would have been allocated to affected units that retire get added to the set aside.**



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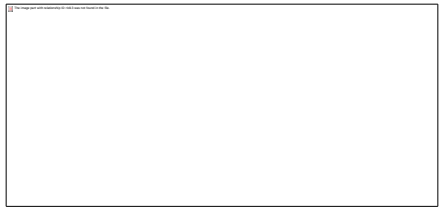


RE Set Aside

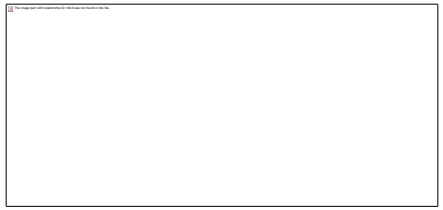
- EPA proposes a project **is only eligible if it is eligible for rate-based ERCs** (i.e. only incremental generation installed after 2012). **AND be located in the state in question**
  - Requesting comment on **limiting eligible to providers that are also owners/operators of affected EGUs.**

*As specified in section IV.C of this preamble, the EPA is proposing **that the same RE measures are eligible to receive set- aside allowances under a mass-based federal plan as would be eligible for ERC issuance under a rate-based federal plan and the model rule**. Specifically, the following RE measures are eligible: **on-shore wind, solar, geothermal power, and hydropower***. *The RE measure must also have the capacity to provide data **quantified by a revenue-quality meter**, a requirement that is further discussed in section IV.D.8 of this preamble. (at 287)*

***There are actually slight differences in this list as compared to the rate based federal plan. See** § 62.16435 What eligible resources qualify for generation of ERCs in addition to affected EGUs?

RE Set Aside

- EPA requests comment on inclusion of other RE measures, incremental nuclear, demand-side EE, CHP, and any other emission reduction measure.
- Also requests comment on potential process for adding eligible measures after the fact.



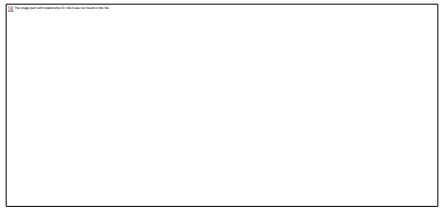
RE Set Aside

Allowance Allocation:

- EPA proposes that **by June 1** of the **year prior to the first compliance period and each year after** RE providers in each state would apply to be approved as eligible, including providing a **projection of generation that will be the basis for allocating allowances.**
- Eligible projects would be entered into a pool in any compliance period. (Generation for future compliance years can be updated).
- On December 1 of each year in the compliance period, EPA would allocate allowances to all eligible projects based on projected generation for the following year.
- Allowances would be distributed pro-rata.
- EPA is taking comment on whether to limit the number of allowances per MWh, such as to one allowance per MWh.
- True up in the following year based on actual generation.
- Any remaining allowances (such as those distributed to projects that no longer exist) would be distributed to affected EGUs based on primary allocation methodology

RE Set Aside

- Seeking comment on whether a portion of the RE set-aside should be targeted to RE projects in low income communities?



Other Trading Issues?

- Need for market monitoring activities?
- Ways to ensure market liquidity?
- Ways to safeguard validity of ERCs?