COMMENT ON PROPOSED FEDERAL PLAN FOR CLEAN POWER PLAN: ATTACHMENT

Revising the Proposed Federal Plan to Comply with the Emissions Guidelines in the Clean Power Plan

EPA Docket ID: EPA-HQ-OAR-2015-0199

NextGen Climate America

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Executive Summary

	Problems	Solutions
A	Mass-based approach sets cap based on assumed high level of renewables without guaranteeing that such generation materializes, creating potential for leakage to new NGCC	1. Hold excess allowances in reserve and only release to affected sources if high levels of renewables materialize; or 2. Hold excess allowances in reserve and retire in proportion to amount by which new NGCC exceeds new source complement; or 3. Institute full updating, output-based allocation.
B	Proposed GS-ERC crediting mechanism offers a weak incentive to all generation rather than a strong incentive to only the marginal generation that displaces coal	Distribute GS-ERCs only to generation at NGCC plants generating at capacity factors above the 2012 statewide capacity factor (based on rolling average capacity factors over the last 365 days)
C	ERCs generated by renewables are inappropriately credited with different emissions reductions depending on whether they are purchased by coal-fired generators or NGCC generators	Apply adjustment factors to ERCs purchased by coal and NGCC respectively to reflect their varying emissions factors

Problem A: Leakage to new NGCC under mass-based approach

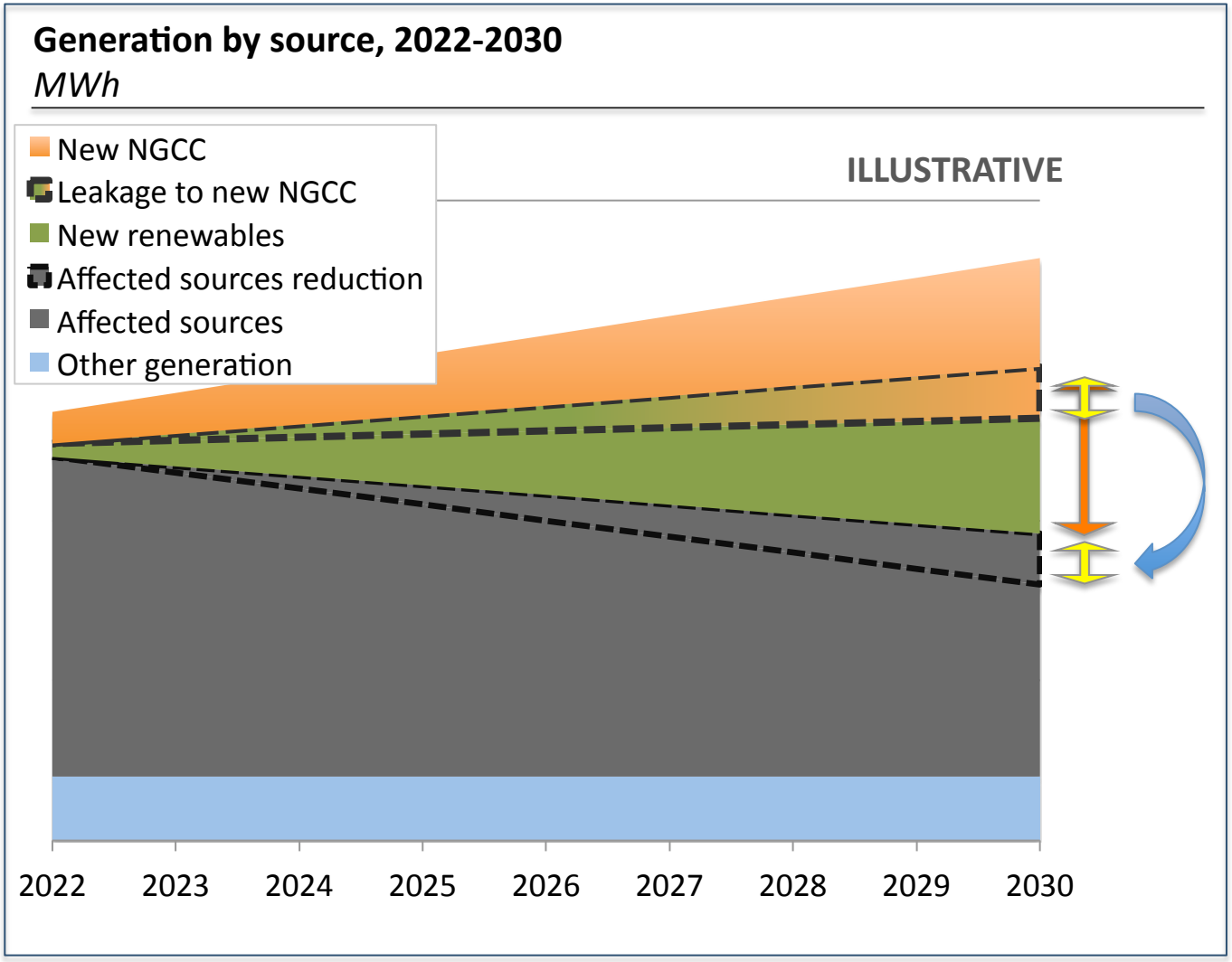
Substantial leakage is possible under the mass-based approach

- Emissions from affected sources vary under the rate-based approach, depending on the level of renewables
- Rate-to-mass conversion assumes that a high level of renewable generation comes online, locking in a high level of allowed emissions under mass-based standard
- Leakage occurs under mass-based approach when new NGCC comes online instead of new renewables / increased utilization of existing NGCC, because the mass-based standard does not adjust

Mass-based approach attempts to prevent leakage, but measures are inadequate

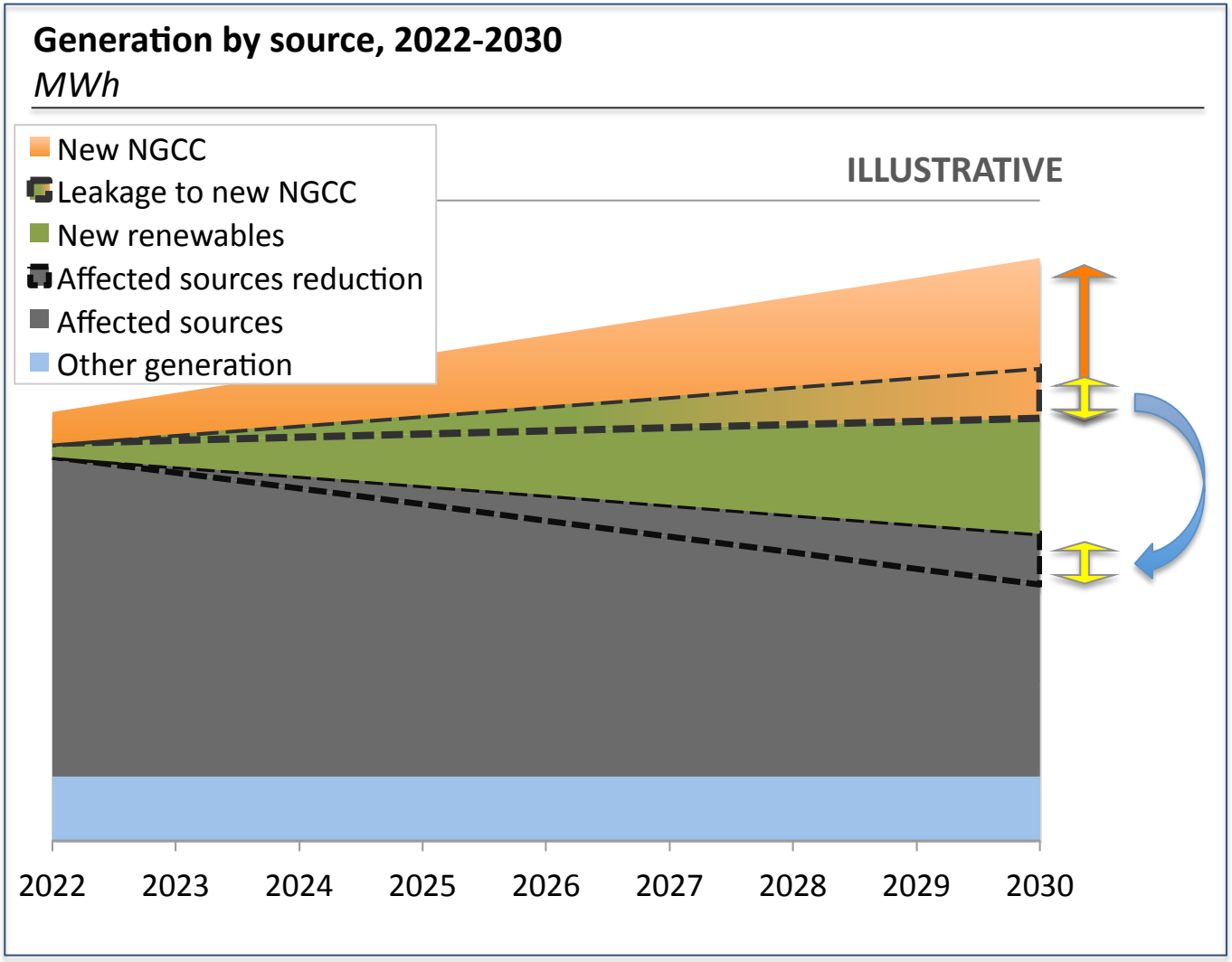
- Renewable set-aside of 5% is too small to provide a sufficient financial incentive and does not reduce overall cap if zero-carbon generation does not materialize
- Updating, output-based allocation for marginal NGCC is not extensive enough to provide right incentives

Solution A.1: New Renewable Generation Threshold



One solution to leakage would be to hold a set of **allowances in reserve** and only release them to affected sources **if renewable generation reaches modeled levels**. Doing so would reduce the level of affected source emissions to compensate for fewer renewables coming online (and hence higher emissions from new sources), just as the rate standards do automatically.

Solution A.2: Reserve based on New NGCC Generation



A similar solution would be to hold a set of allowances in reserve and **reduce the amount** released in proportion to the amount by which **actual new NGCC exceeds NGCC in the new source complement**.

Solution A.3: Updating Output-based Allocations

- **Under updating output-based allocations, qualifying generation sources receive a portion of allowances under the mass cap according to set allocation rates**
  - In the examples that follow, each affected source and eligible zero-emission generation receives allowances based on its previous year generation, according to the following formula:

$$Allocation_{i,t} = Generation_{i,t-1} * Rate_{i,t}$$

  - Variations on this formula adjust the *Rate* at which allowances are allocated to various resources, which may help to achieve the required equivalent environmental outcome.
  - These variations help to ensure leakage to new NGCC does not occur by better matching the incentives inherent in BSER, and may help to identify a more appropriate scope of any RE reserve EPA may implement as a component of the federal plan and model rule.

Solution A.3: Updating Output-based Allocations

- Allocation rates may be determined in several ways, EPA should utilize the allocation method which best ensures environmental equivalence. Options include, among others:
  a) Proportional allocation: all affected sources and RE receive allowances at the same rate based on the mass goal divided by total previous year generation

$$Rate_{i,t} = Mass\ goal_t \Big/ \sum_i Generation_{i,t-1}$$

  b) Allocation indexed to coal: affected sources and RE receive allowances based on their difference from the coal emissions rate, scaled to fully allocate allowances

$$Rate_{i,t} = (ER_{coal} - ER_{i,t-1}) * (Mass\ goal_t \Big/ \sum_i (ER_{coal} - ER_{i,t-1})) * Generation_{i,t-1}$$

  c) Subcategory rate allocation: affected sources receive allowances at their category-specific rate standards, RE receives all remaining allowances proportionally

$$Rate_{i,t} = Subcategory\,rate_{i,t}\ (if\ i \in affected\ sources)$$

$$Rate_{i,t} = \frac{(Mass\ goal_t - \sum_{i \in affected\ sources} Subcategory\,rate_{i,t} * Generation_{i,t-1})}{\sum_{i \in RE} Generation_{i,t-1}}\ (if\ i \in RE)$$

Example A.3a: Proportional Allocation

ILLUSTRATIVE

All affected sources and RE receive allowances at the same rate based on the mass goal divided by total previous year generation

$$Rate_{i,t} = Mass\ goal_t \Big/ \sum_i Generation_{i,t-1}$$

Affected source	Estimated 2029 gen[1]	Allocation rate	2030 allocation	Emissions rate	2030 emissions	Net wealth transfer[2]	Transfer per MWh
Unit	*mn MWh*	***lbs / MWh***	*tons*	*lbs / MWh*	*tons*	*$ mn*	*$ / MWh*
Coal / OG steam	903	**1,150**	519	2,200	993	-4,741	-5.3
NGCC below 55% C.F.	1,099	**1,150**	632	900	495	1,373	1.2
NGCC above 55% C.F.	399	**1,150**	229	900	180	499	1.2
Renewables and EE	500	**1,150**	287	0	0	2,875	5.7
Total	**2,901**	**1,150**	**1,668**		**1,668**	**0**	

Effective RE set-aside: 17.2%

1 Nationwide, based on BSER assumption that existing NGCC increases to 75% C.F. and coal emits to use up remaining allowances
2 At a carbon price of $10 / ton

Example A.3b: Coal-indexed Allocation

ILLUSTRATIVE

Affected sources and RE receive allowances based on their difference from the coal emissions rate, scaled to fully allocate allowances

$$Rate_{i,t} = (ER_{coal} - ER_{i,t-1}) * (Mass\ goal_t / \sum_i (ER_{coal} - ER_{i,t-1})) * Generation_{i,t-1}$$

Affected source	Estimated 2029 gen[1]	Allocation rate	2030 allocation	Emissions rate	2030 emissions	Net wealth transfer[2]	Transfer per MWh
Unit	*mn MWh*	***lbs / MWh***	*tons*	*lbs / MWh*	*tons*	*$ mn*	*$ / MWh*
Coal / OG steam	903	**0**	0	2,200	993	-9,933	-11.0
NGCC below 55% C.F.	1,099	**1,423**	782	900	495	2,874	2.6
NGCC above 55% C.F.	399	**1,423**	284	900	180	1,044	2.6
Renewables and EE	500	**2,408**	602	0	0	6,021	12.0
Total	**2,901**	**1,150**	**1,668**		**1,668**	**0**	

Effective RE set-aside: 36.1%

1 Nationwide, based on BSER assumption that existing NGCC increases to 75% C.F. and coal emits to use up remaining allowances
2 At a carbon price of $10 / ton

Example A.3c: Subcategory Rate Allocation

Affected sources receive allowances at their category-specific rate standards, RE receives all remaining allowances proportionally

$$Rate_{i,t} = Subcategory\,rate_{i,t}\ (if\ i \in affected\ sources)$$

$$Rate_{i,t} = \frac{(Mass\ goal_t - \sum_{i \in affected\ sources} Subcategory\,rate_{i,t} * Generation_{i,t-1})}{\sum_{i \in RE} Generation_{i,t-1}}\ (if\ i \in RE)$$

Affected source	Estimated 2029 gen[1]	Allocation rate	2030 allocation	Emissions rate	2030 emissions	Net wealth transfer[2]	Transfer per MWh
Unit	*mn MWh*	***lbs / MWh***	*tons*	*lbs / MWh*	*tons*	*$ mn*	*$ / MWh*
Coal / OG steam	903	**1,305**	589	2,200	993	-4,041	-4.5
NGCC below 55% C.F.	1,099	**771**	423	900	495	-714	-0.7
NGCC above 55% C.F.	399	**1,305**	260	900	180	+808	+2.0
Renewables and EE	300 to 700	**2,636 to 1,130**	395	0		+3,953	+13.2 to +5.6
Total	**2,701 to 3,101**	**1,150**	**1,668**		**1,668**	**0**	

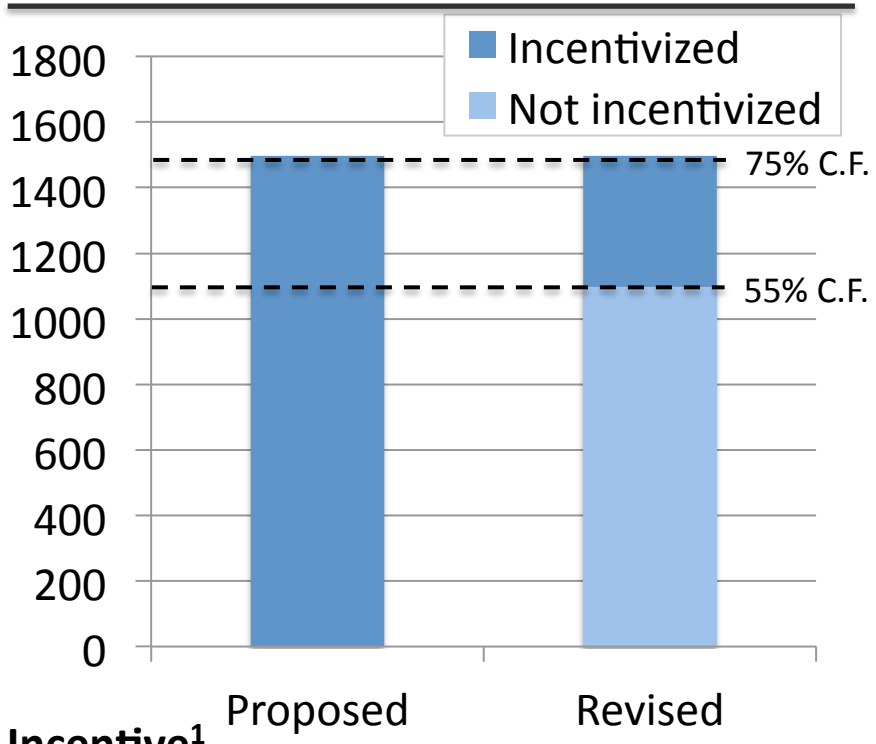
Effective RE set-aside: 23.7%

1 Nationwide, based on BSER assumption that existing NGCC increases to 75% C.F. and coal emits to use up remaining allowances
2 At a carbon price of $10 / ton

Problem B: GS-ERC distribution

Existing NGCC generation

Million MWh



Incentive[1]

$ / MWh

+0.6

+2.0

1 Based on a $10 / ton carbon price

Proposed GS-ERC under-incentivizes marginal NGCC generation

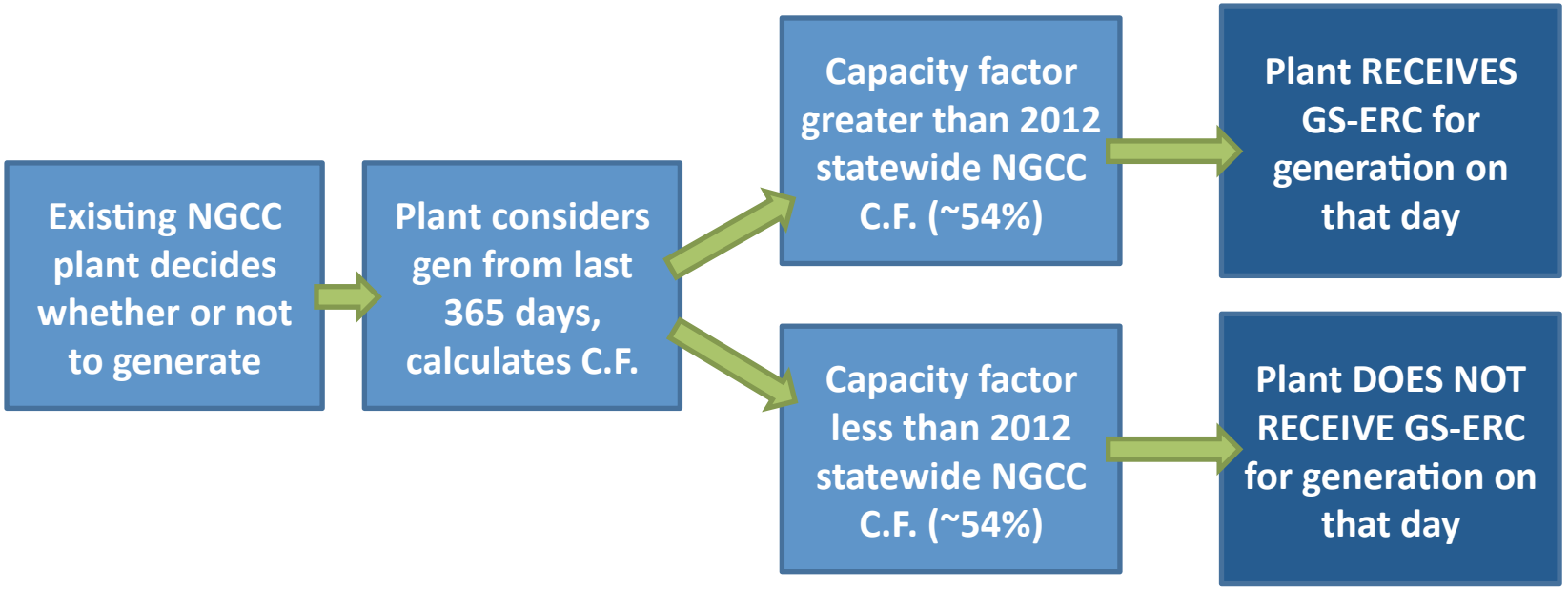
- The proposed crediting mechanism for GS-ERCs offers a weak incentive – $0.6 / MWh – to all existing NGCC generation rather than a strong incentive to marginal NGCC
- This approach dilutes the effect of BB2 in the BSER and credits non-switching
- EPA justifies this proposal by claiming that NGCC power plants would not be able to recognize above 55% C.F. generation before the end of a year

Incentive for coal-to-gas switching is more than three times stronger if it is targeted at marginal generation rather than all generation

Solution B: Last 365 days capacity factor calculation

Power plants can base their generation decisions on capacity factor over the last 365 days and receive GS-ERCs for marginal generation only

- Plants calculate their capacity factor daily based on previous 365 days
- If plant capacity factor is greater than the 2012 statewide NGCC capacity factor (varies by state, nationwide average is 54%), plant is eligible to receive GS-ERCs for marginal generation on that day
- GS-ERCs under revised distribution are roughly three times more valuable as they are granted to marginal generation only



Problem C: ERC credits under subcategory rate standard don't reflect actual emissions avoided

Varying emissions impact from purchase of a single ERC

ERC Purchaser	Coal	NGCC
Grid emissions reduction from ERC generator	~1,113 lbs	~1,113 lbs
Added emissions from ERC purchaser	1,305 lbs	771 lbs
Net emissions change	**+192 lbs**	**-342 lbs**

Leakage occurs under subcategory rate standard due to differing impacts for different ERC purchasers

- A coal generator buying an ERC representing a MWh acquires the license to emit one additional MWh's worth at its subcategory rate – 1,305 lbs
- However, the grid emissions reduction from the MWh that ERC represents, as modeled in the BSER, is only 1,113 lbs
- Thus environmental equivalence is not met between the BSER and the proposed ERC accounting approach

Solution C: Adjustment factors based on ERC purchaser

Leakage can be addressed by adding an adjustment factor to ERC purchasers based on the category of the purchaser to reflect the ratio of emissions avoided by ERC creation to emissions allowed by ERC use

- For the purpose of calculating compliance, **coal generators would have to apply an adjustment factor of 0.85** to their purchased ERCs – as such these generators would have to purchase additional ERCs to reach compliance
- In contrast, **NGCC generators would apply an adjustment factor of 1.44** to their purchased ERCS, meaning that they would not have to purchase as many ERCS to reach compliance

Adjustment factors

$$ERC_{coal} = ERC_D * \frac{1113}{1305} = ERC_D * 0.85 \ \ (for\ coal\ units)$$

$$ERC_{gas} = ERC_D * \frac{1113}{771} = ERC_D * 1.44 \ \ (for\ gas\ units)$$