

Appendix A: Treatment of Existing Nuclear

State Rate Goal-Setting

- EPA has provided significant detail on how the rate goals were calculated for each state
- The rate goal formula is:

Adjusted 2012 Fossil lbs

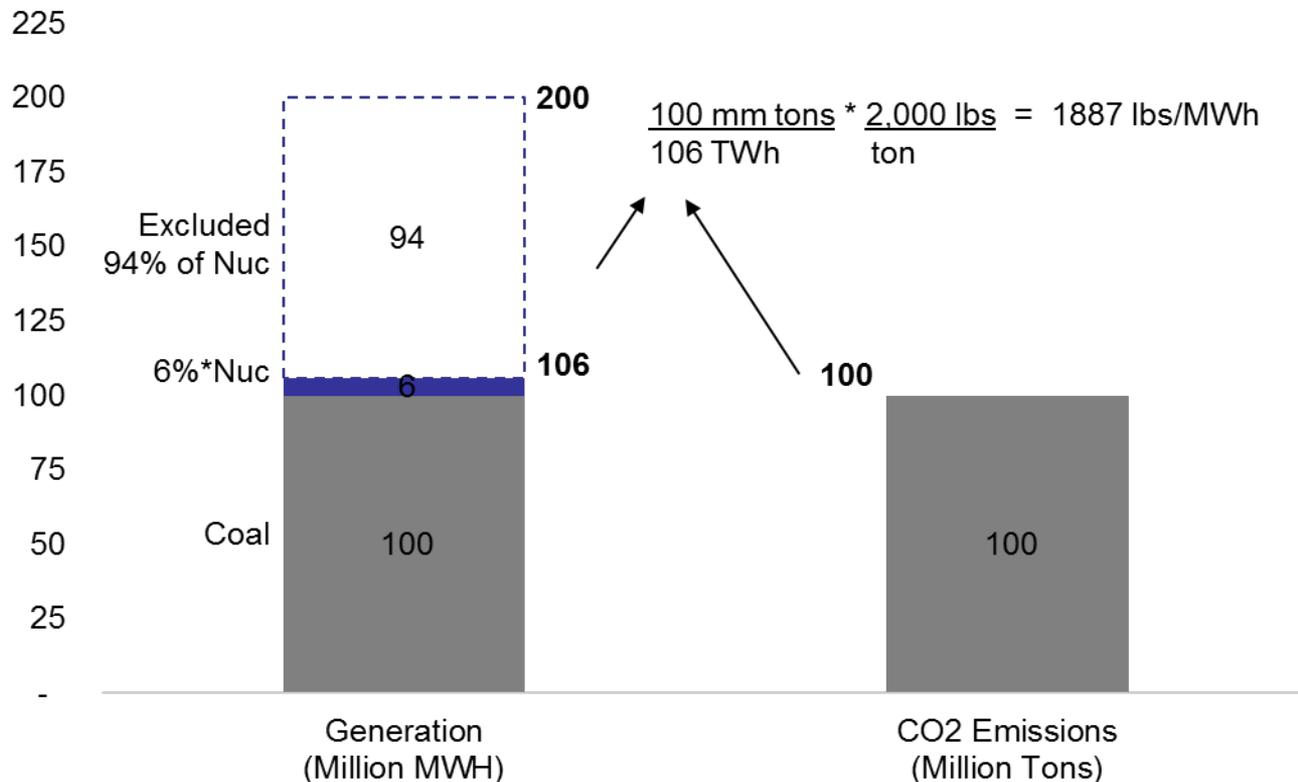
$$2012 \text{ Fossil MWh} + \text{RE MWh} + \text{EE MWh} + (6\% * 2012 \text{ Nuclear MWh}) + \text{New Nuclear MWh}$$

- *Note: The “Adjusted Fossil lbs” reflect a coal heat rate improvement as well as redispatch to NGCC.*

Compliance Example – EPA Proposed Rule

- Only 6% of existing nuclear generation is included in the goal-setting algorithm and presumptive compliance formula, so continued operation of nuclear has little impact on the rate result.
- Consider an example with 100 TWh of Coal and 100 TWh of nuclear in a state:

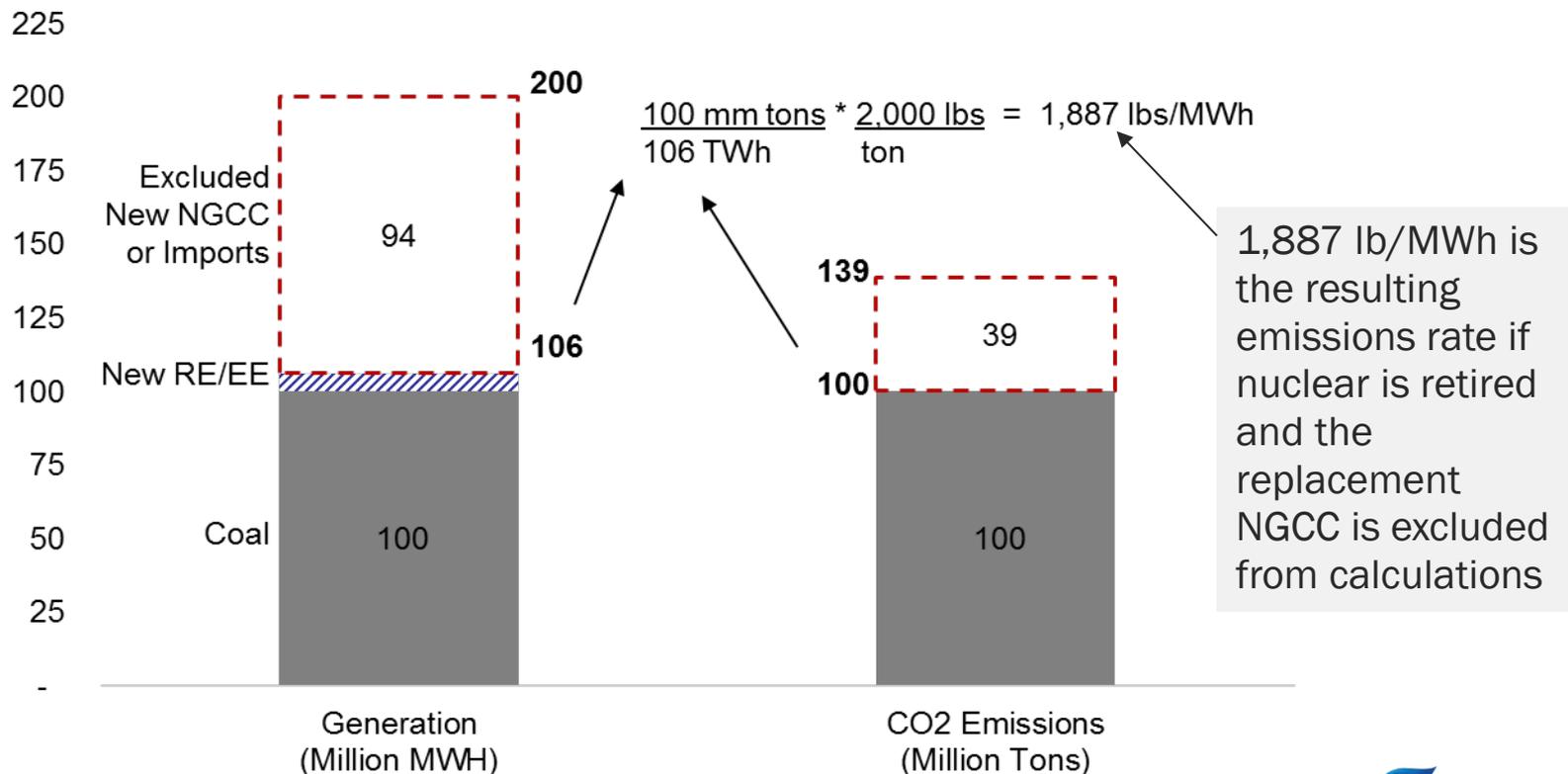
Compliance Example Including Nuclear



Compliance with Nuclear Retirement – Exclude New NGCC

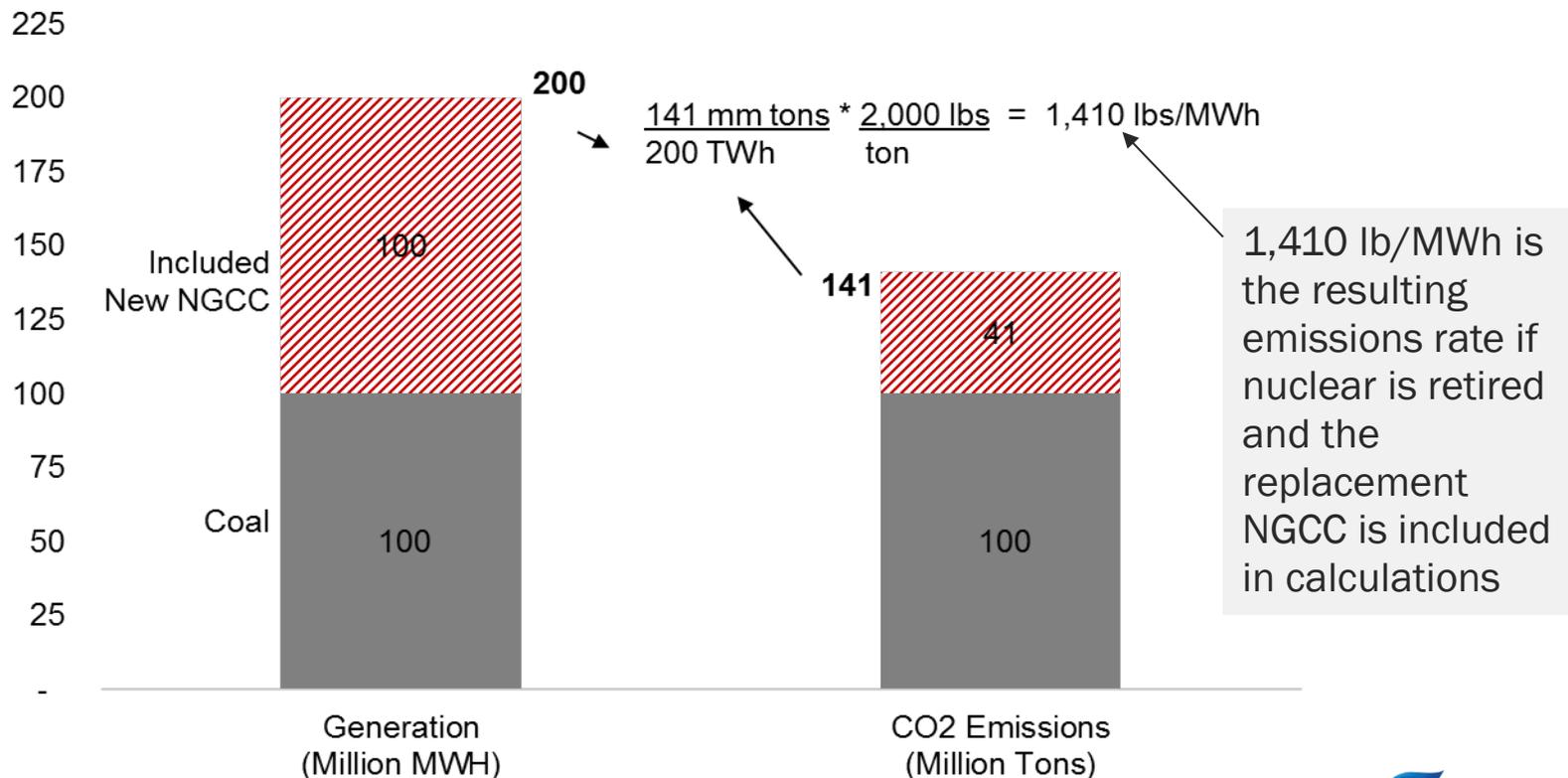
- States can choose whether or not new NGCC is counted in the existing unit rule compliance. If the nuclear units retire and the state excludes new CC generation (or if replacement power is generated by out-of-state gas units) overall emissions can increase by roughly 40% while the rate result is unchanged.
- Only 6% of the nuclear is included in the rate calculation, so only 6% of the retiring generation must be replaced by new clean generation in order to keep the rate result level.

Compliance Example



- If the nuclear units retire and the state includes new NGCC generation in its compliance plan, CO₂ emissions can increase by 40% and the rate result actually decreases.
- Adding NGCC generation to the mix can lower the average rate in the state (as calculated by the proposal).

Compliance Example w/ New NGCC



Appendix B: Comments in Alignment with Reliability Safe Harbor Concept



Calpine “Calpine believes the following additional amendment[s] should be made to the Proposed Clean Power Plan: The Clean Power Plan Should Explicitly Indicate that the Institution of an Appropriately Determined and Administered Carbon Fee is a Viable Means of State and Regional Compliance . . . While we believe that a mass-based program, such as an allowance program, is the preferred method for compliance with the Clean Power Plan for all the reasons noted above, an appropriately constructed and administered carbon fee program would also be a simple and efficient way for states to comply with the Clean Power Plan. Accordingly, EPA should indicate in the final Clean Power Plan that a carbon fee is a viable means of compliance, so long as the fee is sufficiently stringent to demonstrate that the emission performance goal will be achieved.” (p. 6) “One such approach would be an ISO-administered adjustable carbon fee, whereby the electricity from affected EGUs would be priced according to the emission rate of each affected EGU and such affected EGUs would pay for the added carbon cost.” (pp. 30-31)



EEI “Under such an approach, states could choose to require in-state resources to include a carbon adder pre-determined by EPA when bidding resources into the market. This would alter the dispatch of units to better reflect their CO2 emissions and provide a mechanism for continued emission reductions from existing units in a way that both respected system requirements and ensured reliable operation of the portions of the grid administered by the RTOs. EPA could provide that while the carbon adder is used to affect dispatch, states would not be required to file annual compliance reports or otherwise demonstrate compliance with the proposed guidelines . . . [t]his ‘safe harbor’ would give states and electric utilities time to undertake actions and measures that result in emission reductions later Importantly, because the carbon adder relies on existing market structures, it could be implemented soon after state compliance plans are approved (and before 2020) to start reducing emissions . . . Further, to address concerns about costs for electricity customers, the carbon adder could be collected by the market operators and then used to offset increased costs to customers, ensuring that electricity remains affordable for end-users . . . To support the potential use of this option to define state glide paths, the final guidelines should recognize the value of using existing market dispatch structures to achieve emission reductions and specifically note that states could pursue this option as part of an approvable plan.” (pp. 166-167)



Environmental Defense Fund (EDF) “The environmental agency estimates the carbon price needed to achieve the emissions goal and then they, another state agency, or the ISO/RTO collect the fee based on emissions rates from power plants; high emitting fossil plants have to pay a higher fee and become less competitive in the market in comparison to low- or non-emitting resources; revenue from the fee could be returned to utility customers through investments in energy efficiency programs, rebates or used for other state policy goals ; there is no trading although the cost flows through the power markets.” (p. 204) “In a fee-based approach, all fossil generators in the program have their costs rise based on their emissions rate (driven by the fee level); higher emitting generators become less competitive than low or non-emitting resources over time; non-emitting

resources are not directly credited but become more competitive because they do not need to pay fees to cover their generation ; there is also an opportunity to use revenue from the fee to benefit consumers, with energy efficiency being a preferred investment, as it reduces bills and lowers the cost of the program as a whole.” (p. 205) “All of these market-based approaches provide significant flexibility for plant operators, ISO/RTOs, and regulators to ensure reliability requirements are met. If a plant is needed in the short-term it can keep operating by buying allowances, credits or paying a fee. In any of the approaches a unit could be designated as "must-run" for reliability reasons until the reliability constraint is addressed, as long as other facilities could adjust their performance to accommodate the output from that plant.” (p. 205)



Exelon “In order to mitigate the cost borne by consumers, EPA should adopt a safe harbor that places a consumer protection price ceiling on overall compliance costs during the interim compliance period (2020-2029). Under the “Smart System Dispatch” program . . . EPA would determine a carbon fee sufficient to achieve the interim goals, and states adopting such a fee would be deemed to comply with the interim goals – locking in a maximum compliance cost while still reducing carbon pollution consistent with the interim goals.” (p. 7) “Smart System Dispatch relies on the reliability-driven least-cost dispatch mechanisms of regional and local grid management systems, and so preserves the viability of the existing generation fleet as necessary to preserve reliability. That is why Smart System Dispatch and variations of it are being endorsed by electricity industry organizations, environmental groups and other stakeholders. As EPA has noted many times, environmental protection and reliable, affordable electricity are not mutually exclusive. The dramatic reductions in carbon pollution that EPA seeks can be achieved at a small cost to consumers, but only if EPA clears a path for states to contain compliance costs. Of course, the safe harbor program would be optional, and would not limit the latitude EPA gives states in the Proposed Rule to develop unique implementation plans.” (p. 9)



NYU Institute for Policy Integrity (IPI) “EPA should make clear—both in the emissions guidelines and, as appropriate, in amendments to or interpretations of regulatory text—that states may use flexible market mechanisms like a carbon fee or trading program to comply with their entire emissions targets.” (p. 26)



Resources for the Future (RFF) “EPA should consider broadening the policy goal to more explicitly allow for a fee-based approach.” (p. 29). “Because other comments have addressed a role for an emissions fee with revenues going to customers (see Kathleen Barrón’s response to this question in Appendix A, p.56) and government, we will elaborate on the alternative with revenues directed to investment.” (p. 29) “As an alternative to a planning process, EPA might allow states to impose a fee calibrated to the estimated social cost of carbon dioxide emissions as identified by the Interagency Working Group. Alternatively, EPA may allow states to impose a fee equal to the marginal cost of compliance expected to emerge in a regional trading or averaging programs that others are joining for compliance . . . an alternative payment mechanism linked to investment can be designed to meet and exceed environmental goals and produce more rapid investment in innovative technologies, and improve environmental outcomes at a lower cost . . . The

transparency of this approach may be an appealing attribute to some parties who otherwise view the challenges of the Clean Power Plan as complicated and confusing.” (p.30)

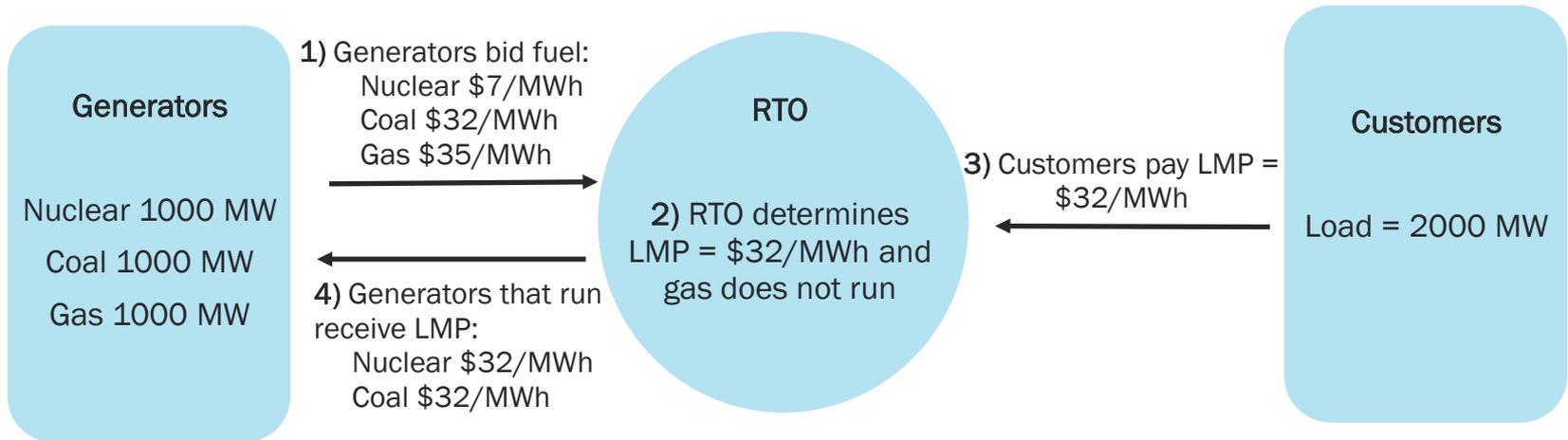


Western Power Trading Forum (WPTF) “In particular, states have requested modification of the interim state targets in order to allow states more time to phase-in measures to re-dispatch the existing fleet . . . WPTF considers multi-state, market-based approaches to be the only means to efficiently achieve re-dispatch of generation. Recognizing that it will take some time for states that do not currently have carbon policies in place to coordinate and develop multi-state, market-based approaches, WPTF recommends that EPA signal flexibility for states that pursue such an approach. Such flexibility could involve modification of the assumptions regarding the timing of emission reductions from re-dispatch in line with later phase-in of a carbon price under a multi-state program. Alternatively, EPA could establish a ‘safe harbor’ for compliance with interim targets for states that implement multi-state, market-based approaches, in line with any guidance provided by EPA.” (pp. 10-11).

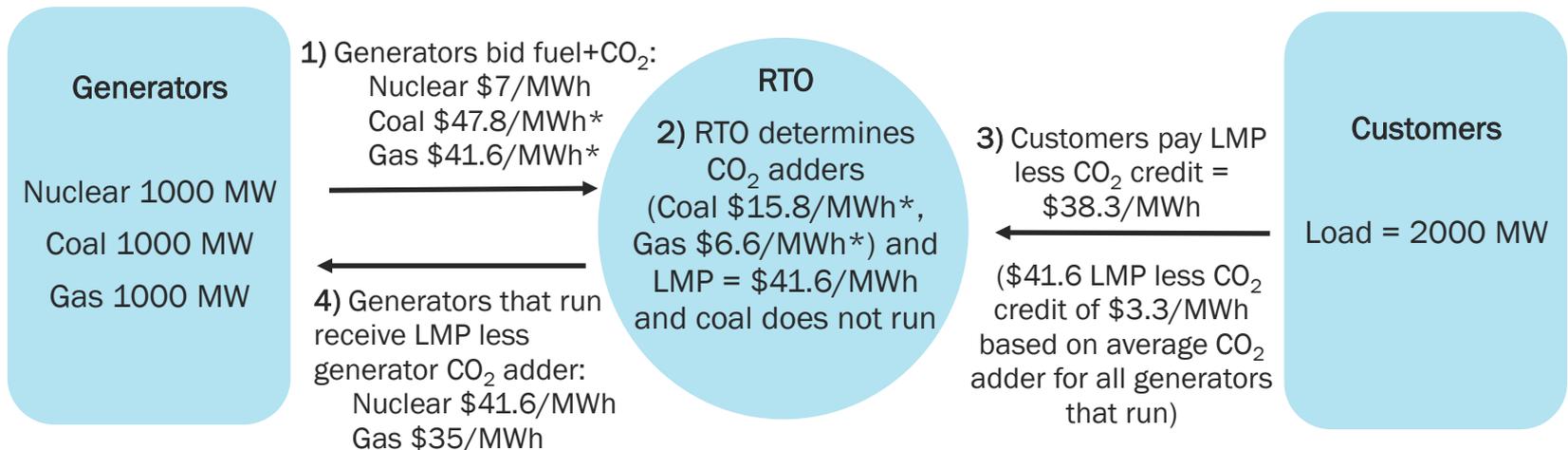
Appendix C: Reliability Dispatch Safe Harbor Mechanics

Reliability Dispatch Safe Harbor – Merchant Generators in RTO

Without Re-Dispatch (CO₂ emissions during hour = 1,050 tons)



With Re-Dispatch at a CO₂ price = \$15/ton (CO₂ emissions during hour = 440 tons; 58% decrease)



*Coal adder based on 1.05 tons/MWh (10 HRx210 lbs/MMBtu) and gas based on 0.44 tons/MWh (7.5HRx117lbs/MMBtu)