Duke Carbon Plan – Technical Conference

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On behalf of the North Carolina Attorney General's Office

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Docket E-100, Sub 190

Overview of AGO Testimony

Topics Addressed	Key Recommendations
Interim Target	• Achieve Interim Target no later than 2032 to satisfy the statutory guidelines (while meeting challenges from new load growth).
Coal Retirements	• Duke should pursue 4 strategies (that were not fully considered) for enabling timely retirements by 2032.
Renewable Additions	• Duke should pursue 6 strategies (that were not fully considered) for accelerating renewable GWh by 2032.
Natural Gas Additions	• 2 major risk factors should be considered in evaluating any new CCs: 1) New EPA Section 111 rules, 2) lack of firm fuel supply for gas fleet as a whole
Load Forecast and Customer Load-Reduction Programs	• We offer 2 recommendations for ensuring future load forecasts are more accurate. • 4 customer load-reduction programs should be further developed
Transmission Planning	• 10 key recommendations for minimizing costs and assisting renewable integration

Today's Focus

Initial Carbon Plan Order on Coal Retirements – Mayo Case Study

TIMELINE:

- Before 5/16/2022: In Duke's initial analysis, EnCompass model selected **2026** as Mayo's optimal retirement
- 5/16/2022: Duke's 2022 CPIRP identified **2029** as the selected retirement date for Mayo (citing issues such as timeline for replacement generation or transmission upgrades)
- 12/30/2022: 2022 Order, p 9: "Duke shall take appropriate steps to **optimally retire** its coal fleet on a schedule commensurate with its Carbon Plan proposal filed on May 16, 2022."
- 2/13/2023: DEP General Rate Case proposal (supplemental) included:
  - No new transmission investments for enabling any coal retirements including Mayo;
  - No replacement generation resources for Mayo.
- 8/17/2023: Duke 2023 CPIRP proposes to delay Mayo's retirement date to **2031**

Coal Has a Limited Role in Addressing Large Load Increases

- Duke's "Fall Base" EnCompass model runs show Mayo capacity factors in 4-11% range in 2028.
- Mayo and other plants operate infrequently on coal and won't serve as "baseload" resources, even under increased load projections.
- Some could be ideal sites for replacement with batteries (or other peaking resource) that have limited run times, but still contribute significantly to reliability.

Resource	Year	Capacity (MW)	Capacity Factor (%) – P1 Fall Base	Capacity Factor (%) – P3 Fall Base
Belews Creek 1 (coal)	2028	1,110	21.72	23.89
Belews Creek 2 (coal)	2028	1,110	27.60	29.35
Cliffside 5 (coal)	2028	546	1.44	2.34
Cliffside 6 (coal)	2028	849	17.12	22.54
Marshall 1	2028	380	6.56	14.30
Marshall 2	2028	380	2.18	4.39
Marshall 3 (coal)	2028	658	8.87	7.23
Marshall 4 (coal)	2028	660	9.68	8.55
Mayo 1	2028	713	4.12	10.77
Roxboro 1	2028	380	28.22	38.32
Roxboro 2	2028	673	43.53	55.98
Roxboro 3	2028	698	33.15	39.29
Roxboro 4	2028	711	17.57	32.69

Importance of Timely Coal Retirements

- Aging coal plants require significant ongoing capital investments that could otherwise be avoided.
- The IRA has unlocked new opportunities that make coal replacements more economic (e.g., through the EIR program and the “energy communities” bonus tax credit).
- New EPA Section 111 rules may require coal retirements by 2032.
- Retirement of certain larger plants (e.g., Belews Creek, Roxboro) within the next 8 years likely represents a “critical path” for meeting the 70% Interim Target in accordance with statutory guidelines (i.e., 2030-2032).

Duke's proposal failed to fully consider 4 key strategies for retiring coal

1. More on-site battery replacement 
2. Off-site replacement w/ transmission (if needed) 
3. Staggered unit retirements 
4. Convert existing units to operate on gas (Belews Creek) 

Strategy 1: More on-site battery replacement

- Duke's modeling assumptions inappropriately limited battery storage deployments during the "critical path" period of 2028-2032.
  - Only 4,200 MW batteries can be selected versus >25,000 MW of gas.
  - On-site replacement can speed interconnection times using "surplus interconnection" (e.g., Allen plant). Could even allow installs before full retirement.
- Batteries have high resource adequacy reliability contributions (>90% ELCC in many scenarios studied by Duke)
- Duke's modeling does not fully reflect likely benefits of IRA:
  - On-site replacement should receive full "energy communities" bonus, not a fraction of it.
  - EIR program can be leveraged for more favorable financing but was not studied.

Strategy 2: Off-site replacement + transmission

- Duke agrees that off-site generation to replace coal plants is feasible but may require transmission upgrades in some cases.
  - E.g., Duke identified conceptual transmission projects that could allow replacement generation for Roxboro/Mayo to be located in DEC and imported to DEP.
- Off-site replacement could unlock more competition among replacement options.
- Duke did not evaluate this possibility in its CPIRP (other than Mayo).
  - “these [transmission] projects are conceptual and thus not the result of any formal study. No cost estimates have been developed for these conceptual projects” (AGO Exh. 7)
  - “The companies did not conduct a competitive solicitation [for replacement generation at Roxboro]” (AGO Exh. 15)

Strategy 3: Staggered unit retirements

- Common practice in planning efforts is to stagger individual unit retirements over time to allow more time and flexibility for replacement generation to come online.
- Duke's modeling inappropriately ties certain unit retirements together: Belews Creek 1 & 2, Marshall (2 units), Roxboro (2 units)
  - Duke: "The Companies have not performed quantitative cost analysis associated with select units retiring together compared to retiring independently" (AGO DR 4-30, attached as Burgess Direct Exhibit 2).
- Individually staggered retirements would allow for more practical and gradual replacement pathways (which could reduce overall costs), and more options for meeting the Interim Target.

Strategy 4: Gas conversion (Belews Creek)

- 2022 Carbon Plan Order required study of Belews Creek 100% gas conversion "as an alternative to investing in new natural gas generating units now"
- Advantages of 100% conversion:
  - Could maintain +1,110 MW after retiring from coal and assist with Interim Target.
  - Initial capital costs considerably less than new build CC.
- Duke's analysis was limited to 1 variant of the initial P1 portfolio and had significant limitations:
  - Higher costs assumed primarily due to: 1) cost to maintain the plant through 2041, 2) cost to secure firm fuel transportation through 2045
  - Unclear why these dates were selected versus a shorter period consistent with 2022 Order calling for an "interim or bridge" solution.
  - Scenario deferred only 425 MW of CT capacity and deferred no CC capacity (or associated FT costs)

Key takeaways

- Recent inaction on Mayo's retirement are an example of how coal retirements are being systematically delayed by Duke (and against Commission direction).
- Delayed actions have created a situation where it is now more challenging & costly to meet the 2030 Interim Target consistent with statutory guidelines.
- Going forward, Duke should be directed to pursue additional strategies (such as the 4 outlined here) for achieving timely retirements while maintaining reliability.
- This should be done in concert with other recommendations the AGO has made regarding near-term additions of renewables, battery storage, transmission, and customer-side resources.

Appendix

P1 Model-selected Solar Additions versus RZEP-enable Solar