North Carolina Utilities Commission
Public Staff

Christopher J. Ayers
Executive Director

Public Staff

- Established in 1977 by N.C. Gen. Stat. § 62-15
- Represents the using and consuming public in North Carolina Utilities Commission (NCUC) proceedings
- Key functions
  - Investigate petitions and other filings before the NCUC
  - Present independently developed testimony and recommendations to the NCUC on behalf of utility customers
  - Investigate customer complaints
  - Assist legislature regarding proposed legislation and constituent services
  - Work with state agencies, counties, and municipalities on regulated utility matters
  - Undertake studies, investigations, and stakeholder processes as requested by the NCUC
- Public Staff and the NCUC are independent agencies

What is a Carbon Plan?

- An analysis of least cost expansion plans through 2050 to meet load, accommodate unit retirements, comply with carbon reduction targets, satisfy regulatory, statutory and physical constraints, and maintain system reliability.
  - Complex modeling software used to perform linear optimization, which minimizes total portfolio cost in accordance with input data and constraints
  - Considers "all in" costs of new resources – capital, financing, transmission, fuel, maintenance, disposal
  - Modeling software is also used to test whether an expansion plan will maintain or improve system reliability
- To test robustness of proposed pathway despite significant uncertainty, multiple portfolios are presented with sensitivity analyses (high/low fuel or capital costs) and variants (access to increased natural gas supply)
  - Can help determine the "least regrets" pathway, or an expansion plan that will minimize costs to ratepayers if major assumptions turn out to be incorrect
- Major points of uncertainty help identify and mitigate significant risks

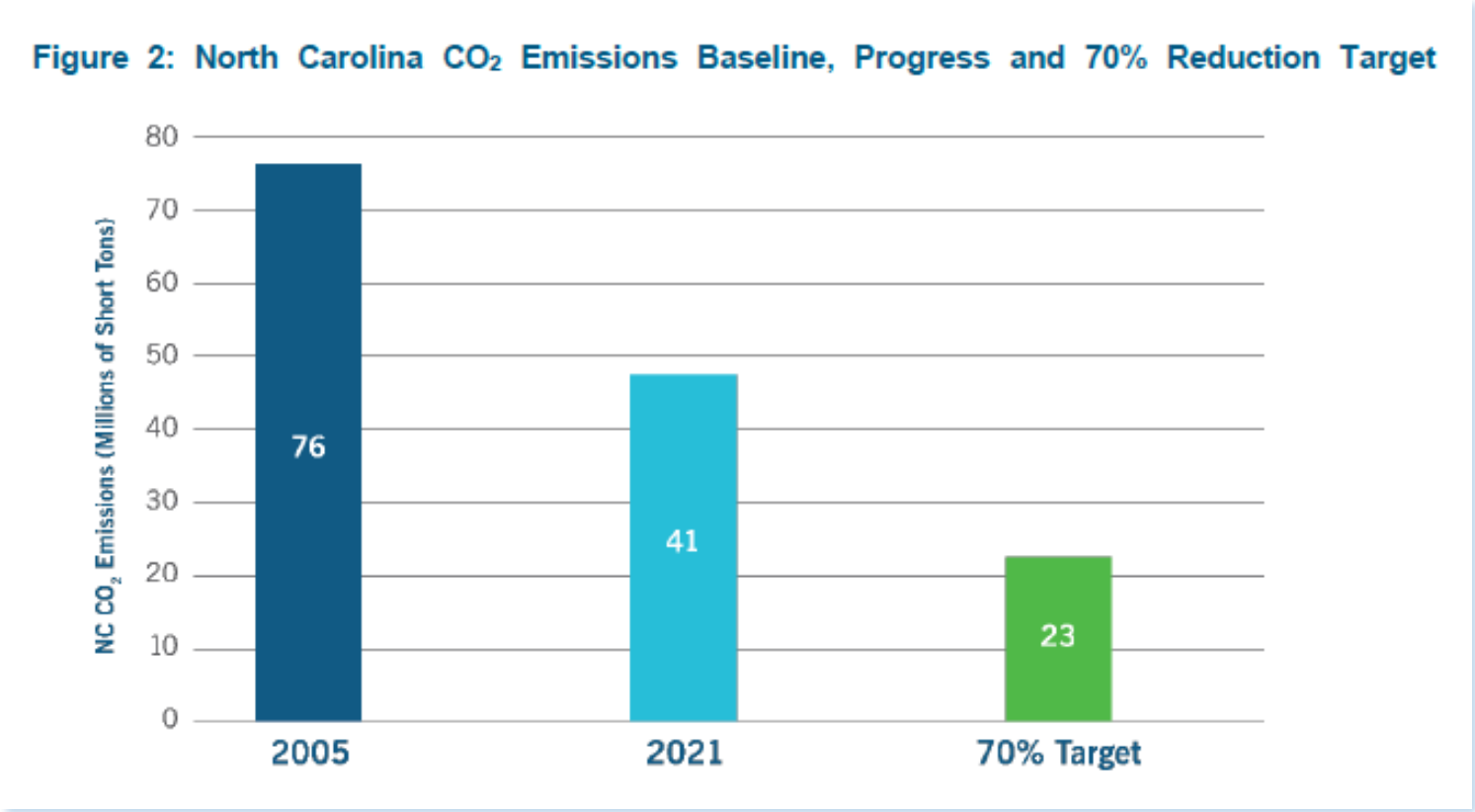
2022 Carbon Plan Schedule

- October 2021 – HB 951 signed into law
- November 2021 – NCUC opens docket and issues scheduling order
- January 2022 – Stakeholder meetings begin
- May 2022 – Duke files Proposed Carbon Plan
- July 2022 – Public Staff and intervenors file comments and alternate plans
- August 2022 – Duke files direct testimony
- September 2022 – Public Staff and intervenors file direct testimony
- September 2022 – Duke files rebuttal testimony
- September 2022 – Public Staff, intervenors, and Duke file comments on non-hearing issues
- September 2022 – Evidentiary hearing
- October 2022 – Parties file proposed orders and briefs
- December 31, 2022 – Commission issues 2022 Carbon Plan

2005 CO_2 Emissions Baseline

- Electric generation facilities
  - Owned by electric public utility
  - Operated by electric public utility
  - Operated on behalf of the electric public utility
- Only carbon dioxide emissions
- Only emissions from electric generating facilities
- Only emissions from facilities located within North Carolina
- Only direct emissions

2005 CO_2 Emissions Baseline



Source: Duke Proposed Carbon Plan, Executive Summary, p. 8 (May 2022)

2022 Proposed Carbon Plan

Figure 6: 70% Portfolio Snapshot at the Time of Achievement of Interim 70% Target (date of achievement varies across portfolios)

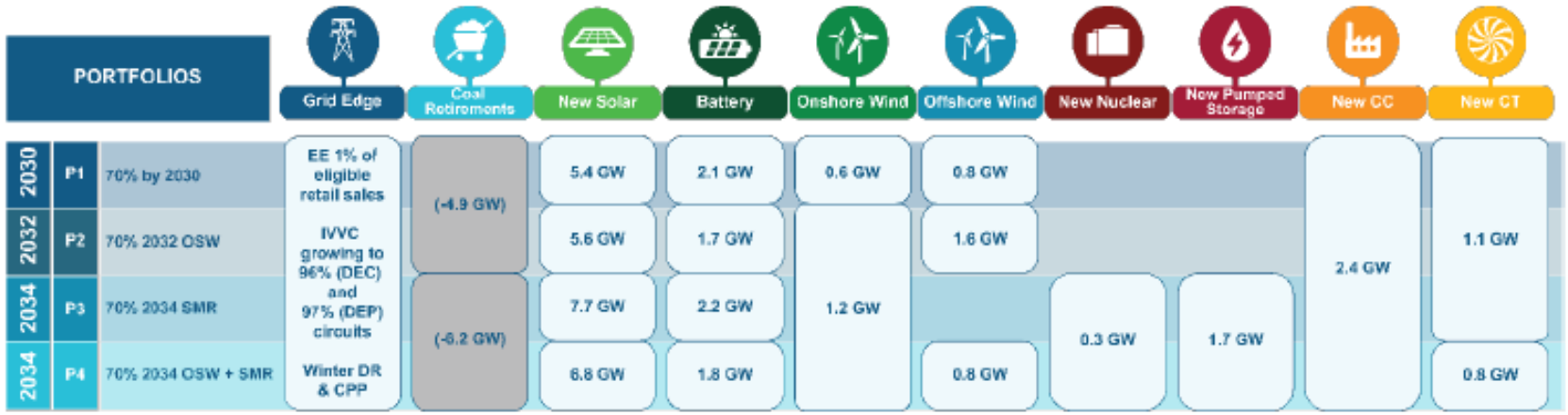
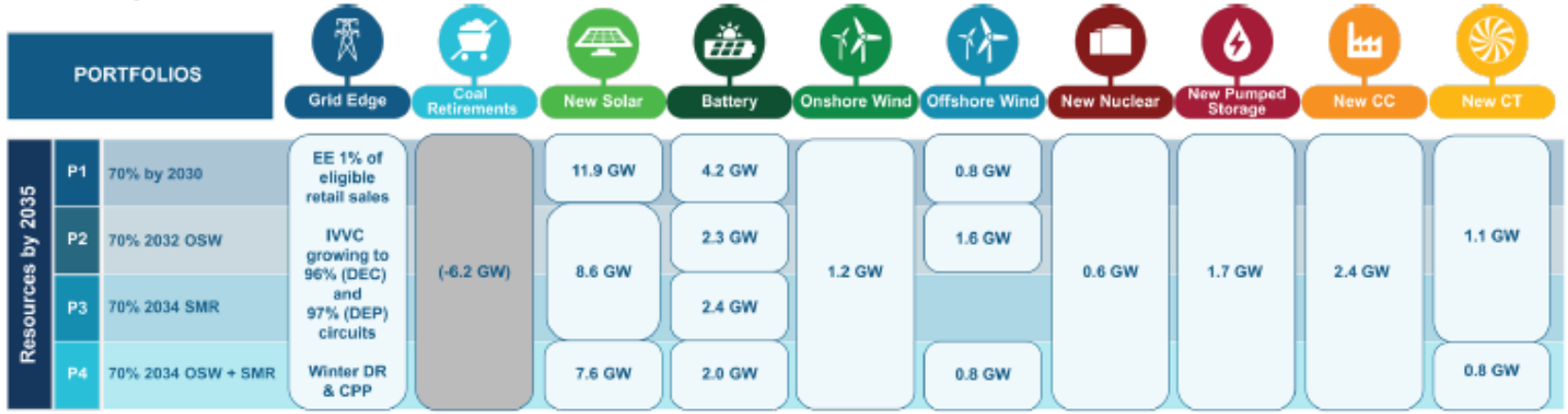


Figure 7: Portfolio Snapshot in 2035



Source: Duke Proposed Carbon Plan, Executive Summary, p. 14 (May 2022)

2022 Proposed Carbon Plan

Resource	Amount	Proposed Near-Term Actions
Proposed Resource Selections: In-Service through 2029		
Carbon Plan Solar	3,100 MW	• Begin Public Policy Transmission projects in 2022[6] • Procure 3,100 MW of new solar 2022-2024 with targeted in service in 2026-2028, of which a portion is assumed to include paired storage
Battery Storage	1,600 MW	• Conduct development and begin procurement activities for 1,000 MW stand-alone storage and procure 600 MW storage paired with solar
Onshore Wind	600 MW	• Engage wind development community in preparation for procurement activities • Procure 600 MW in 2023-2024
New CT[1]	800 MW	• Submit CPCN for 2 CTs totaling 800 MW in 2023
New CC[2]	1,200 MW	• Submit first CPCN for 1,200 MW in 2023 • Evaluate options for additional gas generation pending determination of gas availability
Proposed Resource Development: Options for 70% Interim Target		
Offshore Wind[3]	800 MW	• Secure lease • Initiate development and permitting activities for 800 MW[7] • Conduct interconnection study • Initiate preliminary routing, right-of-way acquisition for transmission
New Nuclear[4]	570 MW	• Begin new nuclear early site permit ("ESP") for one site • Begin development activities for the first of two SMR units
Pumped Storage Hydro[5]	1,700 MW	• Conduct feasibility study for 1,700 MW • Develop EPC strategy • Continued development of FERC Application for Bad Creek relicensing

Source: Duke Proposed Carbon Plan, Executive Summary, p. 23 (May 2022)

2022 Proposed Carbon Plan

CARBON PLAN PORTFOLIOS	P1		P2		P3		P4	
RESOURCES [MW] START OF YEAR (2030 | 2035)								
Total Contribution from Grid Edge & Customer Programs[1]	3,486	4,230	3,486	4,230	3,486	4,230	3,486	4,230
Total System Solar[2, 3]	12,307	18,829	10,432	15,604	10,657	15,604	10,357	14,554
Incremental System Solar (excludes projects in development)[2]	5,400	11,850	3,525	8,625	3,750	8,625	3,450	7,575
Incremental Onshore Wind[2]	600	1,200	600	1,200	600	1,200	600	1,200
Incremental Offshore Wind[2]	800	800	800	1,600	0	0	0	800
Incremental SMR Capacity[2]	0	570	0	570	0	570	0	570
Incremental Energy Storage[2, 4]	2,067	5,671	1,092	3,815	1,030	3,852	917	3,477
Incremental Gas (CC)[2, 6]	2,430	2,430	2,430	2,430	2,430	2,430	2,430	2,430
Incremental Gas (CT)[2, 6]	1,128	1,128	0	1,128	0	1,128	0	752
Remaining Dual Fuel Coal Capacity[2, 8]	4,387	3,069	4,387	3,069	4,387	3,069	4,387	3,069
Early Coal Retirements	*Subcritical by 2030; MSS 3&4 in 2032*		*Subcritical by 2030 except Rox 3&4 in 2031; MSS 3&4 in 2032*		*Subcritical by 2030 except Rox 3&4 in 2033; MSS 3&4 in 2032*		*Subcritical by 2030 except Rox 3&4 in 2033; MSS 3&4 in 2032*	
Total Coal Retirements [MW] by End of 2035	8,445		8,445		8,445		8,445	
COST & AFFORDABILITY (2030 | 2035)								
Average Monthly Residential Bill Impact for a Household Using 1000kWh (DEP) [$/month]	$35	$45	$29	$45	$19	$31	$18	$34
Average Monthly Residential Bill Impact for a Household Using 1000kWh (DEC) [$/month]	$8	$33	$5	$30	$7	$29	$5	$28
Present Value Revenue Requirement (PVRR) through 2050 (DEP/DEC Combined System) [$B]	$101		$99		$95		$96	
PVRR through 2050 (DEP) [$B]	$42		$42		$38		$39	
PVRR through 2050 (DEC) [$B]	$59		$56		$57		$56	
CO_2 EMISSIONS IMPACT (2030 | 2035)								
NC CO_2 Reduction[8]	71%	80%	66%	77%	65%	74%	64%	74%
System CO_2 Reduction[9]	70%	78%	65%	76%	63%	72%	63%	72%
Year in which 70% NC CO_2 Reduction Achieved	2030		2032		2034		2034	
RELIABILITY & FLEXIBILITY (2030 | 2035)								
95th Percentile Expected Net Load Ramp [MW/hr][9]	6,604	10,803	5,341	8,621	5,506	8,656	5,296	7,922
Average CC Starts per Unit per Year	53	99	35	77	34	75	29	67
EXECUTABILITY								
Annual Solar Additions Reached to Achieve 70% (MW/yr | vs. Historical Maximum)[2, 10]	1,800	2.4X	1,350	1.8X	1,350	1.8X	1,350	1.8X
Cumulative Additions of New-to-the-Carolinas Resource Types [MW] (2030 | 2035)[2, 11]	3,140	6,480	2,170	5,380	1,270	3,820	1,150	4,210
Overall Level of Risk to Achieving 70% CO_2 Reduction by Target Year								

Source: Duke Proposed Carbon Plan, Executive Summary, p. 8 (May 2022)

2022 Carbon Plan Order

- Issued on December 30, 2022 (Docket No. E-100, Sub 179)
- Found that ensuring system reliability is “nonnegotiable for the continued health and well-being of all North Carolinians” and that Duke is “appropriately focused” on the adequacy and reliable operation of the grid
  - Found that “the modeling approach Duke employed… considers system reliability at each progressive step.”
  - Required Duke to identify and pursue least-cost flexibility expansion projects for its existing natural gas fleet
  - Found that the coal retirement approach achieves CO_2 reductions while maintaining reliability
- Found that the least cost pathway is “squarely within the Commission’s focus.”
  - Directs Duke to investigate and “doggedly pursue” every opportunity to reduce costs
  - Finds that fuel delivery and transmission network upgrade costs must be considered holistically with the costs of new generation

2022 Carbon Plan Order - Generation

- Directed procurement of **2,350 MW** of solar in 2023-24
- Directed procurement of **1,000 MW** of stand-alone battery storage and **600 MW** of storage co-located with solar
- Ordered study of onshore and offshore wind project feasibility and costs
- Authorized development of **2,000 MW** of new gas resources
- Approval for near-term development **actions** and costs for small modular reactors
- Approval to incur project development costs associated with new pumped hydro
- Approval of certain red zone transmission expansion projects

2022 Carbon Plan Order Implementation

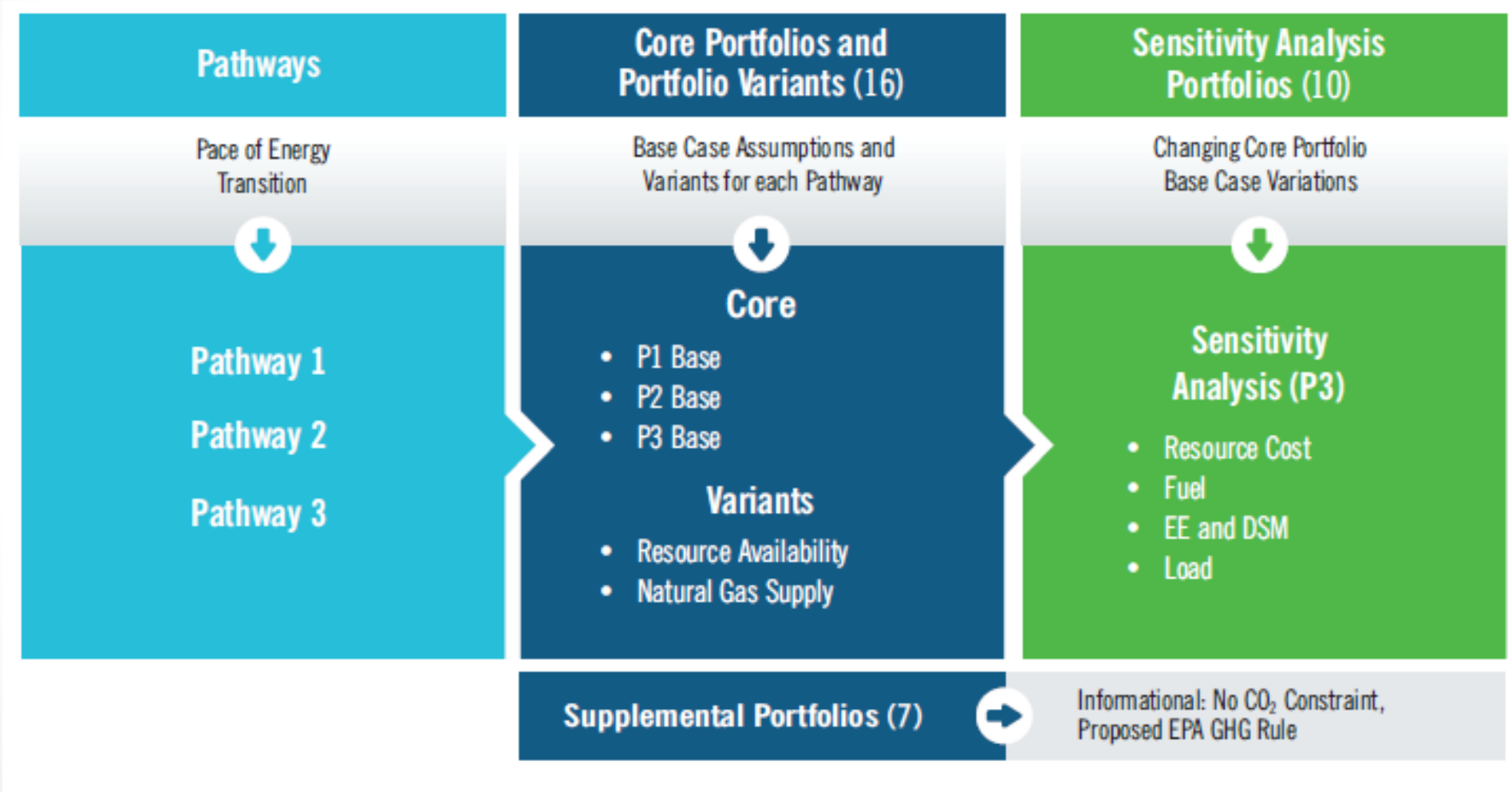
- Three competitive solicitations are underway to select solar and solar plus storage resources
  - Designed with guardrails to protect ratepayers from higher than anticipated costs
  - Each solicitation has received robust participation from the market, driving down costs
- Several large-scale battery storage projects anticipated to come online over the next 3 years (approximately 450 MW)
- Duke working with onshore and offshore wind developers to evaluate potential sites, development strategies, and costs
- CPCNs underway for natural gas facilities to be in service by 2029
- Development work underway for new nuclear
  - Belews Creek selected as the site of the first small modular reactor
- Ongoing FERC relicensing for Bad Creek pumped hydro will include expansion
- Ongoing revisions to energy efficiency and demand response framework

2023 Carbon Plan Schedule

Docket No. E-100, Sub 190

• August 17, 2023	Duke Energy filed proposed Consolidated Carbon Plan and Integrated Resource Plan (CPIRP)
• January 31, 2024	Duke Energy filed updated CPIRP
• April 9 - 23, 2024	Public Hearings
• May 28, 2024	Public Staff and intervenor testimony filed
• June 17, 2024	Technical conference
• July 22, 2024	Expert witness hearing begins
• December 31, 2024	Commission deadline for issuing CPIRP order

2023 Proposed Carbon Plan – Aug 2023



Source: Duke Proposed Carbon Plan, Executive Summary, p. 11 (Aug. 2023)

2023 Proposed Carbon Plan – Aug 2023

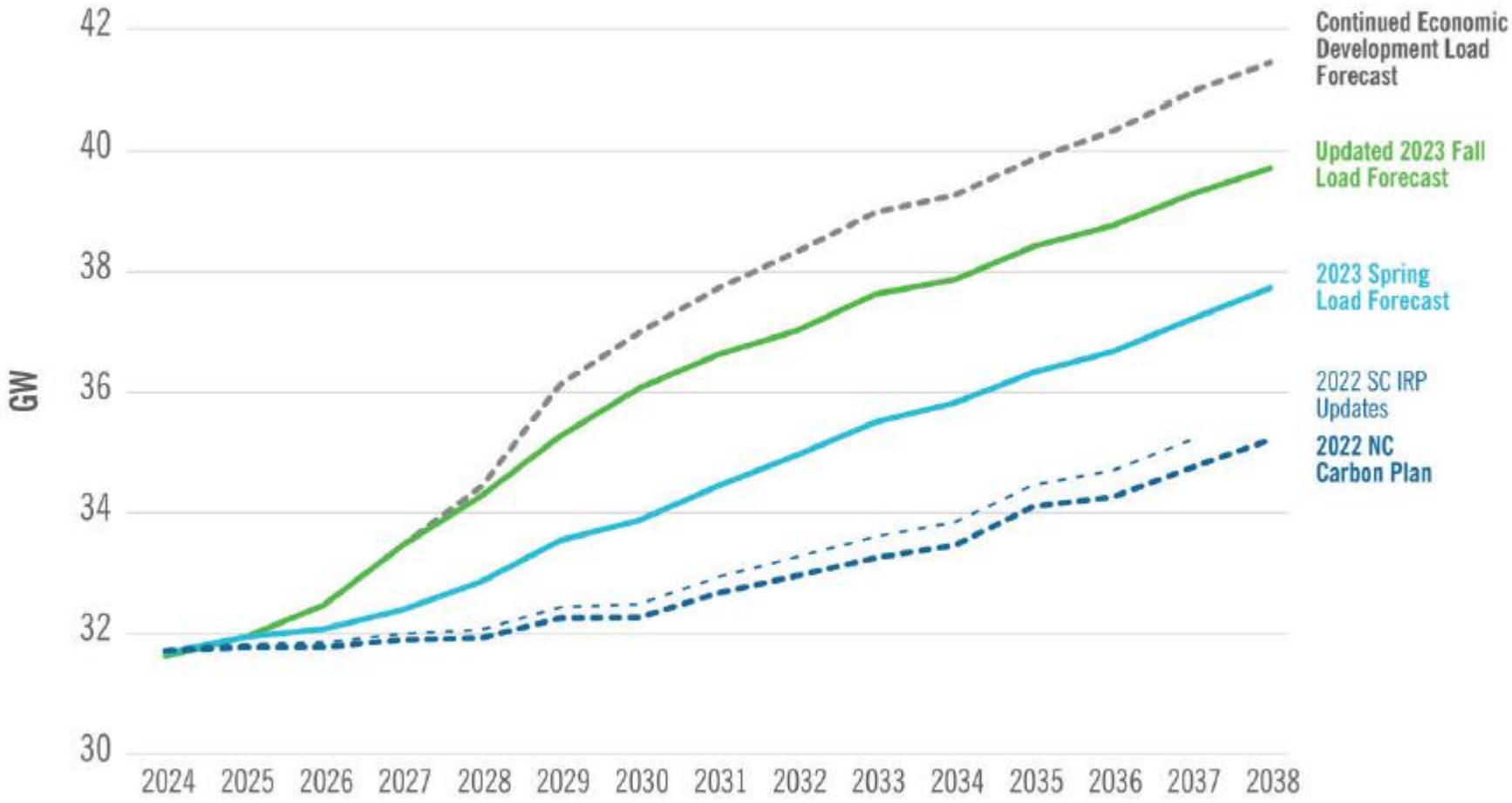
By January 1 2030	Grid Edge	Coal Retirements	Solar	Battery	CT	CC	Onshore Wind	Pumped Storage Hydro	Advanced Nuclear	Offshore Wind
P1 Base	EE at least 1% of eligible retail sales	(-7.1 GW)	6.6 GW	5.1 GW	1.7 GW	2.7 GW	0.3 GW			1.6 GW
P2 Base	IVVC growing to 96% (DEC) & 97% (DEP) circuits	(-2.2 GW)	4.1 GW	0.9 GW	2.1 GW	1.4 GW				
P3 Base	Winter DR & CPP			0.7 GW						

By January 1 2033	Grid Edge	Coal Retirements	Solar	Battery	CT	CC	Onshore Wind	Pumped Storage Hydro	Advanced Nuclear	Offshore Wind
P1 Base	EE at least 1% of eligible retail sales	(-7.1 GW)	13.4 GW	6.1 GW	2.6 GW	2.7 GW	1.5 GW			2.4 GW
P2 Base	IVVC growing to 96% (DEC) & 97% (DEP) circuits	(-6.2 GW)	8.8 GW		2.1 GW	4.1 GW	1.2 GW			1.6 GW
P3 Base	Winter DR & CPP	(-4.8 GW)		3.4 GW						

By January 1 2035	Grid Edge	Coal Retirements	Solar	Battery	CT	CC	Onshore Wind	Pumped Storage Hydro	Advanced Nuclear	Offshore Wind
P1 Base	EE at least 1% of eligible retail sales	(-8.4 GW)	14.9 GW	6.1 GW	2.6 GW	2.7 GW	2.3 GW	1.7 GW	0.6 GW	2.4 GW
P2 Base	IVVC growing to 96% (DEC) & 97% (DEP) circuits	(-6.2 GW)	11.8 GW	6.7 GW	2.1 GW	4.1 GW	1.7 GW			1.6 GW
P3 Base	Winter DR & CPP		11.9 GW	4.3 GW			2.1 GW			0-1.6 GW

Source: Duke Proposed Carbon Plan, Executive Summary, p. 15 (Aug. 2023)

2023 Proposed Carbon Plan - Load Forecast



Source: Duke Supplemental Planning Analysis, p. 8 (Jan 2024)

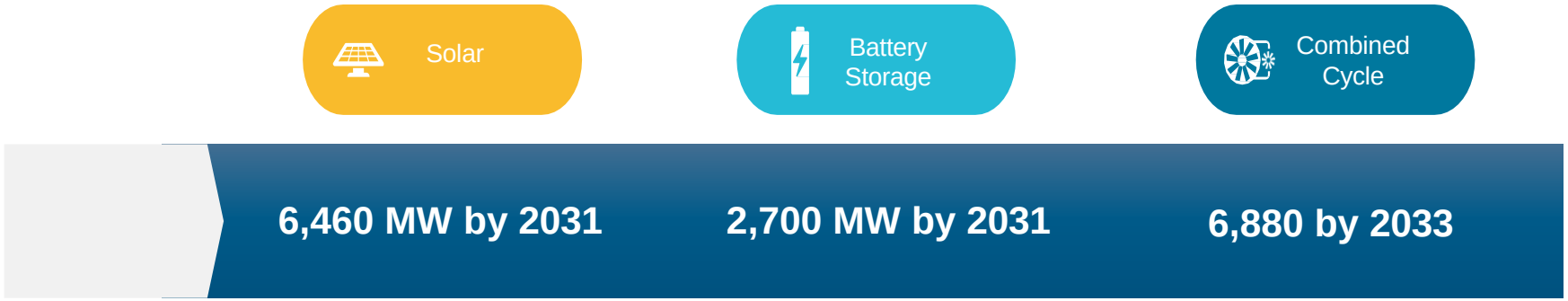
2023 Proposed Carbon Plan – Jan 2024

By January 1 2035	Grid Edge	Coal Retirements	Solar	Battery	CT	CC	Onshore Wind	Pumped Storage Hydro	Advanced Nuclear	Offshore Wind
P3 Base	EE at least 1% of eligible retail sales IVVC growing to 96% DEC & 97% DEP circuits Winter DR & CPP	-6.2 GW	11.9 GW	4.3 GW	2.1 GW	4.1 GW	2.1 GW	1.7 GW	0.6 GW	0 GW
P3 Fall Base			12.6 GW	5.1 GW		6.8 GW		1.8 GW		2.4 GW
Difference		*0 GW*	*0.7 GW*	*0.8 GW*	*0 GW*	*2.7 GW*	*0 GW*	*0.2 GW*	*0 GW*	*2.4 GW*

By January 1 2038	Grid Edge	Coal Retirements	Solar	Battery	CT	CC	Onshore Wind	Pumped Storage Hydro	Advanced Nuclear	Offshore Wind
P3 Base	EE at least 1% of eligible retail sales IVVC growing to 96% DEC & 97% DEP circuits Winter DR & CPP	-8.4 GW	14.6 GW	6.0 GW	3.0 GW	4.1 GW	2.3 GW	1.7 GW	2.4 GW	0 GW
P3 Fall Base			17.5 GW	6.3 GW	2.1 GW	6.8 GW		1.8 GW	2.1 GW	2.4 GW
Difference		*0 GW*	*2.9 GW*	*0.3 GW*	*-0.9 GW*	*2.7 GW*	*0 GW*	*0.2 GW*	*-0.3 GW*	*2.4 GW*

Source: Duke Supplemental Planning Analysis, p. 8 (Jan 2024)

2023 Proposed Carbon Plan – Proposed Near Term Actions



Near-Term Actions 2024–2026

Solar	Battery Storage	Combined Cycle
2024: 1,585 MW of solar and solar plus storage • 2025 and 2026: up to 3,460 MW of solar and solar plus storage	• 475 MW stand-alone • 965 MW of solar plus storage through procurements	• 2024: CPCN for 2 CCs (2029 & 2030) • 2025: CPCN for 2 CCs (2030, 2031)

Source: Duke Supplemental Planning Analysis, p. 9 (Jan 2024)

2023 Proposed Carbon Plan – Proposed Near Term Actions

	Combustion Turbine	Onshore Wind	Pumped Storage Hydro
	2,125 MW by 2031	**1,200 MW by 2033**	**1,834 MW by 2034**
Near-Term Actions 2024–2026	• 2024: CPCN for 2 CTs (2029) • 2025: CPCN for 2 CTs (2030) • 2026: CPCN for 1 CT (2031)	Site feasibility studies and siting development	• 2024: CPCN in South Carolina • 2025 and 2026: North Carolina CPCN and federal license application

Source: Duke Supplemental Planning Analysis, p. 9 (Jan 2024)

2023 Proposed Carbon Plan – Proposed Near Term Actions

	Advanced Nuclear	Offshore Wind
	600 MW by 2035	**2,400 MW by 2035**
Near-Term Actions 2024–2026	• Site 1: Choose reactor technology, submit early site permit, develop construction permit/license application, contract with reactor vendor, order long-lead equipment • Site 2: Develop and submit ESP, begin construction permit/license application	• Conduct Acquisition Request for Information • Stakeholder engagement • Continue limited development of onshore transmission

Source: Duke Supplemental Planning Analysis, p. 9 (Jan 2024)

Appendix

HB 951 Parameters

- All resources selected must be utility-owned, but for new solar ownership
  - 45% - third party power purchase agreements (PPAs)
  - 55% - utility built or purchased
- Must maintain or improve reliability
- Discretion to determine “optimal timing and generation and resource-mix to achieve the least cost path to compliance”
  - Cannot exceed 2030 by more than two years
    - Exceptions:
      - Construction of nuclear or wind facilities
      - Necessary to maintain adequacy and reliability of the existing grid
- Competitive procurement of renewable energy facilities
  - Eliminates 45-month termination period
  - Authorized a 2022 solar procurement
- Requires DEQ to develop solar decommissioning plan

HB 951 Parameters

- Established carbon reduction requirement from 2005 levels
  - 70% by 2030
  - Carbon neutrality by 2050
- Applies only to electric public utilities serving at least 150,000 customers as of January 1, 2021
- Required NCUC to adopt a Carbon Plan no later than December 31, 2022
  - Stakeholder input
    - Minimum of three stakeholder sessions
  - Requires least cost planning and compliance
  - Plan reviewed every two years

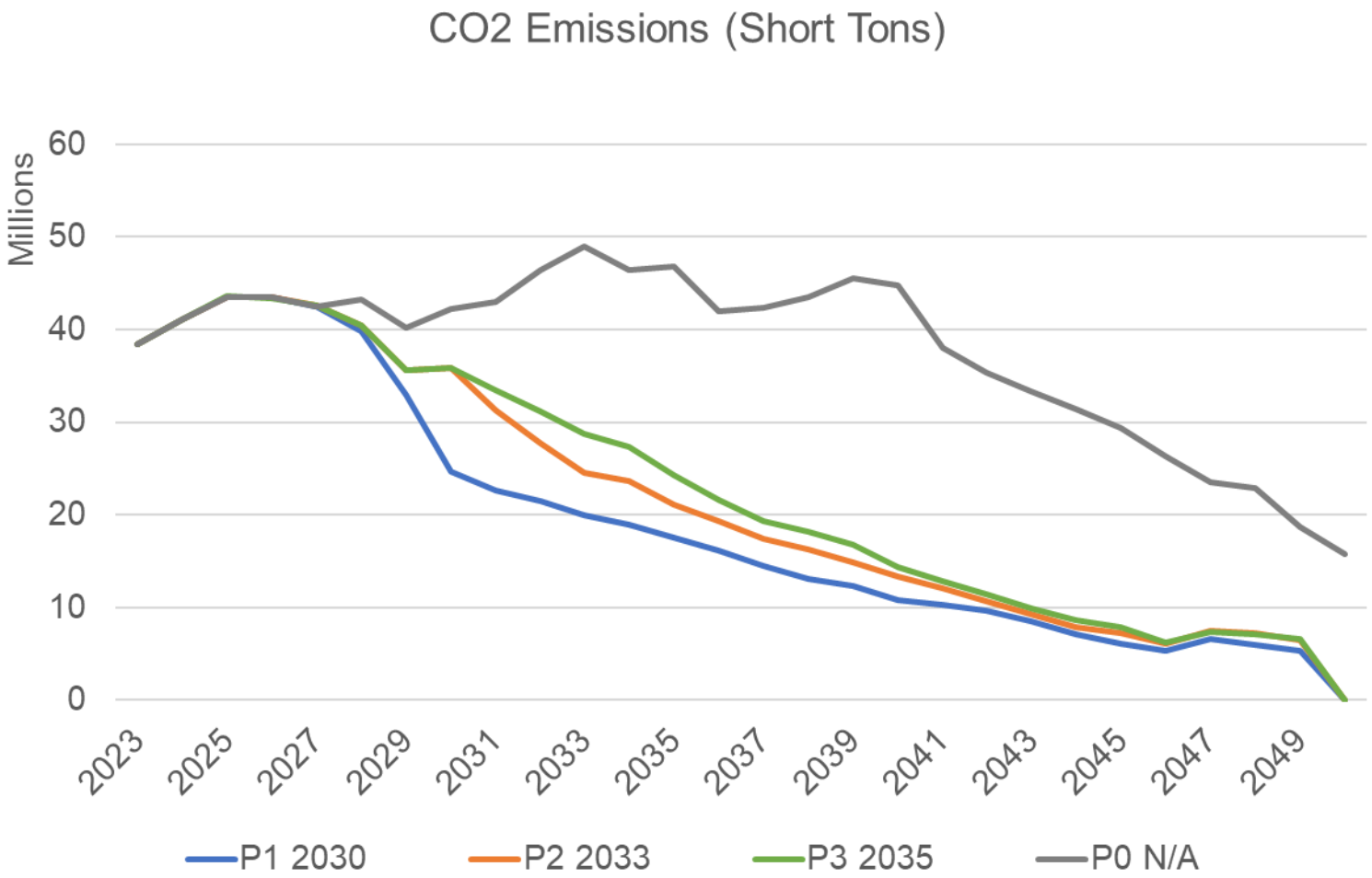
2022 Carbon Plan Order

The Commission notes that N.C.G.S. § 62-110.9(3) provides expressly that the Commission, in developing the Carbon Plan, *must* "[e]nsure any generation and resources changes maintain or improve upon the adequacy and reliability of the existing grid." The Commission is persuaded by the testimony of the Duke and Public Staff witnesses supporting and underscoring the need for the various steps taken to assess and ensure the reliable operation of the system, and is persuaded that Duke, in developing its Carbon Plan proposal, appropriately focused on maintaining adequacy and reliability of the existing grid. The Commission takes special note of the six specific risks to reliability Duke identifies and directs Duke to address robustly each of those risks, with updated information and modeling where appropriate, in its upcoming CPIRP filing. The Commission agrees with Public Staff witness Metz and with Duke, that "[n]ot all system operational factors can be captured within a model," and directs Duke to work with the Public Staff in leveraging actual operational experience to continue to plan for the future, mitigate foreseeable risk, and prepare for the challenges ahead.

The Commission concludes that ensuring system reliability and compliance with mandatory reliability standards in the face of the ongoing energy transition is a requirement of state law, is an obligation uniquely held by Duke and overseen by this Commission, and is nonnegotiable for the continued health and well-being of all North Carolinians.

Order Adopting Initial Carbon Plan and Providing Direction for Future Planning, Docket No. E-100, Sub 179, p. 56 (Dec. 2022)

Projected CO_2 Emission Reductions



2023 Proposed Carbon Plan (Aug 2023)

CAROLINAS RESOURCE PLAN PORTFOLIOS	P1 Base		P2 Base		P3 Base	
DEC/DEP COMBINED SYSTEM RESOURCES [NAMEPLATE MW] START OF YEAR	**2033**	**2038**	**2033**	**2038**	**2033**	**2038**
Total Contribution from Grid Edge & Customer Programs[1]	2,087	2,536	2,087	2,536	2,087	2,536
Incremental System Solar (excl. ~3,000 MW of projects in dev.)	13,350	15,750	8,775	14,100	8,775	14,625
Incremental Onshore Wind	1,500	2,250	1,200	2,100	1,200	2,250
Incremental Offshore Wind	2,400	2,400	1,600	1,600	0	0
Incremental Advanced Nuclear Capacity	0	3,000	0	2,400	0	2,400
Incremental Energy Storage[2]	6,374	8,054	6,314	8,894	3,694	7,954
Incremental Gas (CC)[3]	2,720	2,720	4,080	4,080	4,080	4,080
Incremental Gas (CT)[3]	2,550	2,550	2,125	2,125	2,125	2,975
Remaining Coal Capacity[4]	2,162	0	3,064	0	4,473	0
Total Coal Retirements [MW] by End of 2035[4]	**8,445**		**8,445**		**8,445**	
PORTFOLIO COST (2033/2038)	**2033**	**2038**	**2033**	**2038**	**2033**	**2038**
Average Monthly Residential Bill Impact for a Household Using 1000kWh (DEP/DEC Combined System) [$/month] 2033 | 2038[5]	$60	$70	$48	$56	$35	$55
Average Monthly Residential Bill Impact for a Household Using 1000kWh (DEP) [$/month] 2033 | 2038[5]	$86	$77	$72	$63	$41	$48
Average Monthly Residential Bill Impact for a Household Using 1000kWh (DEC) [$/month] 2033 | 2038[5]	$41	$65	$32	$51	$30	$59
	2038	**2050**	**2038**	**2050**	**2038**	**2050**
Present Value Revenue Requirement (PVRR) (DEP/DEC Combined System) through 2038 | 2050 [$B]	$76	$139	$69	$124	$66	$119
PVRR (DEP) [$B] through 2038 | 2050	$34	$62	$28	$53	$26	$48
PVRR (DEC) [$B] through 2038 | 2050	$42	$77	$40	$71	$40	$71
INCREASINGLY CLEAN RESOURCE MIX	**2033**	**2038**	**2033**	**2038**	**2033**	**2038**
CO2 Intensity (DEP/DEC Combined) [lbs/MWh]	217	131	267	163	313	182
Year in which 70% CO2 Reduction Achieved	**2030**		**2033**		**2035**	
RELIABILITY & FLEXIBILITY	**2033**	**2038**	**2033**	**2038**	**2033**	**2038**
95th Percentile Expected Net Load Ramp (MW/hr)	12,122	13,581	9,206	12,553	9,201	12,880
Average CC Starts per Unit per Year	86	90	39	64	60	81
ENERGY TRANSITION RISK ASSESSMENT	**2033**	**2038**	**2033**	**2038**	**2033**	**2038**
Cumulative Nameplate MW Additions of Resources with Limited Operational History in the Carolinas[6]	10,274	15,704	9,114	14,994	4,894	12,604
Cumulative Nameplate MW Additions, Combined Carolinas System[7]	31,907	39,737	27,107	38,312	22,887	37,297
Cumulative Nameplate MW Additions as % of Current Combined Carolinas System	73%	91%	62%	88%	53%	86%
Cumulative Capital Dollar Requirement, Combined Carolinas System [$B]	$85	$130	$59	$101	$44	$92
Overall Pathway Risk Related to Cost, Reliability, and Plan Execution						

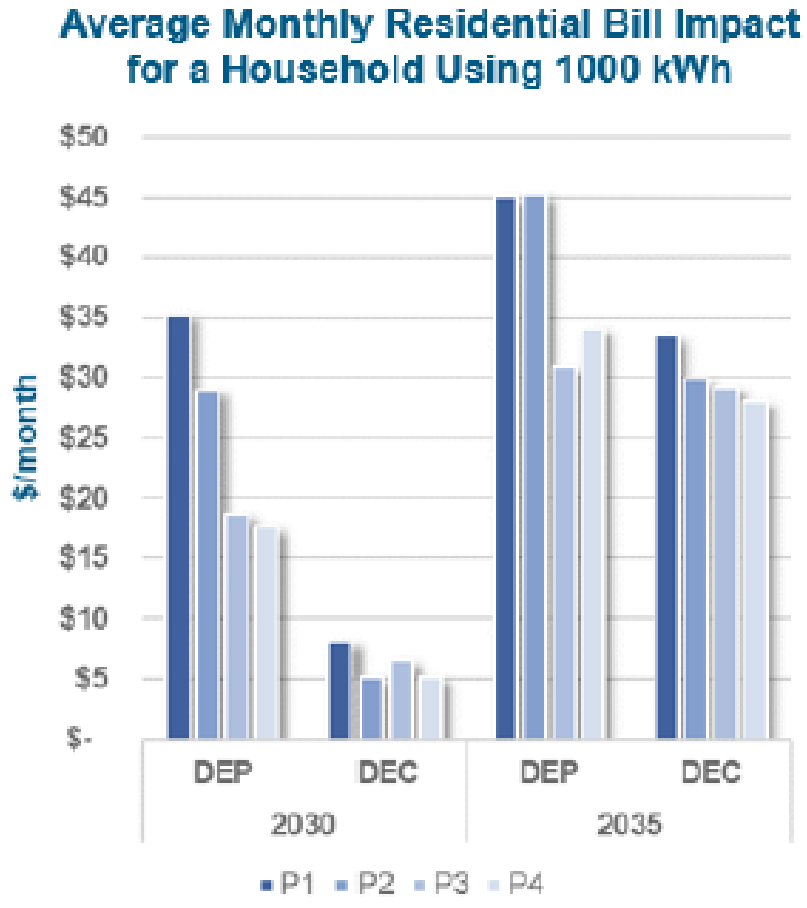
Source: Duke Proposed Carbon Plan, Executive Summary, p. 17 (Aug. 2023)

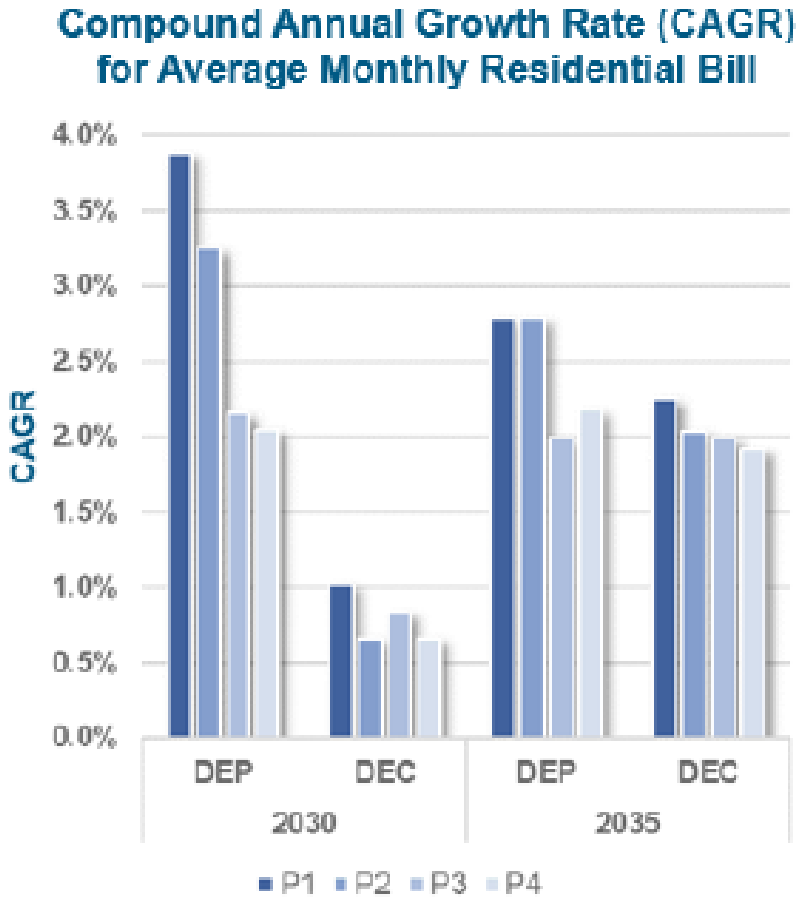
2023 Proposed Carbon Plan (Jan 2024)

Carolinas Resource Plan Portfolios	P3 Base		P3 Fall Base		Difference	
DEC/DEP Combined System Resources [Nameplate MW] start of year (2033 | 2038)						
Total Contribution from Grid Edge & Customer Programs[1]	2,087	2,536	2,254	2,760	167	224
Incremental System Solar (excl. projects in dev.)	8,775	14,625	9,000	17,475	225	2,850
Incremental Onshore Wind	1,200	2,250	1,200	2,250	0	0
Incremental Offshore Wind	0	0	800	2,400	800	2,400
Incremental Advanced Nuclear Capacity	0	2,400	0	2,100	0	-300
Incremental Energy Storage[2]	3,694	7,954	3,053	8,627	-641	673
Incremental Gas (CC)[3]	4,080	4,080	6,800	6,800	2,720	2,720
Incremental Gas (CT)[3]	2,125	2,975	2,125	2,125	0	-850
Remaining Coal Capacity[4]	4,473	0	4,440	0	-33	0
Total Coal Retirements [MW] by End of 2035[4]	8,445		8,445		0	
Portfolio Cost						
Average Monthly Residential Bill Impact for a Household Using 1000kWh (DEP/DEC Combined System) [$/month] 2033|2038[5]	$35	$55	$54	$80	$19	$26
Average Monthly Residential Bill Impact for a Household Using 1000kWh (DEP) [$/month] 2033|2038[5]	$41	$48	$57	$81	$16	$33
Average Monthly Residential Bill Impact for a Household Using 1000kWh (DEC) [$/month] 2033|2038[5]	$30	$59	$52	$80	$21	$21
Present Value Revenue Requirement (PVRR) (DEP/DEC Combined System) through 2038|2050 [$B]	$66	$119	$78	$149	$12	$30
PVRR (DEP) [$B] through 2038|2050	$26	$48	$30	$60	$4	$12
PVRR (DEC) [$B] through 2038|2050	$40	$71	$48	$89	$8	$18
Increasingly Clean Resource Mix (2033 | 2038)						
CO_2 Intensity (DEP/DEC Combined) [lbs/MWh]	313	182	363	196	50	14
Year in which 70% CO_2 Reduction is Achieved	2035		2035		None	
Reliability & Flexibility (2033 | 2038)						
95th Percentile Expected Net Load Ramp (MW/hr)	9,201	12,880	9,185	14,571	-16	1,691
Average CC Starts per Unit per Year	60	81	17	40	-43	-41
Energy Transition Risk Assessment (2033 | 2038)						
Cumulative Nameplate MW Additions of Resources with Limited Operational History in the Carolinas[6]	4,894	10,924	5,053	13,543	159	2,619
Cumulative Nameplate MW Additions, Combined Carolinas System[7]	22,887	37,297	25,764	44,563	2,877	7,266
Cumulative Nameplate MW Additions as % of Current Combined Carolinas System	53%	86%	60%	103%	7%	17%
Cumulative Capital Dollar Requirement, Combined Carolinas System [$B]	$44	$92	$61	$128	$17	$36
Overall Pathway Risk Related to Cost, Reliability, and Plan Execution					Risk Increased	

Source: Duke Supplemental Planning Analysis, p. 42 (Jan. 2024)

2022 Proposed Carbon Plan





Source: Duke Proposed Carbon Plan, Executive Summary, p. 21 (May 2022)

2023 Proposed Carbon Plan

Source: Duke Supplemental Planning Analysis, p. 11 (Jan. 2024)