

**STATE OF NORTH CAROLINA  
UTILITIES COMMISSION  
RALEIGH**

DOCKET NO. E-7, SUB 1214

In the Matter of:	)	
Application by Duke Energy Carolinas, LLC,	)	<b>DIRECT TESTIMONY OF</b>
for Adjustment of Rates and Charges	)	<b>RACHEL S. WILSON ON</b>
Applicable to Electric Utility Service in	)	<b>BEHALF OF SIERRA CLUB</b>
North Carolina	)	<b>(UPDATED FEB. 25, 2020)</b>

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1    **I.       INTRODUCTION AND QUALIFICATIONS**

2    **Q       Please state your name, business address, and position.**

3    **A**     My name is Rachel Wilson and I am a Principal Associate with Synapse Energy  
4       Economics, Incorporated (“Synapse”). My business address is 485 Massachusetts  
5       Avenue, Suite 3, Cambridge, Massachusetts 02139.

6    **Q       Please describe Synapse Energy Economics.**

7    **A**     Synapse Energy Economics is a research and consulting firm specializing in  
8       electricity industry regulation, planning, and analysis. Synapse’s clients include  
9       state consumer advocates, public utilities commission staff, attorneys general,  
10      environmental organizations, federal government agencies, developers, and  
11      utilities.

12   **Q       Please summarize your work experience and educational background.**

13   **A**     At Synapse, I conduct analysis and write testimony and publications that focus on  
14      a variety of issues relating to electric utilities, including integrated resource  
15      planning, resource adequacy, electric system dispatch, environmental regulations  
16      and compliance strategies, and power plant economics.

17       I also perform modeling analyses of electric power systems. I am proficient in the  
18      use of spreadsheet analysis tools, as well as optimization and electricity dispatch  
19      models to conduct analyses of utility service territories and regional energy  
20      markets. I have direct experience running the Strategist, PROMOD IV,  
21      PROSYM/Market Analytics, PLEXOS, EnCompass, and PCI Gentrader models,  
22      and I have reviewed input and output data for several other industry models.

23       Prior to joining Synapse in 2008, I worked for the Analysis Group, Inc., an  
24      economic and business consulting firm, where I provided litigation support in the  
25      form of research and quantitative analyses on a variety of issues relating to the  
26      electric industry.

1 I hold a Master of Environmental Management from Yale University and a  
2 Bachelor of Arts in Environment, Economics, and Politics from Claremont  
3 McKenna College in Claremont, California.

4 A copy of my current resume is attached as Exhibit RW-1.

5 **Q On whose behalf are you testifying in this case?**

6 **A** I am testifying on behalf of Sierra Club.

7 **Q Have you testified previously before the North Carolina Utilities**  
8 **Commission?**

9 **A** Yes. I testified before this Commission in Docket No. EMP-105, Sub 0.

10 **Q What is the purpose of your testimony in this proceeding?**

11 **A** The purpose of my testimony is to evaluate the economics of the coal-fired units  
12 owned by Duke Energy Carolinas (DEC or the Company) and assess the prudence  
13 of continuing to invest in and operate these units, which include Cliffside Units 5  
14 and 6, Belews Creek Units 1 and 2, Allen Units 1-5, and Marshall Units 1-4.

15 **Q Please identify the documents and filings on which you base your opinions.**

16 **A** My findings rely primarily upon the testimony, exhibits, and discovery responses  
17 of DEC and its witnesses. I also rely to a limited extent on certain industry  
18 publications.

19 In addition to my resume, exhibits to this testimony include:

20 Confidential Exhibit RW-2: [BEGIN CONFIDENTIAL] [REDACTED]

21 [REDACTED] [END CONFIDENTIAL]

22 Confidential Exhibit RW-3: [BEGIN CONFIDENTIAL] [REDACTED]

23 [REDACTED] [END CONFIDENTIAL]

24 Exhibit RW-4: Georgia Public Service Commission. 2019. Docket No. 42310.

25 Order Adopting Stipulation as Amended

1    **II.        SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS**

2    **Q        Please summarize your primary conclusions.**

3    **A** My primary findings indicate that all DEC's coal units operated uneconomically  
4        for at least the combined three-year period from 2016 through 2018. I estimate  
5        that each of the coal units had negative net value of [BEGIN CONFID] [REDACTED]  
6        [REDACTED] [END CONFIDENTIAL] from 2016 to 2018. Despite  
7        these net losses, DEC continues to determine unit retirement dates for its coal  
8        fleet based solely on depreciation studies.

9        My analysis shows that each of DEC's coal units will continue to operate  
10       uneconomically in the future. DEC has not provided any economic assessments of  
11       the continued operation of its coal-fired units, even as low gas prices and  
12       declining costs for renewables have disadvantaged many coal units across the  
13       country. Thus, the Company has not demonstrated that continuing to invest in its  
14       coal fired units is a prudent decision and provides value to ratepayers.

15   **Q        Please summarize your primary recommendations.**

16   **A** Based on my findings, I offer the following recommendations:

- 17        1. I recommend that the Commission disallow past spending on capital projects  
18        incurred between the 2017 rate case and this rate case, given that the data show  
19        that all of DEC's coal units had negative net value in 2016 and 2017, and  
20        eleven of DEC's 13 coal units had net negative value in 2018. Capital  
21        spending during this time period should be disallowed until DEC provides  
22        evidence of an analysis demonstrating the value of the investment done at the  
23        time the investment decision was made.
- 24        2. I recommend that DEC consider operating its units seasonally and only during  
25        months of peak demand to minimize losses to ratepayers.
- 26        3. I recommend that the Commission place a cap on future capital expenditures  
27        intended to prolong the lives of the DEC coal units as generating assets, and  
28        require the utilities to come to the Commission for approval of any

1 expenditure that exceeds that cap before the expenditure can be recovered  
2 from ratepayers.

3 **III. DEC'S COAL UNIT PLANS AND PROPOSALS**

4 **Q Which DEC generating units are the focus of this testimony?**

5 **A** This testimony focuses on the economics of DEC's 13 coal units for which the  
6 utility is seeking cost recovery in this case. These include Cliffside Units 5 and 6,  
7 Belews Creek Units 1 and 2, Allen Units 1-5, and Marshall Units 1-4.

8 **Q What are DEC's plans regarding the future operation of these units?**

9 **A** Exhibit 1 of the Direct Testimony of John J. Spanos suggests a "probable  
10 retirement year" for each of DEC's coal units. According to this document, the  
11 probable retirement years are: 2024 for Allen Units 1-5; 2026 for Cliffside Unit 5;  
12 2034 for Marshall Units 1-4; 2037 for Belews Creek Units 1-2; and 2048 for  
13 Cliffside 6. These retirement dates accelerate the retirements of Allen Units 4 and  
14 5, Cliffside Unit 5, and Belews Creek Units 1 and 2 from those in DEC's 2019  
15 Integrated Resource Plan (IRP).<sup>1</sup>

16 **Q What is the basis for DEC's assumed coal unit retirement dates?**

17 **A** DEC bases its retirement dates on the most recent depreciation study approved by  
18 the Commission.<sup>2</sup> In the 2019 IRP, the retirement dates were based on the  
19 depreciation study approved in the 2017 rate case. Spanos Exhibit 1 is the most  
20 recent depreciation study of which DEC is seeking approval in this docket, and  
21 the retirement dates listed above come from that study. The depreciation in that  
22 study refers generally to the loss of service value that result from "wear and tear,  
23 decay, action of the elements, obsolescence, changes in the art, changes in  
24 demand and the requirements of public authorities."<sup>3</sup> The depreciable life span  
25 estimates for DEC's coal units specifically considered the following: life spans of

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<sup>1</sup> Duke Energy Carolinas. *2019 Integrated Resource Plan*. Page 89.

<sup>2</sup> Duke Energy Carolinas. *2019 Integrated Resource Plan*. Page 89.

<sup>3</sup> Direct Testimony of John J. Spanos. Page 3, lines 9-14.

1 similar generating units, unit age, general operating characteristics, major  
2 refurbishments, and discussions with management personnel regarding the long-  
3 term outlook for the units.<sup>4</sup>

4 **Q Did DEC provide any economic analyses of alternative retirement dates in its**  
5 **2019 IRP or in this rate case?**

6 **A** No. DEC has not provided any economic analyses of alternative retirement dates  
7 for its coal units. DEC was ordered to do such an analysis as part of its 2020 IRP,<sup>5</sup>  
8 however, which is expected in September 2020.

9 **Q What is the implication of this lack of analysis?**

10 **A** The implication of this lack of analysis is that DEC has assumed that it is cost-  
11 effective for ratepayers if the utility operates its coal units based solely on their  
12 depreciable lives rather than performing an economic assessment. DEC has  
13 therefore provided no justification for continuing to invest in its coal units, and  
14 thus no basis for asking its customers to pay for capital expenditures associated  
15 with continued operation.

16 **Q Have recent electricity market trends affected the economics of coal units in**  
17 **the United States?**

18 **A** Recent market trends have had a negative impact on the general economics of  
19 coal units across the country and led to a sizable number of retirements.  
20 According to the U.S. Energy Information Administration (EIA), more than  
21 65,000 MW of coal capacity retired between 2007 and 2018.<sup>6</sup> Coal retirements in  
22 2018 alone totaled 12,900 MW.<sup>7</sup> A range of factors have contributed to these  
23 retirements, including sustained low gas prices and increased competition from  
24 renewables, which can be expected to persist in the future. Competition from gas

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<sup>4</sup> Spanos Exhibit 1. Page 40.

<sup>5</sup> North Carolina Utilities Commission. August 27, 2019. *Order Accepting Integrated Resource Plans and REPS Compliance Plans, Scheduling Oral Argument, and Requiring Additional Analyses*.

<sup>6</sup> U.S. EIA. 2018. *Today in energy: U.S. coal consumption in 2018 expected to be the lowest in 39 years*. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=37817>.

<sup>7</sup> U.S. EIA. 2019. *Today in energy: More than 60% of electric generating capacity installed in 2018 was fueled by natural gas*. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=38632>.

1 and renewables has led to decreases in capacity factors at the coal units that have  
2 continued to operate.<sup>8</sup>

3 **Q Have other utilities responded to these changes in the electric sector by**  
4 **conducting retirement assessments of their coal units?**

5 **A** Yes. Economic assessments of existing coal units have become an increasingly  
6 common component of utility resource planning. In its 2018 IRP, Northern  
7 Indiana Public Service Company (NIPSCO) examined alternative retirement dates  
8 for its five existing coal units, concluding that customers would save more than \$4  
9 billion by retiring those units in 2023 rather than operating them until 2030.<sup>9</sup>  
10 PacifiCorp's 2019 IRP includes a unit-by-unit retirement analysis of alternative  
11 retirement dates, years before the end of the units' depreciable lives, for each of  
12 its 22 coal units across its six-state service territory.<sup>10</sup> Georgia Power's 2019 IRP  
13 also included a retirement analysis for each of its existing coal units.<sup>11</sup>

14 **Q What are the important characteristics of a rigorous coal unit retirement**  
15 **analysis?**

16 **A** A rigorous analysis would include all costs and benefits associated with near-term  
17 and mid-term retirement dates. The continued operation of each coal unit would  
18 be compared to an optimized replacement resource portfolio, rather than a single  
19 replacement resource, that can provide all of the services that would otherwise be  
20 provided by the retiring unit. The cost of replacement resources should be  
21 informed by recent all-source requests for proposals (RFPs).

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<sup>8</sup> U.S. EIA. 2018. *Today in energy: U.S. coal consumption in 2018 expected to be the lowest in 39 years*. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=37817>.

<sup>9</sup> Northern Indiana Public Service Company LLC. 2018. *Integrated Resource Plan*. Available at: <https://www.nipsco.com/docs/librariesprovider11/rates-and-tariffs/irp/2018-nipsco-irp.pdf?sfvrsn=15>.

<sup>10</sup> Utility Dive. 2019. *PacifiCorp sees 2 GW coal retirement, \$599M savings by 2040 in latest planning scenarios*. Available at: <https://www.utilitydive.com/news/pacifiCorp-sees-2-gw-coal-retirements-599m-savings-by-2040-in-latest-plann/562670/>.

<sup>11</sup> Georgia Power. 2019. *Technical Appendix Volume 2: Unit Retirement Study to 2019 Integrated Resource Plan*. Georgia Public Service Commission Docket No. 42310.



1 **IV. COAL-RELATED COSTS FOR WHICH DEC IS SEEKING RECOVERY**

2 **Q What types of coal unit expenses is DEC seeking to recover through this**  
3 **case?**

4 **A** DEC is seeking to recover three types of expenses associated with its coal-fired  
5 units in this case: operations and maintenance (O&M) expenses, ongoing capital  
6 expenditures, and previously incurred capital expenditures associated with unit  
7 maintenance and environmental projects.

8 **A What is the test year upon which DEC's rate case application is based?**

9 The test period is January 1, 2018 through December 31, 2018.

10 **Q What levels of O&M expense did DEC incur at its coal units in 2018?**

11 **A** The plant-specific O&M expenses incurred by DEC in 2018 are listed in Table 1.  
12 DEC's total 2018 O&M expense at its four coal plants totals \$192.8 million.

13 **Table 1. DEC coal plant O&M expense, 2018**

Cost Description	Allen	Belews Creek	Cliffside	Marshall
500 - Oper, Supv, and Engr Exp	\$ 2,509,861	\$ 3,864,728	\$ 2,808,785	\$ 4,440,801
502 - Steam Exp	\$ 5,259,905	\$ 16,818,140	\$ 15,502,867	\$ 15,631,121
505 - Electric Exp	\$ 1,640,748	\$ 1,401,414	\$ 1,960,610	\$ 2,335,330
506 - Misc Steam Power Exp	\$ 2,806,754	\$ 5,320,866	\$ 4,096,446	\$ 5,236,860
509 - Allowances	\$ 107	\$ 1,819	\$ 581	\$ 1,693
<b>Total Operations</b>	<b>\$ 12,217,375</b>	<b>\$ 27,406,967</b>	<b>\$ 24,369,289</b>	<b>\$ 27,645,805</b>
510 - Maintenance Supv and Engr	\$ 2,128,603	\$ 4,674,208	\$ 2,565,924	\$ 3,839,799
511 - Maintenance of Structures	\$ 2,901,369	\$ 12,067,660	\$ 4,035,090	\$ 5,164,734
512 - Maintenance of Boiler	\$ 3,434,025	\$ 13,785,625	\$ 10,981,066	\$ 12,355,167
513 - Maintenance of Electric Plant	\$ 1,258,030	\$ 7,305,692	\$ 3,411,695	\$ 6,067,265
514 - Maintenance of Misc Steam Plant	\$ 487,487	\$ 2,348,327	\$ 670,184	\$ 1,650,557
<b>Total Maintenance</b>	<b>\$ 10,209,514</b>	<b>\$ 40,181,512</b>	<b>\$ 21,663,959</b>	<b>\$ 29,077,522</b>
<b>Total Operation &amp; Maintenance</b>	<b>\$ 22,426,889</b>	<b>\$ 67,588,479</b>	<b>\$ 46,033,248</b>	<b>\$ 56,723,327</b>

14 *Source: Sierra Club DR 2-1 Attachment 1.xlsx.*

**Q What levels of capital expense did DEC incur at its coal units in 2018?**

**A** The plant-specific capital expenses incurred by DEC in 2018 are listed in Table 2. DEC's total 2018 capital expense at its four coal plants totals \$509.4 million. This includes expenditures classified by the Company as associated with ash and wastewater compliance under the Coal Combustion Residuals (CCR) rule and the Effluent Limitation Guidelines (ELG) as well as capital expenditures associated with maintenance and investment.<sup>12</sup>

**Table 2. DEC coal plant capital expense, 2018**

Plant	CCR/ELG	Non-Environmental	Total CapEx
Allen	\$70,376,644	\$22,182,553	\$92,559,197
Belews Creek	\$52,831,663	\$91,945,624	\$144,777,287
Cliffside	\$14,646,379	\$100,399,363	\$115,045,743
Marshall	\$83,469,539	\$73,513,019	\$156,982,558
<b>Total</b>	<b>\$221,324,225</b>	<b>\$288,040,559</b>	<b>\$509,364,784</b>

*Source: Sierra Club 2-1c DEC Capital – Supplemental.xls.*

**Q What levels of capital expense is DEC planning to incur at its coal units in future projections?**

**A** The plant-specific capital expenses planned by DEC for the 10-year period between 2019 and 2028 are listed in Confidential Table 3. The combined environmental and non-environmental capital expenditures total almost [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL] in 2019 alone.

<sup>12</sup> Synapse sorted Duke's capital expenditures into the CCR/ELG and non-environmental categories.

1 **Confidential Table 3.** [REDACTED]

Year	Environmental				Non-Environmental				Total
	Allen	Belews Creek	Cliffside	Marshall	Allen	Belews Creek	Cliffside	Marshall	
2019									
2020									
2021									
2022									
2023									
2024									
2025									
2026									
2027									
2028									

2 *Source: CONFIDENTIAL\_SEC Sierra Club DR 2-13.xlsx, No CO2 Constraints.*

3 **V. HISTORICAL ECONOMIC STATUS OF DEC COAL UNITS**

4 **Q Did you assess the recent performance of DEC's coal units?**

5 **A** Yes. Using data provided by DEC, I evaluated the net value of each of DEC's  
6 coal units between 2016 and 2018.

7 **Q Please summarize your findings regarding the recent economic performance**  
8 **of DEC's coal units.**

9 **A** Confidential Table 4 summarizes the results of my analysis. I find that for each of  
10 DEC's coal units, the costs to maintain and operate the unit exceeded the value  
11 provided by the unit by a total of [BEGIN CONFIDENTIAL] [REDACTED]  
12 [REDACTED] [END CONFIDENTIAL] over the three-year period. [BEGIN  
13 CONFIDENTIAL] [REDACTED]  
14 [REDACTED] [END CONFIDENTIAL]

1     **Confidential Updated Table 4.** [REDACTED]

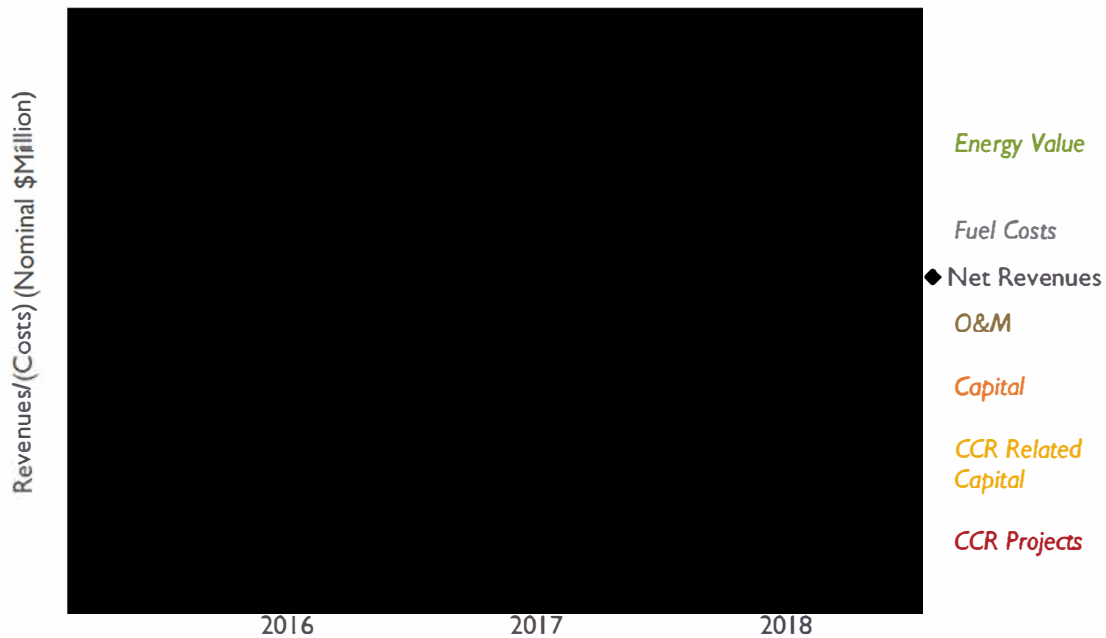
Unit	2016	2017	2018	Total
Allen 1	[REDACTED]			
Allen 2				
Allen 3				
Allen 4				
Allen 5				
Cliffside 5				
Cliffside 6				
Marshall 1				
Marshall 2				
Marshall 3				
Marshall 4				
Belews Creek 1				
Belews Creek 2				

2     *Sources: DEC discovery responses; Synapse tabulation*

3

4             Confidential Figure 1 shows the energy value and cost streams for Allen 1, as  
5             well as the unit's net revenues between 2016 and 2018. Individual results for the  
6             other 12 DEC units are shown in Confidential Exhibit RW-2.

1 Confidential Figure 1 [REDACTED]

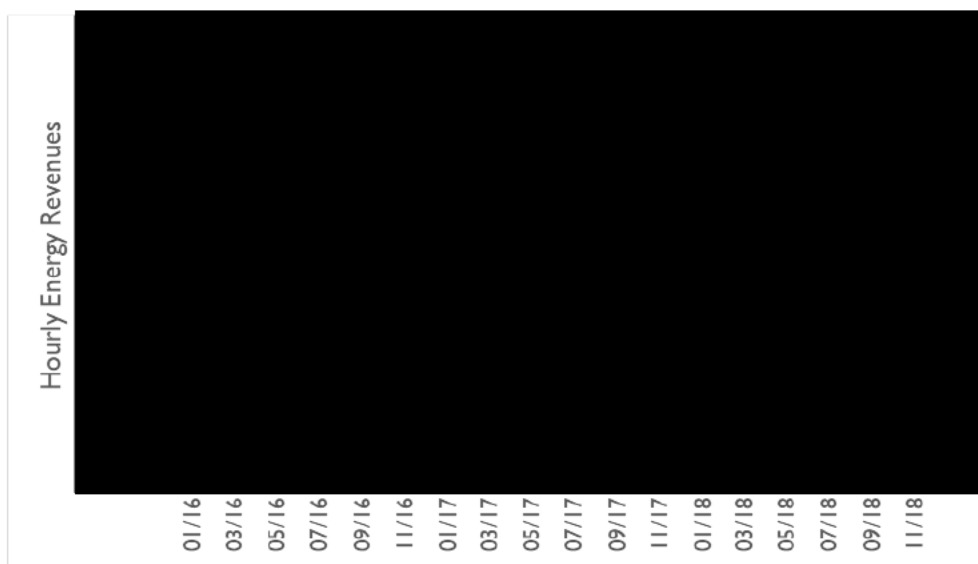


2

3 Q Why do the units have higher energy values in 2018 despite producing less  
4 energy on average compared to 2016 and 2017?

5 A This is mainly attributed to the cold snap in early 2018, as shown in Confidential  
6 Figure 2, below. The hourly lambda for the peak times in January 2018 increased  
7 to [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL]. Therefore,  
8 the units earned a disproportionate amount of value compared to previous months  
9 due to this cold snap.

1 **Confidential Figure 2.** [REDACTED]



2

3 **Q Describe how you arrived at the values in Confidential Table 4.**

4 **A** The values presented are based on data related to each unit's energy value, fuel  
5 costs, O&M costs, environmental costs, capital costs, and ash management costs.

6 DEC provided historical hourly generation for each of the units.<sup>13</sup> To calculate  
7 each unit's energy value, each unit's converted hourly net generation was  
8 multiplied by the relevant hourly DEC system lambda<sup>14</sup> as provided in  
9 discovery.<sup>15</sup>

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<sup>13</sup> DEC Response to Sierra Club DR 2-10, attachments "CONFIDENTIAL 2019 DEC NC Sierra Club 2-10 – DEC Coal HourlyProdCost2018-2019.xls" and CONFIDENTIAL 2019 DEC NC SC 2-10e- Coal HourlyProdCost 2016-2017-Supplemental.xls".

Although DEC did not specify if these hourly generation values were gross or net, a comparison to the monthly net generation values that were provided in 2-10D indicate that the hourly values were gross. Despite the fact that we had explicitly requested hourly net generation via discovery, DEC provided monthly net generation values to SC 2-10D. In DEC's response to SC 2-10E, the Company provided hourly production costs and hourly generation in MWh. Because the monthly net generation values provided in 2-10D were always smaller than the hourly generation values aggregated to the monthly level provided in 2-10E, it is valid to assume the hourly values are gross. For example, the net generation for Allen 1 in May 2016 was reported by DEC in 2-10D to be [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL] MWh. However, when the hourly MWh values for Allen 1 in May 2016 from 2-10E are summed, the result is zero. Because negative hourly generation values never appear in 2-10E, the values must be gross.

To convert the hourly gross generation to hourly net generation, the hourly gross values were multiplied by a net-to-gross ratio. This ratio was calculated by dividing the provided monthly net generation by the aggregated hourly gross generation for each unit, month, and year.

<sup>14</sup> The term "system lambda" refers to the marginal cost of electricity in a system and, in an electricity market, is the locational marginal price of energy in a given hour.

<sup>15</sup> DEC Response to Sierra Club DR 2-10, attachment "SCDR\_2-10a\_DECSystemLambda.xls".

1 DEC provided the total fuel cost burned at the plant-level, and these costs were  
2 allocated based on annual generation levels to get unit-level fuel costs.<sup>16</sup>

3 DEC also provided O&M costs at the plant-level. Although it is standard to show  
4 fixed O&M costs separately from non-fuel variable O&M costs, DEC stated in  
5 discovery that “the Company does not identify historical costs as either fixed or  
6 variable.”<sup>17</sup> For this reason, the O&M costs are shown as one category and the  
7 plant-level costs are divided into unit-level costs using annual generation levels.

8 DEC provided plant-level capital costs. For the years 2016 and 2017, these  
9 capital costs were classified by category.<sup>18</sup> These categories included  
10 “Environmental”, “Investment”, and “Maint-Maint”. The capital cost workbook  
11 also had a column to indicate if the cost was related to Coal Combustion Products.  
12 The capital costs provided for 2018 were not labeled by category, nor was there a  
13 column to indicate if the cost was related to Coal Combustion Products.<sup>19</sup> It was  
14 therefore assumed that a capital expenditure was associated with Coal  
15 Combustion Products if it had the text “CCP” or “Bottom Ash Conversion” in the  
16 project description. Because all capital costs were provided at the plant-level, they  
17 were allocated to individual units based on nameplate capacity.

18 DEC also provided cost estimates for coal ash remediation projects by plant.<sup>20</sup>  
19 These values were allocated to individual units based on nameplate capacity size.  
20 Fuel, O&M, capital costs, and coal ash management costs were subtracted from  
21 each unit’s energy value to arrive at annual net value.

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<sup>16</sup> DEC Response to Sierra Club DR 2-9, attachment “CONFIDENTIAL DEC Sierra DR 2-9i\_supplemental xls”.

<sup>17</sup> DEC Response to Sierra Club DR 2-1.

<sup>18</sup> DEC Response to Sierra Club DR 2-9, attachment “2019 DEC NC SC 2-9 j,k Capex DEC 2016-2017-Supplemental xls”.

<sup>19</sup> DEC Response to Sierra Club DR 2-1, attachment “2019 DEC NC Sierra Club 2-1 c DEC Capital – Supplemental xls”.

<sup>20</sup> DEC Response to Sierra Club DR 2-18, attachment “DEC SC 2-18.xlsx”.

1 **Q Did you evaluate the economics of the plants without the historical capital**  
2 **expenditures?**

3 **A** Yes. The results of the economic analysis that exclude historical capital  
4 expenditures are shown in Confidential Table 5. [BEGIN CONFIDENTIAL] [REDACTED]  
5 [REDACTED] [END  
6 CONFIDENTIAL]. The remaining units have a [BEGIN CONFIDENTIAL]  
7 [REDACTED]  
8 [REDACTED] [END CONFIDENTIAL]. Once again, [BEGIN CONFIDENTIAL] [REDACTED]  
9 [REDACTED]  
10 [REDACTED]  
11 [REDACTED]  
12 [REDACTED] [END CONFIDENTIAL].

13 **Confidential Table 5.** [REDACTED]

Unit	2016	2017	2018	Total
Allen 1	[REDACTED]			
Allen 2				
Allen 3				
Allen 4				
Allen 5				
Cliffside 5				
Cliffside 6				
Marshall 1				
Marshall 2				
Marshall 3				
Marshall 4				
Belews Creek 1				
Belews Creek 2				

14 **Q What are your recommendations to the Commission with regard to any**  
15 **request for recovery of past spending on capital projects at DEC's coal units?**

16 **A** I recommend that the Commission disallow past spending on capital projects  
17 incurred between the 2017 rate case and this rate case, given that the data in Table  
18 4 show that all of DEC's units had negative net value in 2016 and 2017, and  
19 eleven of DEC's thirteen units had net negative value in 2018. DEC made capital



1 investments in these coal-fired units either without evaluating the economics of  
2 continuing to operate the units, or despite the fact that the units had negative value  
3 to DEC ratepayers. Capital spending during this time period should be disallowed  
4 until DEC provides evidence of an analysis demonstrating the value of the  
5 investment done at the time the investment decision was made.

6 **Q Do you have any recommendations with respect to the operation of DEC's**  
7 **coal units?**

8 **A** The data indicate that DEC's coal units only have positive net value in years with  
9 extreme weather. DEC should thus consider operating its units seasonally and  
10 only during months of peak demand to minimize losses to ratepayers until their  
11 retirement dates.

12 **VI. FORWARD-LOOKING ECONOMIC STATUS OF DEC COAL UNITS**

13 **Q Did you also evaluate the forward-looking economic performance of DEC's**  
14 **coal units?**

15 **A** Yes. I analyzed the projected energy value of DEC's coal units in each year from  
16 2019 to 2040 using data provided by the Company.

17 **Q Please summarize the results of that forward-looking economic analysis.**

18 **A** Based on DEC's projections, I find that the Company's coal units are likely to  
19 [BEGIN CONFIDENTIAL] [REDACTED] [END  
20 CONFIDENTIAL]. Confidential Table 6 indicates that [BEGIN  
21 CONFIDENTIAL] [REDACTED]  
22 [REDACTED] [END  
23 CONFIDENTIAL]. Values for 2029 to 2040 are not shown, but the [BEGIN  
24 CONFIDENTIAL] [REDACTED] [END  
25 CONFIDENTIAL].

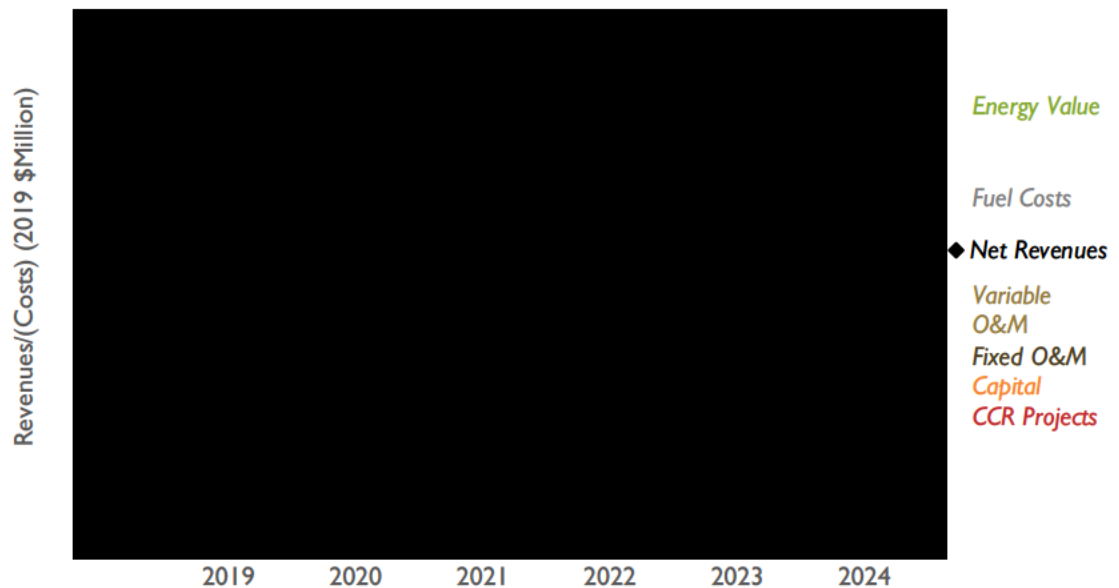
1      Confidential Table 6. [REDACTED]

Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Allen 1	[REDACTED]									
Allen 2										
Allen 3										
Allen 4										
Allen 5										
Cliffside 5										
Cliffside 6										
Marshall 1										
Marshall 2										
Marshall 3										
Marshall 4										
Belews Creek 1										
Belews Creek 2										

2

3            Confidential Figure 3 shows the projected energy value and cost streams for Allen  
4            1, as well as the unit's net revenues between 2019 and 2024. In 2019, [BEGIN  
5            CONFIDENTIAL] [REDACTED]  
6            [REDACTED] [END CONFIDENTIAL] for a unit that it planned to retire at the end of  
7            2024. Results for the remaining DEC units are shown in Confidential Exhibit  
8            RW-3.

1 Confidential Figure 3. [REDACTED]



2

3 **Q Describe how you evaluated the forward-looking economic performance of**  
4 **DEC's coal units.**

5 **A** The net values presented are based on DEC data related to each unit's projected  
6 energy revenues, fuel costs, O&M costs, and capital costs.

7 DEC declined to provide the forecasted avoided energy costs or projected energy  
8 market prices requested through discovery. In response to discovery follow ups,  
9 the only resource DEC provided was their proposed avoided cost energy rate  
10 schedule from NCUC Docket No. E-100, sub 158.<sup>21</sup> Therefore, the Variable Rate  
11 for Annualized Energy of 3.03 cents per KWh from the attachment was used to  
12 calculate projected energy revenues for each unit. The rate was taken to be in  
13 2018\$ and converted to nominal dollars for the duration of the analysis period.<sup>22</sup>

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<sup>21</sup> DEC Response to Sierra Club DR 2-14, attachment "DEC Sierra 2-14 Avoided Cost Annualized Rates.pdf".

<sup>22</sup> DEC Second Supplemental Response to Sierra Club DR 2-14.

1 DEC directly provided unit-specific capacity, capacity factor, fixed O&M, fuel  
2 costs, and capital costs based upon their 2019 IRP studies.<sup>23</sup> DEC also provided  
3 unit-specific capital costs and fixed O&M costs for Allen 4, Allen 5, and Cliffside  
4 5 based upon their 2019 depreciation study with accelerated retirement dates.<sup>24</sup>  
5 The values from the Company's "No CO2 Constraint" IRP analysis were used as  
6 given for all units except for Allen 4, Allen 5, and Cliffside 5. For those three  
7 units, the CapEx and fixed O&M data provided by the IRP study were replaced  
8 with the updated values from the depreciation study because they take into  
9 account the accelerated retirement dates. The generation, variable O&M costs,  
10 and fuel costs were adjusted to be zero in the years following the units'  
11 retirements, as opposed to the values the IRP study had assumed.

12 DEC directly provided forecasted ash management costs through 2040 by plant.<sup>25</sup>  
13 These costs were allocated to each unit using nameplate capacity.

14 Fuel, O&M, capital costs, and forecasted coal ash management costs were  
15 subtracted from energy revenues to arrive at net revenues for each plant and each  
16 year.

17 **Q What are the implications of these uneconomic results for ratepayers?**

18 **A** The continued negative values associated with DEC's coal units means that  
19 ratepayers will continue to pay for the Company's uneconomic operation of its  
20 coal fleet.

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<sup>23</sup> DEC Response to Sierra Club DR 2-13, attachment "CONFIDENTIAL 2019 DEC NC SCDR\_2-13\_a-o\_t\_DEC\_CONFIDENTIAL.xlsx".

<sup>24</sup> DEC Response to Sierra Club DR 2-5, attachment "CONFIDENTIAL 2019 DEC NC\_SierraClub\_DR2-5\_Nov2019DECRetirementAnalysis.xls".

<sup>25</sup> DEC Response to Sierra Club DR 2-18, attachment "DEC SC 2-18.xlsx".

1     **Q     Do your findings regarding the recent negative values associated with DEC's**  
2     **coal units indicate that the Company should retire all of its coal units**  
3     **immediately?**

4     **A     No.** Retirement of DEC's entire coal fleet at once would likely lead to reliability  
5     issues in DEC's service territory. It is also possible that retirement of a portion of  
6     DEC's coal fleet may improve the economics of the remaining coal units.  
7     However, the recent net losses of DEC's coal units should, at a minimum,  
8     encourage DEC to perform a rigorous economic assessment of alternative  
9     retirement dates for each of its units.

10    **Q     Are there additional reasons that DEC should evaluate alternative**  
11    **retirement dates for its coal units?**

12    **A     Yes.** On October 29, 2018, Governor Roy Cooper signed Executive Order 80,  
13    which directed the North Carolina Department of Environmental Quality to  
14    develop a Clean Energy Plan. That Plan was released in October 2019, setting a  
15    goal to reduce emissions of carbon dioxide (CO<sub>2</sub>) from the electric sector by 70  
16    percent below 2005 levels by 2030.<sup>26</sup> In a separate docket, Duke Energy Progress  
17    stated that in order to reduce emissions commensurate with North Carolina goals,  
18    as well as its own corporate goals, it would need to accelerate the pace of coal  
19    plant retirements and replace those units with low-emitting resources.<sup>27</sup>  
20    Duke Energy, DEC's parent company, also has its own carbon-reduction goals,  
21    which are to cut CO<sub>2</sub> emissions by 50 percent or more by 2030 and to attain net-  
22    zero emissions by 2050.<sup>28</sup>

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<sup>26</sup> North Carolina Department of Environmental Quality. 2019. *North Carolina Clean Energy Plan*. Available at: [https://files.nc.gov/ncdeq/climate-change/clean-energy-plan/NC\\_Clean\\_Energy\\_Plan\\_OCT\\_2019\\_.pdf](https://files.nc.gov/ncdeq/climate-change/clean-energy-plan/NC_Clean_Energy_Plan_OCT_2019_.pdf).

<sup>27</sup> Duke Energy Progress. Response to Friesian Holdings Data Request 2-8. Docket No. EMP-105, Sub 0.

<sup>28</sup> Duke Energy. *Global Climate Change*. Available at: <https://www.duke-energy.com/our-company/environment/global-climate-change>.

1     **Q**     **What are your recommendations to the Commission with regard to any**  
2     **request for recovery of future capital investments at DEC's coal units?**

3     **A**     I recommend that the Commission place a cap on future capital expenditures  
4     intended to prolong the lives of the DEC units as generating assets, and require  
5     the utilities to come to the Commission for approval of any expenditure that  
6     exceeds that cap before the expenditure can be recovered from ratepayers. The  
7     cap could be lower for units with near-term retirement dates as indicated by the  
8     most recent depreciation study, e.g. Allen Units 1-4, with a service life that ends  
9     in 2024. The cap could also be contingent upon the results of DEC's unit  
10    retirement study, to be included with the 2020 IRP.

11         Similar action has been taken in other jurisdictions. The Georgia Public Service  
12         Commission, for example, recently applied a cap to capital spending at the  
13         utility's Bowen plant in the recent 2019 proceeding.<sup>29</sup>

14   **VII.     PRUDENCE OF DEC INVESTMENTS IN ITS COAL UNITS**

15   **Q**     **Has DEC demonstrated the prudence of its historical capital investments in**  
16   **its coal units, for which it is seeking cost recovery?**

17   **A**     No. In order to demonstrate prudence in the context of utility planning, DEC  
18     would need to show that its decision to commit to a particular power plant  
19     construction project is justified. Planning prudence includes consideration of a  
20     reasonable set of alternatives, the use of appropriate models and methodologies,  
21     and the collection and application of current forecasts and data. Costs that are  
22     found by regulators to have been incurred imprudently should generally be  
23     disallowed from rates. Similarly, assets that are not used and useful should be  
24     removed from rate base. Customers should not be asked to bear the burden  
25     associated with unjustified system planning decisions.

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<sup>29</sup> Georgia Public Service Commission. 2019. Docket No. 42310. Order Adopting Stipulation as Amended. Attached as Exhibit RW-4.

1     **Q     What do you mean by “used and useful” in this context?**

2     **A**The “used” part of the “used and useful” standard is relatively straightforward.  
3           Specifically, regulators should determine whether a particular asset is physically  
4           used in providing service to customers. Examples of equipment not “used” in  
5           providing service can include power plants that have been retired from service,  
6           environmental retrofit equipment that is not operated, transmission or distribution  
7           equipment that has been removed from the grid, and previously installed meters  
8           that are uninstalled as part of a meter replacement program.

9           The “useful” portion is more complex, as a particular item can be used in  
10          providing service but not be economically useful. For example, there may have  
11          been a power plant construction project that was planned in a prudent manner but  
12          may operate at costs significantly higher than the economic value of the output for  
13          reasons beyond the utility’s control and ability to reasonably foresee. In such a  
14          circumstance a regulatory commission may find that the plant is prudent and used,  
15          but not economically useful in providing service to customers.

16    **Q     Why are these ratemaking concepts important in this docket?**

17    **A**DEC is effectively requesting that the Commission determine that its past and  
18          future capital expenditures represent prudent investments in its coal fleet. I  
19          understand that the Commission applies a presumption of prudence to utility  
20          expenditures in some circumstances. There have been no other dockets before the  
21          Commission to determine whether DEC’s capital expenditures were prudent prior  
22          to the Company actually spending the money, or whether DEC’s coal units are  
23          “used and useful.” Therefore, it is important that the Commission consider the  
24          economics of each of the units when ruling on DEC’s application in this docket.  
25          While the Commission might consider DEC’s coal fleet “used” because it  
26          provides energy to ratepayers, given the fact that the coal units are providing  
27          energy uneconomically, and increasing costs to DEC ratepayers, they are not  
28          currently “useful.”

1     **Q**     **Does DEC provide evidence in this docket of either prudence in its capital**  
2             **spending at its coal units or that they are used and useful?**

3     **A**     No. DEC witness Steve Immel testifies only to the used and usefulness of the gas  
4             conversions at Cliffside Unit 5 and 6 and Belews Creek Unit 1, stating that “The  
5             conversion of Cliffside Station and Belews Creek Unit 1 provides customers with  
6             flexibility to utilize the most cost-effective fuel. The compliance efforts and the  
7             conversion of Cliffside Station and Belews Creek Unit 1 are used and useful,  
8             providing customers reliable low-cost generation. The capital investments  
9             position the Company to provide safe, reliable, and efficient operation of these  
10            assets, with high quality performance.”<sup>30</sup>

## 11 **VIII. CONCLUSIONS AND RECOMMENDATIONS**

12    **Q**     **Please summarize your conclusions.**

13    **A**     My primary findings indicate that all DEC’s coal units operated uneconomically  
14             for at least the combined three-year period between 2016 and 2018. I estimate that  
15             each of the coal units had negative net value of [BEGIN CONFID] [REDACTED]  
16             [REDACTED] [END CONFIDENTIAL] from 2016 to 2018. Despite these net  
17             losses, DEC continues to determine unit retirement dates for its coal fleet based  
18             solely on depreciation studies and continues to invest in its uneconomic coal  
19             units.

20             My analysis shows that each of DEC’s coal units will continue to operate  
21             uneconomically in the future. DEC has not provided any economic assessments of  
22             the continued operation of its coal-fired units, even as low gas prices and  
23             declining costs for renewables have disadvantaged many coal units across the  
24             country. Thus, the Company has not demonstrated that continuing to invest in its  
25             coal fired units is a prudent decision and provides value to ratepayers.

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<sup>30</sup> Direct Testimony of Steve Immel. Page 7, lines 4-9.



1     **Q     Please summarize your recommendations.**

2     **A     Based on my findings, I offer the following recommendations:**

- 3           1. I recommend that the Commission disallow past spending on capital projects  
4           incurred between the 2017 rate case and this rate case, given that the data  
5           show that all of DEC's units had negative net value in 2016 and 2017, and  
6           eleven of DEC's thirteen units had net negative value in 2018. Capital  
7           spending during this time period should be disallowed until DEC provides  
8           evidence of an analysis demonstrating the value of the investment done at the  
9           time the investment decision was made.
- 10          2. I recommend that DEC consider operating its units seasonally and only  
11          during months of peak demand to minimize losses to ratepayers.
- 12          3. I recommend that the Commission place a cap on future capital expenditures  
13          intended to prolong the lives of the DEC units as generating assets, and  
14          require the utilities to come to the Commission for approval of any  
15          expenditure that exceeds that cap before the expenditure can be recovered  
16          from ratepayers.

17    **Q     Does this conclude your direct testimony?**

18    **A     Yes, it does.**