Curriculum Vitae -- Paul J. Alvarez MM, NPDP

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Profile

After 15 years in Fortune 500 product development and product management, including P&L responsibility, Mr. Alvarez entered the utility industry by way of demand-side management rate and program development, marketing, and impact measurement for Xcel Energy in 2001. He has since designed renewable portfolio standard compliance and distributed generation rates and incentive programs. These experiences led to unique projects involving the measurement of grid modernization costs and benefits (energy, capacity, operating savings, revenue capture, reliability, environmental, and customer experience), which revealed the limitations of current utility regulatory and governance models. Mr. Alvarez currently serves as the President of the Wired Group, a boutique consultancy serving consumer and environmental advocates, regulators, associations, and suppliers.

Appearances and Research Projects in Regulatory Proceedings

Critique of Investment in Traditional Meters (Equipped with AMR). Testimony before the New Hampshire Public Utilities Commission recommending rejection of cost recovery. DE 19-057. December 20, 2019.

Critique of Smart Meter Benefits Claimed by Puget Sound Energy. Testimony before the Washington Utility and Telecom Commission recommending rejection of cost recovery pending demonstration of benefits in excess of costs. UE-190529 and UG-190530. November 22, 2019.

Critique of Smart Meter Benefits Claimed by Rockland Electric Company. Testimony before the New Jersey Board of Public Utilities on behalf of the Division of Consumer Advocate recommending rejection of cost recovery pending demonstration of benefits in excess of costs. ER19050552. October 11, 2019.

Critique of Grid Improvement Plan Proposed by Indianapolis Power and Light. Testimony before the Indiana Utility Regulatory Commission recommending reductions in the size of the plan (\$1.2 billion) based on benefit-cost analyses of plan components. Cause 45264. October 7, 2019.

Investigation into Distribution Planning Processes. Comments to the Michigan Public Service Commission recommending a transparent, stakeholder-engaged distribution planning process. U-20147. September 11, 2019.

Investigation into Grid Modernization. Comments to the New Hampshire Public Utilities Commission recommending a transparent, stakeholder-engaged distribution planning process. IR 15-296. September 6, 2019.

Arguments to Reduce and Re-prioritize Grid Modernization Investments Proposed by Pacific Gas & Electric. Testimony before the California Public Utilities Commission. A.18-12-009. July 26, 2019.

Evaluation of Xcel Energy's Request for an Advance Determination of Prudence Regarding Natural Gas Generation Plant Purchase. Testimony before the North Dakota Public Service Commission. PU-18-403. May 28, 2019.

Critique of Smart Meter Replacement Program Implied by Proposed Duke Energy Ohio Global Settlement Agreement. Testimony before the Public Utilities Commission of Ohio on behalf of the Office of Consumer Counsel. Numerous cases including 17-0032-EL-AIR. June 25, 2018.

Support for Considering Duke Energy Grid Modernization Investments in a Distinct Proceeding. Testimony before the North Carolina Utilities Commission on behalf of the Environmental Defense Fund. E-2 Sub 1142, October 18, 2017 and E-7 Sub 1146, January 19, 2018.

Evaluation of Southern California Edison's Request to Invest \$2.3 Billion in its Grid to Accommodate Distributed Energy Resources. Testimony before the California Public Utilities Commission on behalf of The Utility Reform Network. A16-09-001. May 2, 2017.

Evaluation of Kentucky Utilities/Louisville Gas & Electric Smart Meter Deployment Plan. Testimony before the Kentucky Public Service Commission on behalf of the Kentucky Attorney General in 2016-00370/2016-00371. March 3, 2017. Also in 2018-00005 May 18, 2018

Evaluation of National Grid's Massachusetts Smart Meter Deployment Plan. Testimony before the Massachusetts Department of Public Utilities on behalf of the Massachusetts Attorney General in 15-120. March 10, 2017. Also Unitil in 15-121 and Eversource in 15-122/123, March 10, 2017

Evaluation of Pacific Gas & Electric's Request to Invest \$100 Million in Its Grid to Accommodate Distributed Energy Resources. Testimony before the California Public Utilities Commission on behalf of The Utility Reform Network, A15-09-001. April 29, 2016

Recommendations on Metropolitan Edison's Grid Modernization Plan. Testimony before the Pennsylvania Public Utilities Commission on behalf of the Environmental Defense Fund in R-2016-2547449. July 21, 2016.

Arguments to Consider Duke Energy's Smart Meter CPCN in the Context of a Rate Case. Testimony before the Kentucky Public Service Commission on behalf of the Attorney General in 2016-00152. July 18, 2016.

Evaluation of Westar Energy's Proposal To Mandate a Rate Specific to Distributed Generation-Owning Customers. Testimony before the Kansas Corporation Commission on Behalf of the Environmental Defense Fund, case 15-WSEE-115-RTS. July 9, 2015.

Regulatory Reform Proposal to Base a Significant Portion of Utility Compensation on Performance in the Public Interest. Testimony before the Maryland PSC on behalf of the Coalition for Utility Reform, case 9361. December 8, 2014.

Duke Energy Ohio Smart Grid Audit and Assessment. Primary research and report prepared for the Public Utilities Commission of Ohio case 10-2326-GE. June 30, 2011.

SmartGridCity™ Demonstration Project Evaluation Summary. Primary research and report prepared for Xcel Energy. Colorado Public Utilities Commission case 11A-1001E. October 21, 2011.

Books

Smart Grid Hype & Reality: A Systems Approach to Maximizing Customer Return on Utility Investment. Second edition. ISBN 978-0-615-88795-1. Wired Group Publishing. 360 pages. 2018.

Noteworthy Publications

The Rush to Modernize: An Editorial on Distribution Planning and Performance Measurement. With Sean Ericson and Dennis Stephens. Public Utilities Fortnightly. July 8, 2019. Pages 116+

Modernizing the Grid in the Public Interest: Getting a Smarter Grid at the Least Cost for South Carolina Customers. Whitepaper co-authored with Dennis Stephens for GridLab. January 31, 2019

Modernizing the Grid in the Public Interest: A Guide for Virginia Stakeholders. Whitepaper co-authored with Dennis Stephens for GridLab. October 5, 2018.

Measuring Distribution Performance? Benchmarking Warrants Your Attention. With Sean Ericson. Electricity Journal. Volume 31 (April, 2018), pages 1-6.

Busting Myths: Investor-Owned Utility Performance Can be Credibly Benchmarked. With Joel Leonard. Electricity Journal. Volume 30 (October, 2017), pages 45-48.

Price Cap Electric Ratemaking: Does it Merit Consideration? With Bill Steele. Electricity Journal. Volume 30, (October, 2017), pages 1-7.

Integrated Distribution Planning: An Idea Whose Time has Come. Public Utilities Fortnightly. November, 2014; also International Confederation of Energy Regulators Chronicle, 3rd Ed, March, 2015

Smart Grid Economic and Environmental Benefits: A Review and Synthesis of Research on Smart Grid Benefits and Costs. Secondary research report prepared for the Smart Grid Consumer Collaborative. October 8, 2013. Companion piece: Smart Grid Technical and Economic Concepts for Consumers.

Is This the Future? Simple Methods for Smart Grid Regulation. Smart Grid News. October 2, 2014.

A Better Way to Recover Smart Grid Costs. Smart Grid News. September 3, 2014.

Why Should We Switch to Performance-based Compensation? Smart Grid News. August 15, 2014.

The True Cost of Smart Grid Capabilities. Intelligent Utility. June 30, 2014.

Maximizing Customer Benefits: Performance Measurement and Action Steps for Smart Grid Investments. Public Utilities Fortnightly. January, 2012.

Buying Into Solar: Rewards, Challenges, and Options for Rate-Based Investments. Public Utilities Fortnightly. December, 2009.

Notable Presentations

NASUCA Annual Meeting. *Reinventing Distribution Planning in New Hampshire.* With D. Maurice Kreis, Executive Director, Office of Consumer Advocate. San Antonio, TX. November 19, 2019.

National Council on Electricity Policy Annual Meeting. Trainer on the economics of distribution grid interoperability and standard compliance; Presentation on communication network economics. Austin, TX. Sept 10-12, 2019.

NASUCA Annual Meeting. *Grid Modernization: Basic Technical Challenges Advocates Should Assert.* Orlando, FL. November 13, 2018.

Illinois Commerce Commission, NextGrid Working Group 7. Using Peer Comparisons in Distributor Performance Evaluation. Workshop 3 Presentation. Chicago, IL. July 30, 2018.

NARUC Committee on Electricity. *Using Peer Comparisons in Distributor Performance Evaluation*. Smart Money in Grid Modernization Panel Presentation. Scottsdale, AZ. July 16, 2018.

Public Utilities Commission of Ohio, Power Forward Proceeding Phase 2. *Getting a Smart Grid for FREE.* Columbus, Ohio. July 26, 2017.

NASUCA Mid-Year Meeting. Using Performance Benchmarking to Gain Leverage in an "Infrastructure Oriented" Environment. Denver, CO. June 6, 2017.

NARUC Committee on Energy Resources and the Environment. *How big data can lead to better decisions for utilities, customers, and regulators*. Washington DC. February 15, 2016.

National Conference of Regulatory Attorneys 2014 Annual Meeting. Smart Grid Hype & Reality. Columbus, Ohio. June 16, 2014.

NASUCA 2013 Annual Conference. *A Review and Synthesis of Research on Smart Grid Benefits and Costs.* Orlando, FL. November 18, 2013.

NARUC Subcommittee on Energy Resources and the Environment. The Distributed Generation (R)Evolution.

Orlando, FL. November 17, 2013.

IEEE Power and Energy Society, ISGT 2013. *Distribution Performance Measures that Drive Customer Benefits*. Washington DC. February 26, 2013.

Great Lakes Smart Grid Symposium. What Smart Grid Deployment Evaluations are Telling Us. Chicago. September 26, 2012.

Mid-Atlantic Distributed Resource Initiative. Smart Grid Deployment Evaluations: Findings and Implications for Regulators and Utilities. Philadelphia. April 20, 2012

DistribuTECH 2012. Lessons Learned: Utility and Regulator Perspectives. Panel Moderator. January 25.

DistribuTECH 2012. Optimizing the Value of Smart Grid Investments. Half-day course. January 23.

NARUC Subcommittee on Electricity. *Maximizing Smart Grid Customer Benefits: Measurement and Other Implications for Investor-Owned Utilities and Regulators*. St. Louis, MO. November 13, 2011.

Canadian Electric Institute 2013 Annual Distribution Conference. The (Smart Grid) Story So Far: Costs, Benefits, Risks, Best Practices, and Missed Opportunities. Toronto, Canada. January 23, 2011.

Teaching

Post-graduate Adjunct Professor. University of Colorado, Global Energy Management Program. Course: Renewable Energy Commercialization -- Electric Technologies, Markets, and Policy.

Guest Lecturer. Michigan State University, Institute for Public Utilities. Courses: Performance Measurement of Distribution Utility Businesses; Introduction to Grid Modernization.

Education

Master's Degree in Management, 1991, Kellogg School of Management, Northwestern University. Concentrations: Finance, Accounting, Information Systems, and International Business.

Bachelor's Degree in Business Administration, 1984, Kelley School of Business, Indiana University. Concentrations: Finance, Marketing.

Certifications

New Product Development Professional. Product Development and Management Association. 2007.

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 5

Docket No. E-7, Sub 1214

Date of Request: January 16, 2020
Date of Response: January 27, 2020

CONFIDENTIAL

X NOT CONFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-3, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Carolinas

NCJC Data Request No. 5 DEC Docket No. E-7, Sub1214 Item No. 5-3 Page 1 of 2

Request:

- 5-3. Refer to Oliver testimony, Exhibit 10. Provide the estimated useful life for each of the assets listed below:
- a. Page 47: Energy Storage Management System
- b. Page 47: Energy Storage Projects
- c. Page 51: Next Gen Cellular
- d. Page 51: Mission Critical Voice
- e. Page 51: POC
- f. Page 51: BizWAN
- g. Page 51: GridWAN
- h. Page 51: Mission Critical Transport
- i. Page 51: Towers/Shelters/Pow Sup
- j. Page 51: Network Asset Systems
- k. Page 51: Vehicle Area Network
- 1. Page 52: Hydraulic to Electric Reclosers
- m. Page 52: Sys Intel and Monitoring
- n. Page 52: Fuse Replacement
- o. Page 52: UG Sys Automation
- p. Page 81: Enterprise Applications
- q. Page 82: Advanced Distribution Planning Tool
- r. Page 83: DER Dispatch Tool
- s. Page 84: Electric Transportation
- t. Page 85: Power Electronics for Volt-VAR Control
- u. Page 90: Substation Physical Security
- v. Page 90: Windows-based unit change outs
- w. Page 90: Device Entry Alert System
- x. Page 90: Secure Access Device Management
- y. Page 90: Line Device Protection

Response:

The list above are projects and not assets. This level of information is not available for the forecasted deferral. The depreciable lifespan of individual projects is not known prior to a project being placed in-service upon which time the capital cost for the project are unitized into the various plant FERC accounts based on the materials used. So, for the deferral estimate an estimated breakdown was made between Transmission, Distribution and General Plant spend. The average depreciation rate for each category was used.

• Distribution – 2.02% See Updated Depr Rates tab (meters were excluded from the average rate.) See Attachment CUCA 2-6 McManeus Grid Deferral Estimate

NCJC Data Request No. 5 DEC Docket No. E-7, Sub1214 Item No. 5-3 Page 2 of 2

• Transmission—2.23% See Updated Depr Rates tab. See Attachment CUCA 2-6 McManeus Grid Deferral Estimate



CUCA 2-6 McManeus Grid Deferral Estimate

- Advanced DMS 10% (10-year life)
- Communications— 10% (10-year life)
- \bullet Enterprise Application & Distributed Energy 20% (5-year life) All of this information was supplied under Public Staff DR 1.8

E7 Sub 1214

NORTH CAROLINA RETAIL GRID IMPROVEMENT

NC Retail ROEs Reported in E.S.-1 and Impacts of Potential Adjustments

Note: Adjustments are estimated at a high-level and may not be at the same level of precision as would be done in a rate case.

			Q1 2019	
		Common Equity (in	Rate Base for Common Equity	Return on Common
		\$000)	(in \$000)	Equity
	ES-1 Reference	Sched 1, Line 11, Col f	Sched 1, Line 11, Col c	C.E./Rate Base for C.E.
1	As Reported	737,546	7,304,749	10.10%
2	Adjust Equity Ratio to Last Approved	(606)	(16,818)	0.01%
3	Normalize Weather	(56,047)		-0.77%
4	Remove DSM/EE PPI Incentive	(23,449)		-0.32%
5	Adjust to End of Period Rate Base, including Interest Sync	(13,307)	400,166	-0.64%
6	Annualize Depreciation Expense, including adjustment to Reserve	(41,746)	(28,321)	-0.51%
8	Spread Severance Over 3 Years	41,733		0.54%
9	Adjusted	644,125	7,659,776	8.41%

	Q2 2019	
income for	Kate Base for	
Common	Common	Return on
Equity (in	Equity (in	Common
\$000)	\$000)	Equity
		income jor
Sched 1, Line 11,	Sched 1, Line 11,	C.E./Rate Base
Col f	Col c	for C.E.
777,069	7,516,016	10.34%
(974)	(27,043)	0.02%
(47,756)		-0.64%
(24,469)		-0.33%
(8,459)	254,377	-0.42%
(37,160)	(25,210)	-0.45%
41,755		0.54%

Grid Improvement Plan Impacts without Deferral

2020 Revenue Requirements	(10,319)	132,246	-0.28%
2021 Revenue Requirements	(27,165)	335,682	-0.67%
2022 Revenue Requirements	(49,835)	584,120	-1.07%

(10,319)	132,246	-0.28%
(27,165)	335,682	-0.69%
(49,835)	584,120	-1.11%

E7 Sub 1214 NORTH CAROLINA RETAIL GRID IMPROVEMENT

DEC NC Summary Grid Impact

<u>2020</u>	<u>2021</u>	2022
442,845	580,407	702,957
292,768	419,941	516,024
257,012	663,075	1,170,019
(2,693)	(17,534)	(46,712)
254,318	645,541	1,123,307
5,447	6,424	10,612
2,693	14,840	29,178
-	666	1,717
2,292	9,572	19,058
94	753	2,336
7,033	29,377	58,488
288	2,311	7,171
17,847	63,943	128,561
17,847	81,790	210,351
	442,845 292,768 257,012 (2,693) 254,318 5,447 2,693 - 2,292 94 7,033 288 17,847	442,845 580,407 292,768 419,941 257,012 663,075 (2,693) (17,534) 254,318 645,541 5,447 6,424 2,693 14,840 - 666 2,292 9,572 94 753 7,033 29,377 288 2,311 17,847 63,943

DUKE ENERGY CAROLINAS, LLC E7 Sub 1214 NORTH CAROLINA RETAIL GRID IMPROVEMENT F For the period January, 2020 through December 31, 2022	LAN MULTI YE	AR RATE PI	LAN																																		
Calculation of North Carolina Retail Costs	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022
Line No. Description	Dec	<u>Jan</u>	<u>Feb</u>	Mar	Apr	May	Jun	<u>Jul</u>	Aug	<u>Sep</u>	Oct	Nov	Dec	<u>Jan</u>	Feb	Mar	Apr	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	Mar	Apr	May	Jun	<u>Jul</u>	Aug	<u>Sep</u>	Oct	Nov	Dec
1 Dlant in Coming [13																																					
Plant-in-Service: [1] Distribution to Plant in Service			13.210.021	13.210.021	13.210.021	13,210,021	13,210,021	13.210.021	13.210.021	13.210.021	13,210,021	13,210,021	13.210.021	13.210.021	23,177,334	23,177,334	23.177.334	23,177,334	23,177,334	23,177,334	23,177,334	23.177.334	23,177,334	23,177,334	23.177.334	22 177 224	30.018.178	30.018.178	30.018.178	30.018.178	30.018.178	20.019.179	30.018.178	20.019.179	20 010 170	30.018.178	30.018.178
3 Transmission to Plant in Service	-	-	4.784.997				4.784.997	7.163.017	7.163.017	7.163.017	7.163.017	7.163.017	7.163.017	7.163.017	7.163.017	7.163.017	7.163.017	7.163.017	7.163.017	7.444.291	7.444.291	7.444.291	7.444.291	7.444.291	7.444.291	7.444.291	7.444.291	7.444.291	7.444.291	7.444.291	7.444.291	7.608.302	7.608.302	7.608.302	7.608.302	7.608.302	7,608,302
4 Advanced DMS Plant in Service		-	4,764,997	4,764,997	4,704,997	4,704,997	4,704,997	7,103,017	7,105,017	7,103,017	7,103,017	7,103,017	9.327.310	7,105,017	7,103,017	7,103,017	7,103,017	7,105,017	7,103,017	7,444,291	7,444,291	7,444,291	7,444,291	7,444,291	8.793.258	7,444,291	7,444,291	7,444,291	7,444,291	7,444,291	7,444,291	7,000,302	7,000,302	7,000,302	7,008,302		11,517,212
5 Communications Plant in Service	-		1,627,514	1.627.514	2.249.207	2.249.207	2.249.207	2.249.207	2.249.207	2.249.207	2.249.207	2.249.207	2.249.207	2.249.207	2.249.207	2.249.207	2.989.928	2.989.928	2.989.928	2.989.928	2.989.928	2.989.928	2.989.928	2.989.928	2.989.928	2.989.928	2.989.928	2.989.928	3.408.102	3.408.102	3.408.102	3.408.102	3.408.102	3.408.102	3.408.102	3.408.102	
Enterprise Application & Distributed Energy Plant			1,027,514	1,027,314	2,249,207	2,249,207	2,249,207	2,249,207	2,249,207	2,249,207	2,249,207	2,249,207	2,249,207	2,249,201	2,249,207	2,249,207	2,969,926	2,989,928	2,969,926	2,989,928	2,969,926	2,969,926	2,909,920	2,909,920	2,989,928	2,969,926	2,989,928	2,969,926	3,408,102	3,400,102	3,408,102	3,408,102	3,408,102	3,400,102	3,408,102	3,408,102	3,408,102
6 in Service	-	-	-	-	-	-	-	-	-	-	-	-	11,973,249	-	-	_	-	-	-	-	-	-	-	-	7,808,788	-	-	-	-	_	-	-	-	-	-	-	12,091,341
7 Cumulative Distribution investment (L2)	-	-	13,210,021	26,420,043	39,630,064	52,840,086	66,050,107	79,260,128	92,470,150	105,680,171	118,890,193	132,100,214	145,310,235	158,520,257	181,697,591	204,874,925	228,052,258	251,229,592	274,406,926	297,584,260	320,761,594	343,938,928	367,116,262	390,293,596	413,470,929	436,648,263	466,666,442	496,684,620	526,702,798	556,720,976	586,739,154	616,757,333	646,775,511	676,793,689	706,811,867	736,830,045	766,848,224
8 Cumulative Transmission investment (L3)	-	-	4,784,997	9,569,993	14,354,990	19,139,986	23,924,983	31,088,000	38,251,018	45,414,035	52,577,053	59,740,070	66,903,087	74,066,105	81,229,122	88,392,140	95,555,157	102,718,175	109,881,192	117,325,483	124,769,774	132,214,065	139,658,356	147,102,647	154,546,938	161,991,229	169,435,520	176,879,811	184,324,102	191,768,393	199,212,684	206,820,986	214,429,289	222,037,591	229,645,893	237,254,196	244,862,498
9 Cumulative Advanced DMS investment (L4)	-	-	_	-	-	-	-	-	-	-	-	-	9,327,310	9,327,310	9,327,310	9,327,310	9,327,310	9,327,310	9,327,310	9,327,310	9,327,310	9,327,310	9,327,310	9,327,310	18,120,568	18,120,568	18,120,568	18,120,568	18,120,568	18,120,568	18,120,568	18,120,568	18,120,568	18,120,568	18,120,568	18,120,568	29,637,780
10 Cumulative Communication investment (L5)	-	-	1,627,514	3,255,029	5,504,236	7,753,443	10,002,650	12,251,857	14,501,065	16,750,272	18,999,479	21,248,686	23,497,893	25,747,100	27,996,307	30,245,515	33,235,443	36,225,371	39,215,299	42,205,227	45,195,155	48,185,083	51,175,011	54,164,939	57,154,867	60,144,795	63,134,723	66,124,651	69,532,753	72,940,855	76,348,957	79,757,059	83,165,160	86,573,262	89,981,364	93,389,466	96,797,568
Cumulative Enterprise Application & Distributed	_												11.973.249	11.973.249	11.973.249	11.973.249	11.973.249	11.973.249	11.973.249	11.973.249	11.973.249	11.973.249	11.973.249	11.973.249	19.782.037	19.782.037	19.782.037	19.782.037	19.782.037	19.782.037	19.782.037	19.782.037	19.782.037	19.782.037	19.782.037	19.782.037	21 072 270
11 Energy investment (L6)	-	-	-	-	-	-	-	-	-	-	-	-	11,973,249	11,973,249	11,973,249	11,973,249	11,973,249	11,973,249	11,973,249	11,973,249	11,973,249	11,973,249	11,973,249	11,973,249	19,762,037	19,762,037	19,762,037	19,762,037	19,762,037	19,762,037	19,762,037	19,762,037	19,762,037	19,762,037	19,762,037	19,762,037	31,073,376
12																																					
13 Accumulated depreciation & amortization:																																					
14 Distribution plant depreciation rate [2]	1.98%	1.989				1.98%	1.98%	1.98%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	2.02%	
15 Transmission plant depreciation rate [2]	2.05%	2.059					2.05%	2.05%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	2.23%	
16 Advance DMS plant depreciation rate [2]	10.00%	10.009					10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	
17 Communication plant depreciation rate [2]	10.00%	10.009	6 10.00%	10.00%	5 10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Enterprise Application & Distributed Energy plant																																					
18 depreciation rate [2]	20.00%	20.009	6 20.00%				20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
19 Distribution depreciation expense (L7 * L14)	-	-	-	21,797	43,593	65,390	87,186	108,983	133,421	155,658	177,895	200,132	222,369	244,606	266,842	305,858	344,873	383,888	422,903	461,918	500,934	539,949	578,964	617,979	656,994	696,009	735,025	785,555	836,086	886,616	937,147	987,678	1,038,208	1,088,739	1,139,269	1,189,800	
20 Transmission depreciation expense (L8 * L15)	-	-	-	8,174	16,349	24,523	32,697	40,872	57,772	71,083	84,394	97,706	111,017	124,328	137,640	150,951	164,262	177,573	190,885	204,196	218,030	231,864	245,698	259,532	273,366	287,200	301,034	314,868	328,702	342,536	356,370	370,204	384,342	398,481	412,620	426,759	440,897
21 Advanced DMS depreciation expense (L9 * L16) 22 Communication depreciation expense (L10 * L17)	-	-	-	13,563	27.125	45.869	64.612	83,355	102,099	120.842	120 506	158.329	177.072	77,728 195,816	77,728 214,559	77,728 233,303	77,728 252,046	77,728 276,962	77,728 301.878	77,728 326,794	77,728	77,728 376,626	77,728 401 542	77,728 426,458	77,728 451,374	151,005 476,291	151,005 501 207	151,005 526 123	151,005 551,039	151,005 579,440	151,005 607.840	151,005 636,241	151,005 664,642	151,005 693,043	151,005 721,444	151,005 749,845	151,005 778,246
Enterprise Application & Distributed Energy	-	-	-	13,563	27,125	45,869	64,612	83,333	102,099	120,842	139,586	158,329	1//,0/2	195,816	214,559	255,505	252,046	276,962	301,878	326,794	351,/10	3/6,626	401,542	426,458	451,374	476,291	501,207	526,123	551,039	579,440	607,840	636,241	664,642	693,043	/21,444	749,845	//8,246
23 depreciation expense (L11 * L18)	-	-	-	-	-	-	-	-	-	-	-	-	-	199,554	199,554	199,554	199,554	199,554	199,554	199,554	199,554	199,554	199,554	199,554	199,554	329,701	329,701	329,701	329,701	329,701	329,701	329,701	329,701	329,701	329,701	329,701	329,701
24 Distribution accumulated depreciation	-	-	-	(21,797	(65,390)	(130,779)	(217,965)	(326,948)	(460,369)	(616,027)	(793,922)	(994,054)	(1,216,423)	(1,461,028)	(1,727,871)	(2,033,728)	(2,378,601)	(2,762,489)	(3,185,392)	(3,647,311)	(4,148,244)	(4,688,193)	(5,267,157)	(5,885,136)	(6,542,130)	(7,238,139)	(7,973,164)	(8,758,719)	(9,594,805)	(10,481,421)	(11,418,568)	(12,406,246)	(13,444,454)	(14,533,193)	(15,672,462)	(16,862,262)	(18,102,593)
25 Transmission accumulated depreciation	-	-	-	(8,174	(24,523)	(49,046)	(81,744)	(122,616)	(180,387)	(251,471)	(335,865)	(433,571)	(544,588)	(668,916)	(806,555)	(957,506)	(1,121,768)	(1,299,342)	(1,490,226)	(1,694,422)	(1,912,452)	(2,144,316)	(2,390,014)	(2,649,545)	(2,922,911)	(3,210,111)	(3,511,145)	(3,826,012)	(4,154,714)	(4,497,249)	(4,853,619)	(5,223,823)	(5,608,165)	(6,006,646)	(6,419,266)	(6,846,025)	(7,286,922)
26 Advanced DMS accumulated depreciation	-	-	-	-	-	- '	- 1	-	-	-	- 1	- 1	-	(77,728)	(155,455)	(233,183)	(310,910)	(388,638)	(466,366)	(544,093)	(621,821)	(699,548)	(777,276)	(855,003)	(932,731)	(1,083,736)	(1,234,741)	(1,385,745)	(1,536,750)	(1,687,755)	(1,838,759)	(1,989,764)	(2,140,769)	(2,291,774)	(2,442,778)	(2,593,783)	(2,744,788)
27 Communication accumulated depreciation	-	-	-	(13,563	(40,688)	(86,556)	(151,169)	(234,524)	(336,623)	(457,465)	(597,051)	(755,380)	(932,452)	(1,128,268)	(1,342,827)	(1,576,129)	(1,828,175)	(2,105,137)	(2,407,015)	(2,733,810)	(3,085,520)	(3,462,146)	(3,863,689)	(4,290,147)	(4,741,521)	(5,217,812)	(5,719,019)	(6,245,141)	(6,796,180)	(7,375,620)	(7,983,460)	(8,619,701)	(9,284,344)	(9,977,387)	(10,698,830)	(11,448,675)	(12,226,921)
Enterprise Application & Distributed Energy																																					
28 accumulated depreciation	-	-	-	-	-	-	-	-	-	-	-	-	-	(199,554)	(399,108)	(598,662)	(798,217)	(997,771)	(1,197,325)	(1,396,879)	(1,596,433)	(1,795,987)	(1,995,542)	(2,195,096)	(2,394,650)	(2,724,350)	(3,054,051)	(3,383,752)	(3,713,452)	(4,043,153)	(4,372,854)	(4,702,554)	(5,032,255)	(5,361,955)	(5,691,656)	(6,021,357)	(6,351,057)

DUKE ENERGY CAROLINAS, LLC E7 Sub 1214 NORTH CAROLINA RETAIL GRID IMPROVEMENT PLAN MULTI YEAR RATE PLAN For the period January, 2020 through December 31, 2022

NORTH CAROLINA RETAIL GRID IMPROVEMENT PI For the period January, 2020 through December 31, 2022	AN MULTI YEA	AR RATE PL	AN																																		
Calculation of North Carolina Retail Costs	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2021	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022	2022
Line No. Description	Dec	<u>Jan</u>	Feb	Mar	Apr	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec	<u>Jan</u>	<u>Feb</u>	Mar	Apr	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec	<u>Jan</u>	Feb	Mar	Apr	May	<u>Jun</u>	<u>Jul</u>	Aug	Sep	Oct	Nov	Dec
29 30 <u>Net electric plant</u>																																					
31 Distribution (L7 + L24)	-	-																						384,408,460												719,967,783	
32 Transmission (L8 + L25) 33 Advanced DMS (L9 + L26)	-	-	4,784,997	9,561,819	14,330,467	19,090,940	23,843,239	30,965,385	38,070,630	45,162,565	52,241,188	59,306,499	9,327,310	9,249,583	9,171,855	9,094,128	94,433,389		108,390,966 8,860,945	8,783,217				144,453,102 8,472,307		17,036,832					16,281,809					230,408,171 15,526,785	
34 Communication (L10 + L27)	-	-	1,627,514	3,241,466	5,463,548	7,666,887	9,851,482	12,017,333	14,164,442	16,292,807	18,402,428	20,493,306			26,653,481													59,879,510			68,365,496			76,595,876		81,940,791	
Enterprise Application & Distributed Energy (L11 + 35 L28)	_	_	_	_	_	_	_	_	_	_	_	_	11.973.249	11.773.695	11.574.141	11.374.587	11.175.032	10.975.478	10.775,924	10,576,370	10,376,816	10.177.262	9,977,708	9.778.153	17,387,387	17.057.687	16,727,986	16.398.285	16,068,585	15,738,884	15,409,184	15.079.483	14,749,782	14.420.082	14.090.381	13,760,680	25,522,321
36 Average rate base - Distribution	-	-										124,601,215												373,128,782												705,553,594	
37 Average rate base - Transmission 38 Average rate base - Advanced DMS	-	-	2,392,498	7,173,408	11,946,143	16,710,703	21,467,090	27,404,312	34,518,007	41,616,597	48,701,876	55,773,843	62,832,500 4,663,655	69,877,844 9,288,447	76,909,878 9,210,719	83,928,600 9,132,991	90,934,011	97,926,111 8,977,536	104,904,900 8,899,809	8,822,081	8,744,354	126,463,536 8,666,626	8,588,898			155,202,573	162,352,747	169,489,087 16,810,325	176,611,594	183,720,266	190,815,104 16,357,311	197,978,114		15.904.297	15,753,292	15,602,287	
39 Average rate base - Communication	-	-	813,757	2,434,490	4,352,507	6,565,217	8,759,184	10,934,408	13,090,888	15,228,624	17,347,618	19,447,867	21,529,374		25,636,157				35,464,258						51,144,069	53,670,164	56,171,344				66,965,366	69,751,427	72,509,087	75,238,346	77,939,205	80,611,662	83,255,719
Average rate base - Enterprise Application & 40 Distributed Energy	_	_	_	_	_	_	_	_	_	_	_	_	5,986,625	11,873,472	11.673.918	11.474.364	11,274,809	11.075,255	10.875,701	10,676,147	10,476,593	10,277,039	10,077,485	9,877,930	13,582,770	17.222.537	16,892,836	16,563,136	16,233,435	15,903,734	15,574,034	15,244,333	14,914,633	14,584,932	14,255,231	13,925,531	19.641.501
41													.,,.	,,	,,		, . ,	,,	.,,	.,,	., ,	.,,	.,,	.,,		, , , , , , , , , , , , , , , , , , , ,	.,	.,,	.,,		.,,	.,	, ,	, , , , ,	, , .	.,,.	, , , , , , , , , , , , , , , , , , , ,
42 Return on rate base: 43 Long-term debt	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%	2.188%
44 Members' equity	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%	6.716%
Distribution Debt return on rate base (L36 x L43 / 45 12)		-	12,045	36,117	60,148	84,139	108,091	132,003	155,873	179,701	203,487	227,234	250,939	274,605	307,318	349,064	390,739	432,342	473,875	515,336	556,726	598,046	639,294	680,470	721,576	762,610	809,812	863,169	916,434	969,607	1,022,688	1,075,676	1,128,573	1,181,377	1,234,089	1,286,709	1,339,237
Transmission Debt return on rate base (L37 x L43 / 46 12)			4,363	13,082	21.786	30,475	39,149	49.977	62,950	75,896	88,817	101,714	114,587	127,435	140,260	153,060	165,835	178,587	191,314	204.273	217,464	230,630	243.771	256,886	269.976	283.041	296.081	309,095	322.084	335.048	347.987	361.050	374,237	387.399	400.534	413.644	426,728
Advance DMS Debt return on rate base (L38 x L43 /		-	4,505	13,082	21,760	30,473	39,149	49,911	02,930	73,890	00,017	101,714	114,567	127,433	140,200	155,000	105,655	170,567	191,314	204,273	217,404	230,030	243,771	230,660	209,970	203,041	290,081	309,093	322,004	333,046	347,987	301,030	374,237	367,399	400,554	413,044	420,728
47 12) Communication Debt return on rate base (L39 x L43		-	-	-	-	-	-	-	-	-	-	-	8,505	16,939	16,797	16,656	16,514	16,372	16,230	16,089	15,947	15,805	15,663	15,522	23,398	31,208	30,932	30,657	30,381	30,106	29,831	29,555	29,280	29,004	28,729	28,454	38,680
48 / 12)		-	1,484	4,440	7,938	11,973	15,974	19,941	23,874	27,772	31,637	35,467	39,263	43,025	46,752	50,446	54,781	59,751	64,676	69,555	74,389	79,178	83,921	88,619	93,271	97,878	102,439	106,955	111,807	116,991	122,124	127,205	132,234	137,211	142,137	147,010	151,832
Enterprise Application & Distributed Energy Debt 49 return on rate base (L40 x L43 / 12)		_	_	_	_	_	_	_	_	_	_	_	10,918	21,654	21,290	20,926	20,562	20,198	19,834	19,470	19,106	18,742	18,378	18,014	24.771	31.409	30,807	30,206	29,605	29.003	28,402	27,801	27,200	26,598	25,997	25,396	35,820
Distribution Equity return on rate base (L36 x L44 /			26.060	110.040	104.504	250 224	221 722	405 110	470.275	551 501	624.502	co= 250	770 122	0.42.7.60	042.157	1 071 075	1 100 175	1.004.057	1 454 220	1.501.565	1 700 502	1 025 100	1.051.000	2 000 261	2214514	2240.440	2 405 200	2 (40 0/2	2.012.522	2.075.720	2 120 625	2 201 247	2.462.506	2 625 642	2 707 416	2.040.006	4 110 114
50 12) Transmission Equity return on rate base (L37 x L44 /		-	36,968	110,842	184,594	258,224	331,732	405,118	478,375	551,501	624,502	697,379	770,132	842,760	943,157	1,071,275	1,199,175	1,326,857	1,454,320	1,581,565	1,708,592	1,835,400	1,961,990	2,088,361	2,214,514	2,340,449	2,485,309	2,649,062	2,812,532	2,975,720	3,138,625	3,301,247	3,463,586	3,625,642	3,787,416	3,948,906	4,110,114
51 12) Advance DMS Equity return on rate base (L38 x L44		-	13,391	40,149	66,861	93,528	120,149	153,379	193,194	232,924	272,579	312,160	351,667	391,099	430,456	469,739	508,948	548,082	587,141	626,913	667,397	707,803	748,131	788,382	828,556	868,652	908,671	948,612	988,476	1,028,262	1,067,971	1,108,062	1,148,533	1,188,925	1,229,238	1,269,472	1,309,627
52 / 12)		-	-	-	-	-	-	-	-	-	-	-	26,102	51,986	51,551	51,116	50,681	50,246	49,811	49,376	48,941	48,506	48,071	47,636	71,809	95,776	94,931	94,086	93,240	92,395	91,550	90,705	89,860	89,015	88,169	87,324	118,709
Communication Equity return on rate base (L39 x 53 L44 / 12)		_	4,555	13,626	24.361	36,745	49,024	61.199	73,268	85,233	97,093	108.848	120,498	132.043	143,483	154.818	168,121	183,375	198,490	213,465	228,300	242,996	257,553	271.970	286,248	300.386	314,385	328,244	343,134	359.046	374,798	390,391	405,825	421.101	436.217	451,175	465.973
Enterprise Application & Distributed Energy Equity													22.506		65.338	c 1 22 1	62.104	61.987	CO 070	50.752	50.626	57.510	56 402	55.286	74.001	96.393	94.547	92,702	00.057	00.011	07.166	05.221	83.476	81.630	70.705	77.940	109.931
54 return on rate base (L40 x L44 / 12) 55		-	-	-	-	-	-	-	-	-	-	-	33,506	66,455	05,558	64,221	63,104	01,987	60,870	59,753	58,636	57,519	56,403	33,280	76,021	90,393	94,547	92,702	90,857	89,011	87,166	85,321	83,470	81,030	79,785	77,940	109,931
56 Other operation and maintenance expense: [3] 57 Distribution O&M		233,836	233,836	233,836	233,836	233,836	233,836	233,836	233,836	233,836	233,836	233,836	233,836	335 959	335 959	335 959	335,959	335 959	335 959	335 959	335 959	335 959	335 959	335 959	335 959	504 761	504 761	504 761	504.761	504,761	504.761	504.761	504 761	504.761	504 761	504 761	504,761
58 Transmission O&M		70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019
59 General Plant O&M 60 Total O&M		557,355 861,921	,	557,355 861,921	530,911 943,337	530,911 943,337	530,911 943,337	530,911 943,337	530,911 943,337	530,911 943,337	530,911 943,337	530,911 943,337	530,911 943,337	530,911 943,337	530,911 943,337	530,911 943,337	717,527 1,292,307	717,527 1,292,307	717,527 1,292,307	717,527 1.292.307	717,527 1,292,307	717,527 1.292.307	717,527 1,292,307	717,527 1,292,307	717,527 1,292,307	717,527 1.292,307	717,527 1,292,307	717,527 1,292,307									
61			001,721	001,721	001,721	001,721	001,721	001,721	001,721	001,721	001,721	001,721	001,721	743,331	743,331	743,331	743,331	743,331	743,331	743,331	743,331	743,331	743,331	743,337	743,331	1,272,307	1,272,307	1,272,307	1,272,307	1,272,307	1,272,307	1,272,307	1,272,307	1,272,307	1,272,307	1,272,307	1,272,307
62 2018 Grid O&M Threshhold 63 Distribution	Annual Threshol (174,727)	ld 59,109	233,836	233,836	233,836	233,836	233.836	233,836	233,836	233,836	233,836	233,836	233,836	161,232	335,959	335,959	335,959	335,959	335,959	335,959	335,959	335,959	335,959	335,959	335,959	330.033	504,761	504.761	504.761	504.761	504,761	504.761	504,761	504.761	504.761	504.761	504.761
64 Transmission		70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	70,729	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	76,467	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019	70,019
65 General Plant 66	(4,721,392)	(4,164,037)	(3,606,682)	(3,049,327)	(2,491,972)	(1,934,617)	(1,377,262)	(819,907)	(262,552)	294,803	557,355	557,355	557,355	(4,190,481)	(3,659,570)	(3,128,660)	(2,597,749)	(2,066,838)	(1,535,927)	(1,005,017)	(474,106)	56,805	530,911	530,911	530,911	(4,003,865)	(3,286,337)	(2,568,810)	(1,851,283)	(1,133,756)	(416,228)	301,299	717,527	717,527	717,527	717,527	717,527
67 Depreciation and amortization:				21.707	42.502	c5 200	07.106	100.002	122 121	155 650	155.005	200 122	222 260	244.606	266.042	205.050	244.072	202.000	122 002	461.010	500.024	520.040	570.054	617.070	656,004	505 000	725.025	705 555	024.004	006616	027 147	007.470	1.020.200	1 000 720	1 120 250	1 100 000	1 240 221
68 Distribution depreciation expense (L19) 69 Transmission depreciation expense (L20)	-	-	-	21,797 8,174	43,593 16,349	65,390 24,523	87,186 32,697	108,983 40,872	133,421 57,772	155,658 71,083	177,895 84,394	200,132 97,706	222,369 111,017	244,606 124,328	266,842 137,640	305,858 150,951	344,873 164,262	383,888 177,573	422,903 190,885	461,918 204,196	500,934 218,030	539,949 231,864	578,964 245,698	617,979 259,532	656,994 273,366	696,009 287,200	735,025 301,034	785,555 314,868	836,086 328,702	886,616 342,536	937,147 356,370	987,678 370,204	1,038,208 384,342	1,088,739 398,481	1,139,269 412,620	1,189,800 426,759	1,240,331 440,897
70. Constal plant depressiotion expanse (sum (I 21,22))				13,563	27 125	45,869	64.612	83 355	102,099	120,842	139,586	158,329	177,072	473,098	491.841	510,584	529,328	554.244	579,160	604,076	628.992	653,908	678,824	703,740	728,656	956,996	981,912	1.006.828	1,031,744	1.060.145	1.088.546	1,116,947	1,145,348	1,173,748	1,202,149	1 220 550	1.258.951
70 General plant depreciation expense (sum (L21:23)) 71 Total Depreciation	-	-	-	43,534		135,781	184,496	233,210	293,292	347,583	401,875	456,167	510,458	842,031	896,323	967,393	1,038,463	1,115,705				1,425,721	1,503,486		1,659,016			2,107,251	2,196,532	2,289,297	2,382,062	2,474,828		2,660,968	2,754,038	2,847,109	
72 73 <u>General taxes:</u>																																					
Property tax rate - Combined North Carolina and	0.265	0.25	0.255	0.05	0.055	0.255	0.26=	0.25=	0.26	0.26**	0.267	0.26**	0.267	0.26=	0.265	0.0	0.26	0.265	0.25-	0.26-1	0.255	0.26	0.265	0.265	0.265	0.26**	0.265	0.06-1	0.265	0.26=	0.2651	0.25=	0.25	0.25-	0.26**	0.26**	0.260
74 South Carolina 75	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%
76 Distribution property tax expense		-	-	-	-	-	-	-	-	-	-	-	-	31,364	31,364 14.441	31,364 14,441	31,364	31,364 14.441	31,364 14,441	31,364	31,364 14,441	31,364 14.441	31,364	31,364 14,441	31,364 14.441	89,245 33,358	89,245 33,358	89,245 33,358	89,245 33,358	89,245 33,358	89,245 33,358	89,245 33,358	89,245 33,358	89,245 33,358	89,245 33,358	89,245 33,358	89,245 33,358
77 Transmission property tax expense 78 General Plant property tax expense		-	-	-	-	-	-	-	-	-	-	-	-	14,441 9,669	14,441 9,669	14,441 9,669	14,441 9,669	14,441 9,669	14,441 9,669	14,441 9,669	14,441 9,669	14,441 9,669	14,441 9,669	14,441 9,669	14,441 9,669	20,518	20,518	33,358 20,518	20,518	20,518	20,518	20,518	20,518	20,518	20,518	20,518	20,518
79 Impact to general taxes (Sum (L76:L78))		-	-	-	-	-	-	-	-	-	-	-	-	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121

DUKE ENERGY CAROLINAS, LLC E7 Sub 1214 NORTH CAROLINA RETAIL GRID IMPROVEMENT PLAN MULTI YEAR RATE PLAN For the period January, 2020 through December 31, 2022

ral plant impact to operating income (L47:49) + sum(L52:54) + L84)		59,109 70,729 - 59,109 70,729 - 129,838 59,109	233,836 70,729 - 282,849 88,483 6,039 377,371	255,633 78,904 13,563 402,591 132,135	277,429 87,078 27,125 522,171 175,725	299,226 95,252 45,869 641,589	321,022 103,427 64,612 760,845	342,819 111,601 83,355	367,257 128,501 102,099	389,494 141,812 415,645	411,731 155,124 696,941	433,968 168,435 715,684	456,205 181,746 734,427	437,202 215,236	634,166 228,547	673,181	712,196	751,212	700 227								1,329,031	1,379,561	1.430.092	1.480.622	1.531.153	1,581,684	1,632,214	1,682,745	1,733,275	Nov 1,783,806
ibution (if L63>0 Then L63 + L68 + L76 else + + L76) smission (if L64>0 Then L64 + L69 + L77 else 9 + L77) rear al Plant (if L65>0 Then L65 + L70 + L78 else 0 + L78) Limpact to operating income: ibution impact to operating income (L45 + L50 2) smission impact to operating income (L46 + + L83) ral plant impact to operating income (L47:49) + sum(L52:54) + L84) [L47:49] + sum(L52:54) + L84) [Idiution Cumulative impact to operating income income (L46 + L50)	- - -	70,729 - 59,109 70,729 - 129,838	70,729 - 282,849 88,483 6,039	78,904 13,563 402,591	87,078 27,125 522,171	95,252 45,869	103,427 64,612	111,601 83,355			,	168,435	181,746	437,202 215,236	634,166 228,547	673,181	712,196	751,212	700 227								1 220 021	1 370 561	1 430 092	1,480,622	1.531.153	1,581,684	1,632,214	1,682,745	1,733,275	1,783,806
smission (if L64>0 Then L64 + L69 + L77 else 9 + L77) rata Plant (if L65>0 Then L65 + L70 + L78 else 0 + L78) limpact to operating income: ibution impact to operating income (L45 + L50 2) smission impact to operating income (L46 + L83) ratal plant impact to operating income (L47:49) + sum(L52:54) + L84) [17]	- - -	70,729 - 59,109 70,729 - 129,838	70,729 - 282,849 88,483 6,039	78,904 13,563 402,591	87,078 27,125 522,171	95,252 45,869	103,427 64,612	111,601 83,355			,	168,435	181,746	437,202 215,236	634,166 228,547	673,181	712,196	751,212	700 227							4 4 4 5 000	1 220 021	1 370 561	1.430.092	1.480,622	1,531,153	1,581,684	1,632,214	1,682,745	1,733,275	1,783,800
ral Plant (if L65>0 Then L65 + L70 + L78 else 0 + L78) Limpact to operating income: ibution impact to operating income (L45 + L50 2) smission impact to operating income (L46 + L83) rat plant impact to operating income (L47:49) + sum(L52:54) + L84) libution Cumulative impact to operating income	- - -	59,109 70,729 - 129,838	282,849 88,483 6,039	13,563 402,591	27,125 522,171	45,869	64,612	83,355			,			215,236	228,547				790,227	829,242	868,257	907,272	946,287	985,303	1,024,318	1,115,288	1,329,031	1,579,501	1,430,072	.,,	-,,					
impact to operating income; bution impact to operating income (L45 + L50 c) mission impact to operating income (L46 + L53 c) L43 c) L43 c) L47:49) + sum(L52:54) + L84) bution Cumulative impact to operating income	-	70,729	88,483 6,039	402,591	522,171	13,007	,		102,099	415,645	696,941	715,684	734.427			241,858	255,170	268,481	281,792	295,103	308,937	322,771	336,605	350,439	364,273	390,577	404,411	418,245	432,079	445,913	459,747	473,581	487,719	501,858	515,997	530,136
nission impact to operating income (L45 + L50 nission impact to operating income (L46 + L83) Il plant impact to operating income 47:49) + sum(L52:54) + L84) ution Cumulative impact to operating income	-	70,729	88,483 6,039	. ,	522,171 175,725	641,589	760,845	000 - 1-					,	482,767	501,510	520,254	538,997	563,913	588,829	613,745	638,661	720,382	1,219,404	1,244,320	1,269,236	977,514	1,002,430	1,027,346	1,052,262	1,080,663	1,109,063	1,438,763	1,883,392	1,911,793	1,940,194	1,968,595
ission impact to operating income (L46 + .83) I plant impact to operating income 47:49) + sum(L52:54) + L84) ution Cumulative impact to operating income	-	70,729	88,483 6,039	. ,	522,171 175,725	641,589	760,845	0.000																												
.83) plant impact to operating income 47:49) + sum(L52:54) + L84) ution Cumulative impact to operating income	-	129,838	6,039	132,135	175,725			879,940	1,001,505	1,120,696	1,239,721	1,358,581	1,477,276	1,554,567	1,884,641	2,093,520	2,302,110	2,510,411	2,718,422	2,926,143	3,133,575	3,340,718	3,547,571	3,754,134	3,960,408	4,218,347	4,624,151	4,891,792	5,159,058	5,425,949	5,692,465	5,958,607	6,224,373	6,489,764	6,754,780	7,019,422
tion Cumulative impact to operating income			0,007			219,256	262,725	314,957	384,645	450,632	516,520	582,309	648,000	733,770	799,263	864,657	929,953	995,149	1,060,247	1,126,290	1,193,798	1,261,204	1,328,507	1,395,707	1,462,805	1,542,270	1,609,162	1,675,952	1,742,639	1,809,223	1,875,705	1,942,693	2,010,490	2,078,182	2,145,770	2,213,252
tion Cumulative impact to operating income				31,628 566,353	59,423 757,320	94,586 955,431	129,610 1,153,181	164,495 1,359,392	199,241 1,585,391	528,651 2,099,978	825,670 2.581,911	859,998 2.800.889	973,219 3,098,495	814,868 3.103.205	846,722 3,530,625	878,436 3,836,614	912,760 4.144.823	955,843 4,461,403	998,740 4.777.409	1,041,453 5,093,887	1,083,981 5,411,355	1,183,129 5,785,051	1,699,393 6,575,471	1,741,367 6,891,208	1,844,754 7,267,967	1,630,562 7,391,179	1,670,471 7,903,784	1,710,195 8,277,939	1,751,286 8,652,983	1,797,216 9,032,388	1,842,934 9,411,105	2,189,741 10,091,040	2,651,267 10,886,129	2,696,353 11,264,299	2,741,229 11.641,779	2,785,894
ission Cumulative impact to operating income	-	57,107	342,126	745,859	,	1,918,461	2,688,394	3,581,461	4,600,835	5,744,851	7,014,061	8,409,011	9,930,253	11,537,101	13,482,942	15,647,791		20,639,383	.,,	-,-,-,,		33,297,330			.,= ,		54,520,624			70,976,227	,,,	,				,,,
Plant Cumulative impact to operating		70,729	159,414	292,203	469,215	690,639	956,669	1,276,320	1,667,329	2,126,350	2,653,683	3,249,617	3,914,444	4,668,636	5,492,366	6,385,990	7,349,806	8,384,115	9,489,220	10,666,468	11,917,732	13,243,328	14,643,574	16,118,793	17,669,311	19,307,921	21,022,517	22,813,466	24,681,098	26,625,748	28,647,751	30,748,054	32,927,909	35,187,663	37,527,664	39,948,266
g	-	-	6,039	37,684	97,231	192,202	322,636	488,598	690,150	1,222,159	2,053,277	2,922,606	3,910,003	4,744,342	5,615,732	6,523,701	7,471,069	8,466,810	9,510,990	10,603,700	11,745,031	12,991,882	14,761,807	16,582,303	18,516,422	20,247,056	22,028,052	23,858,789	25,740,917	27,679,562	29,674,823	32,028,108	34,855,319	37,742,383	40,690,617	43,700,157
for return ion Balance for Return ((L87 + L103 +																																				
Current Month L87 /2) ssion Balance for Return ((L88 + L104 +	-	29,555	200,702	544,563	1,010,042	1,597,667	2,307,971	3,141,491	4,100,082	5,184,504	6,394,200	7,729,721	9,191,615	10,759,817	12,540,621	14,601,031	16,881,895	19,384,177	22,108,848	25,056,882	28,229,261	31,626,972	35,251,005	39,102,360	43,182,039	,,	52,208,549	,,		68,263,252	, 1,210,731	80,458,366	87,007,491	93,859,445	101,015,576	108,477,23
Current Month L88 /2) Plant Balance for Return ((L89 + L105 +	-	35,365	115,172	226,136	381,352	581,012	825,307	1,118,842	1,475,006	1,901,034	2,395,423	2,958,462	3,590,444	4,301,751	5,092,735	5,953,661	6,884,830	7,886,541	8,959,096	10,103,323	11,320,833	12,612,726	13,979,320	15,420,940	.,,		20,217,936	21,975,490	23,809,779	25,721,136	27,709,898	29,776,707	31,922,664	34,148,572	36,454,780	38,841,64
Current Month L89 /2)	-	-	3,019	21,870	67,520	144,909	257,831	406,350	590,529	957,834	1,640,442	2,492,607	3,423,393	4,336,908	5,192,371	6,084,483	7,014,689	7,988,889	9,011,620	10,082,973	11,203,041	12,400,317	13,912,110	15,711,620	17,594,045	19,431,775	21,192,817	23,003,692	24,865,274	26,780,955	28,753,356	30,933,238	33,529,685	36,394,207	39,320,003	42,307,21
Deferred Balance Long-term debt 1	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.677%	1.67
Members' equity 5. on Debt return on rate base (L96 x L101 /	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.148%	5.14
sion Debt return on rate base (L97 x L101 /	-	41	281	761	1,412	2,233	3,226	4,391	5,731	7,247	8,938	10,805	12,849	15,041	17,530	20,410	23,598	27,096	30,905	35,026	39,460	44,210	49,276	54,659	60,362	66,422	72,980	80,046	87,526	95,422	103,736	112,469	121,624	131,202	141,205	151,63
ant Debt return on rate base (L98 x L101 /	-	49	161	316	533	812	1,154	1,564	2,062	2,657	3,348	4,135	5,019	6,013	7,119	8,322	9,624	11,024	12,523	14,123	15,825	17,631	19,541	21,556	23,677	25,912	28,262	30,718	33,283	35,954	38,734	41,623	44,623	47,735	50,958	54,29
on Equity return on rate base (L96 x L101 /	-	-	4	31	94	203	360	568	825	1,339	2,293	3,484	4,785	6,062	7,258	8,505	9,805	11,167	12,597	14,094	15,660	17,334	19,447	21,963	24,594	27,163	29,624	32,156	34,758	37,436	40,193	43,240	46,870	50,874	54,964	59,13
ion Equity return on rate base (L97 x L101	-	127	861	2,336	4,333	6,854	9,901	13,477	17,589	22,242	27,431	33,161	39,432	46,160	53,799	62,638	72,423	83,158	94,847	107,494	121,104	135,680	151,227	167,749	185,251	203,848	223,975	245,660	268,617	292,849	318,364	345,166	373,262	402,657	433,357	465,30
lant Equity return on rate base (L98 x L101	-	152	494	970	1,636	2,493	3,541	4,800	6,328	8,155	10,276	12,692	15,403	18,455	21,848	25,541	29,536	33,833	38,435	43,343	48,566	54,109	59,971	66,156	72,664	79,523	86,735	94,275	102,144	110,344	118,875	127,742	136,948	146,497	156,391	166,63
	-	369	13 1.814	94 4,508	290 8,298	622 13,216	1,106 19,288	1,743 26,543	2,533 35.069	4,109 45,750	7,037 59,325	10,693 74,970	14,686 92,174	18,605 110,336	22,275 129,829	26,102 151,520	30,093 175,080	34,272 200,551	38,660 227,967	43,256 257,336	48,061 288,676	53,197 322,160	59,683 359,145	67,403 399,486	75,478 442,026	83,362 486,229	90,917 532,493	98,686 581,541	106,672 632,999	114,890 686.895	,	132,704 802,944	143,842 867,169	156,131 935,095	168,683 1,005,557	181,49
	-	309	1,014	4,506	0,270	13,210	17,200	20,343	55,009	43,730	39,343	74,770	92,174	110,550	129,029	131,320	173,000	200,331	221,701	231,330	200,070	322,100	337,143	377,400	442,020	400,229	332,493	301,341	032,779	000,093	143,234	002,744	007,109	550,055	1,003,337	1,070,30
tion deferral (L87 + L103 + L106)	-	59,277	283,991	405,688	527,916	650,676	773,973	897,808	1,024,826	1,150,184	1,276,090	1,402,547	1,529,557	1,615,767	1,955,970	2,176,569	2,398,132	2,620,665	2,844,174	3,068,663	3,294,139	3,520,607	3,748,073	3,976,542	4,206,021	4,488,617	4,921,105	5,217,498	5,515,201	5,814,220		6,416,242	6,719,258	7,023,623	7,329,342	7,636,42
Plant deferral (L89 + L105 + L108)	-	70,930	89,138 6,056 379,185	133,421 31,752 570,861	177,894 59,807 765,618	222,560 95,411 968.647	267,419 131,077 1,172,469	321,321 166,806 1,385,936	393,034 202,600 1,620,460	461,444 534,099 2.145,727	530,145 835,001 2,641,235	599,136 874,176 2,875,859	668,422 992,691 3,190,669	758,238 839,536 3,213,540	828,230 876,255 3,660,455	898,521 913,044	969,112 952,658	1,040,007 1,001,282	1,111,205 1,049,997	1,183,756 1,098,804	1,258,189 1,147,703	1,332,943 1,253,660	1,408,019 1,778,523	1,483,419 1,830,732	1,559,145 1,944,826	1,647,704 1,741,087	1,724,159 1,791,013	1,800,945 1,841,037	1,878,065 1,892,716	1,955,521 1,949,542	2,033,315 2,006,479	2,112,058 2,365,685	2,192,061 2,841,978	2,272,414 2,903,358	2,353,119 2,964,875	2,434,178 3,026,531

Based on lag time assumptions noted on Page 6
 Per accounting.
 From page 6.

Summary																																						
O&M	-	129,8	38 304	566	304,566	304,566	304,566	304,566	304,566	304,566	599,369	861,921	861,921	861,921	237,699	412,426	412,426	412,426	412,426	412,426	412,426	412,426	469,231	943,337	943,337	943,337	400,052	574,780	574,780	574,780	574,780	574,780	876,078	1,292,307	1,292,307	1,292,307	1,292,307	1,292,307
Depreciation	-	-		-	43,534	87,067	135,781	184,496	233,210	293,292	347,583	401,875	456,167	510,458	842,031	896,323	967,393	1,038,463	1,115,705	1,192,948	1,270,190	1,347,955	1,425,721	1,503,486	1,581,251	1,659,016	1,940,205	2,017,970	2,107,251	2,196,532	2,289,297	2,382,062	2,474,828	2,567,898	2,660,968	2,754,038	2,847,109	2,940,179
Property Tax	-	-		-	-	-	-	-	-	-	-	-	-	-	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	55,475	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121	143,121
Debt Return - Capital Asset	-		17.	893	53,638	89,872	126,587	163,215	201,921	242,697	283,369	323,941	364,415	424,212	483,657	532,417	590,150	648,430	707,250	765,929	824,723	883,633	942,401	1,001,027	1,059,511	1,132,992	1,206,145	1,270,071	1,340,082	1,410,311	1,480,756	1,551,031	1,621,287	1,691,524	1,761,590	1,831,486	1,901,213	1,992,298
Debt Return - Deferred Balance	-		91	446	1,108	2,039	3,248	4,740	6,523	8,619	11,243	14,580	18,425	22,653	27,116	31,907	37,238	43,028	49,288	56,025	63,243	70,945	79,174	88,264	98,178	108,633	119,496	130,866	142,920	155,566	168,812	182,663	197,332	213,116	229,810	247,127	265,069	283,701
Equity Return - Capital Asset Equity Return - Deferred Balance	-		54.	913	164,616	275,815	388,496	500,905	619,695	744,836	869,657	994,174	1,118,387	1,301,905	1,484,343	1,633,985	1,811,170	1,990,030	2,170,547	2,350,632		2,711,866	2,892,224	3,072,147		3,477,147	3,701,655	3,897,842	4,112,706	4,328,240	4,544,435	4,760,110	4,975,726	5,191,280	5,406,313	5,620,826	5,834,817	6,114,355
Equity Return - Deferred Balance	-	2	79 1,	368	3,400	6,259	9,968	14,548	20,020	26,451	34,506	44,745	56,546	69,521	83,219	97,922	114,282	132,052	151,264	171,941	194,093	217,731	242,986	270,881	301,308	333,393	366,733	401,627	438,621	477,433	518,083	560,591	605,612	654,053	705,286	758,431	813,496	870,677
	-	130,2	08 379.	,185	570,861	765,618	968,647	1,172,469	1,385,936	1,620,460	2,145,727	2,641,235	2,875,859	3,190,669	3,213,540	3,660,455	3,988,133	4,319,903	4,661,954	5,005,376	5,351,223	5,700,031	6,107,211	6,934,616	7,290,694	7,709,992	7,877,408	8,436,277	8,859,480	9,285,982	9,719,283	10,154,359	10,893,985	11,753,298	12,199,395	12,647,336	13,097,132	13,636,638

E7 Sub 1214 NORTH CAROLINA RETAIL GRID IMPROVEMENT 2018 Test Year O&M

2018 O&M is a part of the rate case test period O&M. Therefore the amount elegible for deferral would be the O&M incurred above the amount included in the 2018 test period.

2018 O&M incurred	<u>2018</u>		NC Retail
Self Optimizing Grid	113,457	0.762817	86,547
Targeted Undergrounding	103,146	0.762817	78,682
Hardening & Resiliency	2,939	0.762817	2,242
Customer Delivery Hardening & Resiliency	9,513	0.762817	7,257
Enterprise Applications	4,596,836	0.747926	3,438,093
Advanced DMS	851,514	0.747926	636,869
Communications	864,296	0.747926	646,429
Transmission	-		-
Total	6,541,701	_	4,896,119
Distribution			174,727
Transmission			-
General			4,721,392

E7 Sub 1214
NORTH CAROLINA RETAIL GRID IMPROVEMENT
Capital Spend and Installation O&M Estimates
Dollars in Millions

		DE	C Total Ca	pit	al Spend		
						5-у	ear
Strategic Category [1]	2020		2021		2022	Tot	:al
Advanced DMS	\$ 12	\$	12	\$	15	\$	40
АМІ	\$ -	\$	-	\$	-		-
Communication	\$ 36	\$	48	\$	55		139
Enterprise Applications	\$ 12	\$	10	\$	15		37
Hardening/Resiliency	\$ 47	\$	26	\$	79		152
Self Optimizing Grid	\$ 156	\$	290	\$	333		779
Targeted Underground	\$ 14	\$	20	\$	45		79
Distributed Energy	\$ 4	\$	1	\$	1		6
Transmission	\$ 161	\$	174	\$	159		494
Other	\$ -	\$	-	\$	-		-
							-
Total P/F Capital	\$ 443	\$	580	\$	703	\$	1,726

		DEC Total Ca	pital Spend		NC Retail
				3-year	Allocation
SYSTEM	2020	2021	2022	Total	[2]
ADMS	12.5	11.8	15.4	39.6	74.79%
Communication	36.1	48.0	54.7	138.7	74.79%
Enterprise Appliaction	12.0	9.9	15.2	37.1	74.79%
Distributed Energy	4.0	0.5	1.0	5.5	74.79%
Distribution NC	158.5	278.1	360.2	796.9	Direct
Distribution SC	56.5	62.5	83.1	202.2	
Transmission	163.2	169.6	173.4	506.2	52.66%
TOTAL	442.8	580.4	703.0	1,726.2	

Calculation of NC Retail Costs

Page 1 of 2

DEC Total Installation O&M Sp												
				5-year								
Strategic Category [1]	2020	2021	2022	Total								
Advanced DMS	\$ 1	\$ 1	\$ 2	\$ 4								
AMI	-	-	-	-								
Communication	2	3	4	9								
Enterprise Applications	5	4	6	15								
Hardening/Resiliency	2	1	3	5								
Self Optimizing Grid	2	4	5	11								
Targeted Underground	0	0	0	1								
Distributed Energy	0	0	0	0								
Transmission	2	2	2	5								
Other	-	-	-	-								
				-								
Total O&M	\$ 14	\$ 15	\$ 21	\$ 50								

	DEC T	DEC Total Installation O&M Spend									
				3-year	Allocation						
SYSTEM	2020	2021	2022	Total	[2]						
ADMC	1.2	1.2	1.6	4.1	74.79%						
ADMS	1.3	1.2	1.6	4.1							
Communication	2.4	3.2	3.6	9.2	74.79%						
Enterprise Appliaction	4.9	4.1	6.2	15.2	74.79%						
Distributed Energy	0.3	0.1	0.1	0.5	74.79%						
Distribution NC	2.8	4.0	6.1	12.9	Direct						
Distribution SC	1.0	1.0	1.5	3.5							
Transmission	1.6	1.7	1.6	4.9	52.66%						
TOTAL	14.4	15.3	20.7	50.3							

E7 Sub 1214
NORTH CAROLINA RETAIL GRID IMPROVEMENT
Capital Spend and Installation O&M Estimates
Dollars in Millions

	DEC	C NC Retail (Capital Sper	nd
				3-year
DEC NC Retail	2020	2021	2022	Total
ADMS	9.3	8.8	11.5	29.6
Communication	27.0	35.9	40.9	103.8
Enterprise Appliaction	9.0	7.4	11.3	27.8
Distributed Energy	3.0	0.4	0.8	4.1
Distribution NC Distribution SC	158.5	278.1	360.2	796.9 -
Transmission	86.0	89.3	91.3	266.6
TOTAL	292.8	419.9	516.0	1,228.7

Plant in Service Assumptions [1]										
Distribution	1 month									
Transmission	6 months									
Communication	3 months									
Advanced DMS &										
Enterprise Application	Annually in December									

- [1] System numbers and Plant in Service assumptions from Witness Oliver
- [2] Allocation factors from the Cost of service study.

Calculation of NC Retail Costs

Page 2 of 2

DEC NC Retail Installation O&M													
				3-year									
DEC NC Retail	2020	2021	2022	Total									
ADMS	1.0	0.9	1.2	3.1									
Communication	1.8	2.4	2.7	6.9									
Enterprise Appliaction	3.7	3.0	4.6	11.4									
Distributed Energy	0.2	0.0	0.1	0.3									
Distribution NC	2.8	4.0	6.1	12.9									
Distribution SC				-									
Transmission	0.8	0.9	0.8	2.6									
TOTAL	10.3	11.3	15.5	37.2									

Feb 25 2020 OFFICIAL COPY

Weighted Average Cost of Capital based on docket E-7 Sub 1146

Line <u>No.</u> 1		Capital <u>Structure</u> (a)	Cost/ <u>Return</u> (b)	Weighted Cost/Return (c)	Income Taxes Factor	After Tax Return	Income Taxes Factor	Revenue Requirement Excluding Gross Reciept Tax and Regulatory Fee	Combined Gross Receipts Tax and Regulatory Fee Factor	Revenue Requirement Including Gross Reciept Tax and Regulatory Fee
2 3 4 5	Long-term debt Members' equity Total (L3 + L4)	48.0000% [1] 52.0000% [1] 100.0000%	4.56% [2] 9.90% [2]	2.1884% 5.1480% 7.3364%	0.7664970 1.0000000	1.67742% 5.14800% 6.8254%	1.00000 0.76650	2.18843% 6.71627% 8.9047%	99.62023% 99.62023%	2.19677% 6.74187% 8.9386%
7 8 9 10 11 12 13	Gross revenue State income tax rate (L36) Remainder (L14 - L15) Federal income tax rate Federal income tax (L16 x L17) State income tax rate (L36) Combined income tax rate (L18 + L19) I minus combined income tax rate (1 - L20)				1.0000000 0.0297500 0.9702500 0.2100000 0.2037525 0.0297500 0.2335030 0.7664970					
15	Gross revenue uncollectibles rate Balance Regulatory fee rate Combined gross receipts tax and regulatory fee ra State income tax (L15 x L26) Balance (L26 - L27) Federal income tax (L17 x L28) Retention factor (L28 - L29)	te (L23 - L24 - L25)			1.000000 0.0025010 0.9974990 0.0012967 0.9962023 0.0296370 0.9665653 0.2029787 0.7635866					
	State income tax rate NC SC	0.0250000 67% 0.0500000 26%		0.0167500 0.0130000 0.0297500	0.2364134					

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Ser des recipes to any depth day, delical, an any recipes to the control total	III. Cost Non III. Labor III. Protection Comment	20.00	215.00 21,00 10,00	220	2	68.675 10.600 55.000	100,100° 243,100° 107,500	255	.00	95.796 95.995	722	.4	27	22 755	12	2,000 1000	145	102							10.000	400 FM		0.00 STATE		- 1.0000 - 170-1700 - 170-1700			mn 1700 mn 1000
M. AND WINES PLANT, PROSENTS. MINISTER PLANTS, PROSENTS. MINISTER PLANTS, PROSENTS.	W. Terretoire Server	10070 210070	10,000	91.00	100	500	10,600 14,600	100	240 240	60,005 6006 205,005	10.00	-:-	187 11	m NO.	100	1000 500 5000	1.00 1.00 10.00	-	1000 1000 1000 1000	10/20	4679	20170 1	1530 2	ED 19873	100	9.51	7.00	170.000	11.700	Marie Marie	500	100 W	200
Market S.		105	3,305	26.0%	275	2.5	E-10	74%		2.00		105	625		. 0.75		1.00	125			476	4.00		16 16		100	-	20%	105	185	3/5	675 1	165 275
		PM.)461	100,000	man, ha	1.00%				135 236 236	30,600		es ' com	140	40 330	6-95 Gars	1,000	200	m. 2,710 sam	- CAM	2775	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	10% AND 10%	2200 2000	1005	100	HE'S COM	6186	2.70%	0.79%	2705		- m-	1.00
			100%	hes.	**		875	46.	100	10%	*	95.	100	26 186 96		- 20	~	1%	es		*	**	**	16 00		~	-	5%	25	~	**	*	*

DUKE ENERGY CAROLINAS COMPARISON OF CURRENT AND PROPOSED DEPRECIATION PARAMETERS, RATES AND ACCRUALS AS OF DECEMBER 31, 2018 VERSION 1 - REVISED

					CURRENT					PROPOSED			
		ORIGINAL COST	PROBABLE		NET	CALCULATED)	PROBABLE		NET	CALCULA	ATED	
		AS OF	RETIREMENT	SURVIVOR	SALVAGE	ANNUAL ACC	RUAL	RETIREMENT	SURVIVOR	SALVAGE	ANNUAL AC	CRUAL	INCREASE/
	ACCOUNT	DECEMBER 31, 2018	DATE	CURVE	PERCENT	AMOUNT	RATE	DATE	CURVE	PERCENT	AMOUNT	RATE	DECREASE
	(1)	(2)	(3)	(4)	(5)	(6)=(2)*(7)	(7)	(8)	(9)	(10)	(11)	(9)=(8)/(5)	(13)
-	TRANSMISSION PLANT												
352.00	STRUCTURES AND IMPROVEMENTS	108,489,173.06		60-R3	(20)	2,115,539	1.95		55-R2	(10)	2,170,087	2.00	54,548
353.00	STATION EQUIPMENT	1,849,287,080.50		52-R1.5	(25)	39,204,886	2.12		48-R1.5	(20)	43,512,066	2.35	4,307,180
354.00	TOWERS AND FIXTURES	587,791,762.36		70-R2	(40)	9,933,681	1.69		75-R2	(50)	10,058,236	1.71	124,555
355.00	POLES AND FIXTURES	558,831,171.11		50-R1.5	(25)	12,741,351	2.28		48-R1	(30)	15,024,969	2.69	2,283,618
356.00	OVERHEAD CONDUCTORS AND DEVICES	760,660,328.73		60-R2	(40)	15,213,207	2.00		60-R2.5	(40)	15,381,796	2.02	168,589
357.00	UNDERGROUND CONDUIT	124,173.82		55-S4	0	1,391	1.12		55-S4	0	1,356	1.09	(35)
358.00	UNDERGROUND CONDUCTOR AND DEVICES	5,812,002.49		55-S3	0	80,787	1.39		50-S4	0	104,142	1.79	23,355
359.00	ROADS AND TRAILS	42,238.00		65-R4	0	617	1.46		65-R4	0	615	1.46	(2)
7	TOTAL TRANSMISSION PLANT	3,871,037,930.07				79,291,459	2.05				86,253,267	2.23	6,961,808
	DISTRIBUTION PLANT												
361.00	STRUCTURES AND IMPROVEMENTS	112,827,983.33		60-R2.5	(20)	2,188,863	1.94		55-S0.5	(10)	2,214,720	1.96	25,857
362.00	STATION EQUIPMENT	1,376,647,876.87		42-R1	(25)	35,655,180	2.59		44-R1	(20)	32,261,405	2.34	(3,393,775)
364.00	POLES, TOWERS AND FIXTURES	1,633,135,516.15		49-R2	(25)	32,336,083	1.98		50-R2	(30)	34,614,100	2.12	2,278,017
365.00	OVERHEAD CONDUCTORS AND DEVICES	2,263,640,318.34		49-R0.5	(20)	43,914,622	1.94		52-R0.5	(25)	44,559,335	1.97	644,713
366.00	UNDERGROUND CONDUIT	203,949,849.78		55-R3	(15)	3,202,013	1.57		60-R3	(15)	2,791,873	1.37	(410,140)
367.00	UNDERGROUND CONDUCTORS AND DEVICES	2,040,861,815.64		54-R3	(20)	40,817,236	2.00		55-R3	(20)	40,019,115	1.96	(798,121)
368.00	LINE TRANSFORMERS			43-R1.5	(20)	26,881,068	1.77		45-R1.5	(10)	31,289,615	2.06	4,408,547
	SERVICES	1,518,704,424.45			-				52-R1.5	, ,		1.39	4,406,547 755,044
369.00 370.00		1,107,500,564.10		50-R1.5	(10) 0	14,619,007	1.32			(15) 0	15,374,051		
	METERING EQUIPMENT METERS	100,494,301.47	40.0040	20-L0 *	0	5,326,198	5.30		17-L0	0	2,615,173	2.60	(2,711,025)
370.01		68,544,544.14	12-2019	20-L0 *	0	10,553,102	=		17-L0	~	10,601,895		48,793
370.02	METERS -UTILITY OF THE FUTURE	438,309,266.89		15-S2.5	0	31,514,436	7.19		15-S2.5	0	30,148,683	6.88	(1,365,753)
371.00	INSTALLATIONS ON CUSTOMERS' PREMISES	914,011,910.46		40-R0.5	(5)	19,742,657	2.16		40-R1	(5)	21,338,273	2.33	1,595,616
373.00	STREET LIGHTING AND SIGNAL SYSTEMS	243,393,601.32		35-R1	(10)	6,522,949	2.68		36-R0.5	(10)	6,020,417	2.47	(502,532)
7	TOTAL DISTRIBUTION PLANT	12,022,021,972.94				273,273,414	2.27				273,848,655	2.28	575,241
	Excluding Meters	11,414,673,860				225,879,678	1.98				230,482,904	2.02	
(GENERAL PLANT												
390.00	STRUCTURES AND IMPROVEMENTS	675,049,911.19		40-R2	(10)	21,736,607	3.22		40-S1	(10)	20,657,294	3.06	(1,079,313)
391.00	OFFICE FURNITURE AND EQUIPMENT	48,878,029.08		15-SQ	0	3,260,165	6.67		15-SQ	0	3,258,543	6.67	(1,622)
391.10	OFFICE FURNITURE AND EQUIPMENT - EDP	113,710,527.80		8-SQ	0	14,213,816	12.50		8-SQ	0	14,217,928	12.50	4,112
331.10	OFFICE FORWITCHE AND EQUIT WENT - EDI	113,/10,327.80		8-3Q	Ü	14,213,010	12.30		0-3Q	O	14,217,320	12.50	4,112
392.00	TRANSPORTATION EQUIPMENT				_				5.00.5	40	0.477	0.00	0.477
	PASSENGER CARS AND STATION WAGONS	94,914.61		5-S2.5	5	0	-		5-S2.5	10	3,477	3.66	3,477
	LIGHT TRUCKS	2,419,475.49		6-L3	5	181,461	7.50		6-L3	10	150,280	6.21	(31,181)
	MEDIUM TRUCKS	438,550.50		8-L2	5	0	-		8-L2	10	32,054	7.31	32,054
	HEAVY TRUCKS	1,304,835.00		10-L2	5	129,440	9.92		10-L2	10	0	-	(129,440)
	HEAVY TRUCKS / POWER EQUIPPED	2,801,236.11		10-L2	5	0	-		10-L2	10	0	-	0
	TRACTORS	65,897.00		13-L3	5	6,847	10.39		13-L3	10	0	-	(6,847)
	TRAILERS	5,511,868.72		17-L0.5	5	288,271	5.23		16-L0.5	10	104,821	1.90	(183,450)
	TOTAL TRANSPORTATION EQUIPMENT	12,636,777.43				606,019	4.80				290,632	2.30	(315,387)
393.00	STORES EQUIPMENT	14,298,928.76		20-SQ	0	714,946	5.00		20-SQ	0	714,946	5.00	0
394.00	TOOLS, SHOPS AND GARAGE EQUIPMENT												
	FULLY ACCRUED	0.00		0.00	0	0	-				0	-	0
	AMORTIZED	104,793,595.68		20-SQ	0	5,239,680	5.00		20-SQ	0	5,240,529	5.00	849
	TOTAL TOOLS SHOP AND GARAGE EQUIPMENT	104,793,595.68				5,239,680					5,240,529		849
395.00	LABORATORY EQUIPMENT	5,877,459.28		15-SQ	0	392,027	6.67		15-SQ	0	391,830	6.67	(197)
396.00	POWER OPERATED EQUIPMENT												
390.00	MOBILE CRANES	509,129.42		19-\$1.5	0	15,987	3.14		19-S1.5	10	19,910	3.91	3,923
	MISCELLANEOUS NON-HIGHWAY EQUIPMENT	1,020,976.03			0				13-L2	10	0	-	
				14-S1.5		48,394	4.74			10			(48,394) (640,781)
	MISCELLANEOUS EQUIPMENT	9,797,880.43		14-S1.5	0	640,781	6.54		13-L2	10	0	-	(640,781)
	TOTAL POWER OPERATED EQUIPMENT	11,327,985.88				705,162	6.22				19,910	0.18	(685,252)
397.00	COMMUNICATION EQUIPMENT	153,219,179.05		10-SQ	0	15,321,918	10.00		10-SQ	0	15,328,598	10.00	6,680
398.00	MISCELLANEOUS EQUIPMENT	10,275,692.04		20-SQ	0	15,321,918 513,785	5.00		20-SQ	0	513,784	5.00	(1)
				20 30	Ü				20 00	3			
7	TOTAL GENERAL PLANT	1,150,068,086.19				62,704,125	5.45				60,633,994	5.27	(2,070,131)

DEPRECIABLE LAND RIGHTS

DUKE ENERGY CAROLINAS COMPARISON OF CURRENT AND PROPOSED DEPRECIATION PARAMETERS, RATES AND ACCRUALS AS OF DECEMBER 31, 2018 VERSION 1 - REVISED

					CURRENT			PROPOSED					
		ORIGINAL COST	PROBABLE		NET	CALCULATED)	PROBABLE		NET	CALCULAT	ED	
		AS OF	RETIREMENT	SURVIVOR	SALVAGE	ANNUAL ACCE	RUAL	RETIREMENT	SURVIVOR	SALVAGE	ANNUAL ACC	RUAL	INCREASE/
	ACCOUNT	DECEMBER 31, 2018	DATE	CURVE	PERCENT	AMOUNT	RATE	DATE	CURVE	PERCENT	AMOUNT	RATE	DECREASE
	(1)	(2)	(3)	(4)	(5)	(6)=(2)*(7)	(7)	(8)	(9)	(10)	(11)	(9)=(8)/(5)	(13)
310.00	RIGHTS OF WAY												
	MARSHALL	452,636.00	06-2034	100-R4	0	0	-	06-2034	100-R4	* 0	0	-	0
	BELEWS CREEK	1,543,811.00	06-2037	100-R4	0	0	-	06-2037	100-R4	* 0	0	-	0
	LEE	3,106.00	06-2030	100-R4	0	0	-	06-2030	100-R4	* 0	0	-	0
	ALLEN	4,303.00	06-2026	100-R4	0	0	-	06-2024	100-R4	* 0	0	-	0
	TOTAL ACCOUNT 310	2,003,856.00				0	-				0	-	0
		, ,											
320.00	RIGHTS OF WAY												
	OCONEE	425,003.00	07-2034	100-R4	0	6,588	1.55	07-2034	100-R4	* 0	6,546	1.54	(42)
	MCGUIRE	74,882.00	03-2043	100-R4	0	1,236	1.65	03-2043	100-R4	* 0	1,227	1.64	(9)
	CATAWBA	456,656.68	12-2043	100-R4	0	8,448	1.85	12-2043	100-R4	* 0	8,399	1.84	(49)
	ONNWER	430,030.08	12-2043	100-114	U	0,440	1.03	12 2040	100 114	O	0,000	1.04	(40)
	TOTAL ACCOUNT 320	956,541.68				16,272	1.70				16,172	1.69	(100)
	TO THE HOUGHT DEC	330,341.00				10,272	1.70				10,112	1.00	(100)
330.00	RIGHTS OF WAY												
330.00	COWANS FORD	6,881,547.00	06-2055	110-R4	0	45,418	0.66	06-2055	110-R4	* 0	45,372	0.66	(46)
	BAD CREEK				0				110-R4	* 0		1.22	
		723,692.00	06-2058	110-R4	0	8,901	1.23	06-2058			8,840		(61)
	JOCASSEE	436,179.00	06-2046	110-R4	0	3,751	0.86	06-2046	110-R4	* 0	3,685	0.84	(66)
	KEOWEE	12,071,075.00	06-2046	110-R4	0	86,912	0.72	06-2046	110-R4	* 0	86,162	0.71	(750)
	FISHING CREEK	35,796.00	06-2055	110-R4	0	0	-	06-2055	110-R4	* 0	0	-	0
	BRIDGEWATER	393,705.00	06-2055	110-R4	0	0	-	06-2055	110-R4	* 0	0	-	0
	GASTON SHOALS	16,648.00	06-2036	110-R4	0	0	-	06-2036	110-R4	* 0	0	-	0
	LOOKOUT SHOALS	7,426.00	06-2055	110-R4	0	0	-	06-2055	110-R4	* 0	0	-	0
	MOUNTAIN ISLAND	323,913.00	06-2055	110-R4	0	0	-	06-2055	110-R4	* 0	0	-	0
	99 ISLANDS	17,102.00	06-2036	110-R4	0	0	-	06-2036	110-R4	* 0	0	-	0
	OXFORD	695,790.00	06-2055	110-R4	0	417	0.06	06-2055	110-R4	* 0	548	0.08	131
	RHODHISS	199,929.00	06-2055	110-R4	0	0	-	06-2055	110-R4	* 0	17	0.01	17
	TUXEDO	245,404.00	06-2041	110-R4	0	0	-	06-2041	110-R4	* 0	0	-	0
	WATEREE	204,111.00	06-2055	110-R4	0	0	-	06-2055	110-R4	* 0	0	-	0
	WYLIE	1,189,441.24	06-2055	110-R4	0	0	-	06-2055	110-R4	* 0	0	-	0
	NPL BEAR CREEK	435.00	06-2041	110-R4	0	0	-	06-2041	110-R4	* 0	0	-	0
	NPL FRANKLIN	12,423.00	06-2041	110-R4	0	0	-	06-2041	110-R4	* 0	0	-	0
	NPL NANTAHALA	80,304.00	06-2042	110-R4	0	0	_	06-2042	110-R4	* 0	0	-	0
	NPL QUEENS CREEK	5,782.00	06-2032	110-R4	0	0		06-2032	110-R4	* 0	0	_	0
	NPL TENNESSEE CREEK	711.00	06-2041	110-R4	0	0	_	06-2041	110-R4	* 0	0	_	0
	NPL THORPE	47,127.00	06-2041	110-R4	0	0	_	06-2041	110-R4	* 0	0	_	0
	NPL TUCKASEGEE	1,518.00	06-2041	110-R4	0	0	-	06-2041	110-R4	* 0	0		0
	NFL TOORAGEGEE	1,518.00	06-2041	110-R4	0		-	00-2041	110-114	U		-	
	TOTAL ACCOUNT 330	22 500 050 24				145 200	0.63				144,624	0.61	(775)
	TOTAL ACCOUNT 330	23,590,058.24				145,399	0.62				144,024	0.61	(775)
240.00	DICLITE OF WAY												
340.00	RIGHTS OF WAY		00.0050	00 D4			4.45	00 0050	00 D4	* 0	000	4.00	44
	DAN RIVER	7,693.00	06-2052	60-R4	0	342	4.45	06-2052	60-R4	* 0	383	4.98	41_
	TOTAL ACCOUNT OOG	7 000 00				0.40	4.45				200	4.00	44
	TOTAL ACCOUNT 330	7,693.00				342	4.45				383	4.98	41
	DIQUED OF WAY												(004.004)
350.00	RIGHTS OF WAY	163,057,492.39		75-R4	0	1,875,161	1.15		80-R4	0	1,673,327	1.03	(201,834)
360.00		8,830,280.42		75-R3	0	120,975	1.37		80-R3	0	110,290	1.25	(10,685)
360.20	LAND RIGHTS	561,560.00		75-R3	0	8,480	1.51		80-R3	0	7,656	1.36	(824)
389.00	RIGHTS OF WAY	550,127.03		60-R3	0	8,307	1.51		60-R3	0	8,256	1.50	(51)
389.20	LAND RIGHTS	165.00		60-R3	0	2	1.21		60-R3	0	2	1.21	0
_													
٦	TOTAL DEPRECIABLE LAND RIGHTS	199,557,773.76				2,174,938	1.09				1,960,710	0.98	(214,228)
ı	RESERVE ADJUSTMENT FOR AMORTIZATION												
391.00	OFFICE FURNITURE AND EQUIPMENT					(485,779) ***					(1,091,336) ***		(605,557)
391.10	OFFICE FURNITURE AND EQUIPMENT - EDP					(7,162,540) ***					(6,686,253) ***		476,287
393.00	STORES EQUIPMENT					(167,822) ***					(510,479) ***		(342,657)
394.00	TOOLS,SHOP AND GARAGE EQUIPMENT					791,555 ***					182,044 ***		(609,511)
395.00	LABORATORY EQUIPMENT					60,273 ***					(196,882) ***		(257,155)
397.00	COMMUNICATION EQUIPMENT					(3,375,963) ***					(5,756,654) ***		(2,380,691)
398.00	MISCELLANEOUS EQUIPMENT					181,040 ***					152,142 ***		(28,898)
7	TOTAL RESERVE ADJUSTMENT FOR AMORTIZATION					(10,159,236)					(13,907,418)		(3,748,182)
						(-,,,					. , . , -,		. , -, - ,
7	TOTAL DEPRECIABLE PLANT	50,816,367,931.52				1,343,742,881	2.64				1,458,084,379	2.87	109,738,272
						• • •							• •
ı	NONDEPRECIABLE PLANT												
-													

DUKE ENERGY CAROLINAS COMPARISON OF CURRENT AND PROPOSED DEPRECIATION PARAMETERS, RATES AND ACCRUALS AS OF DECEMBER 31, 2018 VERSION 1 - REVISED

					CURRENT					PROPOSED			
		ORIGINAL COST	PROBABLE		NET	CALCULAT		PROBABLE		NET	CALCUI		
		AS OF	RETIREMENT	SURVIVOR	SALVAGE	ANNUAL AC		RETIREMENT	SURVIVOR	SALVAGE	ANNUAL A		INCREASE/
	ACCOUNT	DECEMBER 31, 2018	DATE	CURVE	PERCENT	AMOUNT	RATE	DATE	CURVE	PERCENT	AMOUNT	RATE	DECREASE
	(1)	(2)	(3)	(4)	(5)	(6)=(2)*(7)	(7)	(8)	(9)	(10)	(11)	(9)=(8)/(5)	(13)
302.00	FRANCHISES AND CONSENTS	10,582,513.97											
302.01	NPL FEASIBILITY	51,514.00											
303.00	MISCELLANEOUS INTANGIBLE PLANT	881,801,467.56											
303.10	MISCELLANEOUS INTANGIBLE PLANT - 10 YEAR	77,334,560.26											
303.02	NUCLEAR LICENSING	16,980,814.09											
310.00	LAND	26,928,990.69											
317.00	ARO	886,954,100.65											
320.00	LAND	2,084,901.52											
326.00	ARO	(333,080,604.95)											
330.00	LAND	28,756,791.34											
340.00	LAND	9,356,078.64											
347.00	ARO	14,776,081.47											
350.00	LAND	33,315,866.21											
360.00	LAND	54,389,762.82											
389.00	LAND	62,366,844.64											
399.00	ARO	(931,335.11)											
7	TOTAL NONDEPRECIABLE PLANT	1,771,668,347.80											
	ACCOUNTS NOT STUDIED												
352.99	STRUCTURES AND IMPROVEMENTS - IMPAIRMENT	(4,692,470.50)											
353.99	STATION EQUIPMENT - IMPAIRMENT	(9,531,580.93)											
354.99	TOWERS AND FIXTURES - IMPAIRMENT	(146,639.71)											
355.99	POLES AND FIXTURES - IMPAIRMENT	(146,639.63)											
356.99	OVERHEAD CONDUCTORS AND DEVICES - IMPAIRMENT	(146,639.68)											
7	TOTAL ACCOUNTS NOT STUDIED	(14,663,970.45)											
7	TOTAL ELECTRIC PLANT	52,573,372,308.87				1,343,742,881	:				1,458,084,379		109,738,272

= Provided in Melissa A.'s 5-2-2019 email

= Used the Ordered Projected Rates from 2016 Depr Study.

^{*} Curve shown is interim survivor curve. Each facility in the account is assigned an individual probable retirement year.

** Annual Accrual Amount calculated based on remaining amortization period of 14.58 years (August 2033 which is 15 years from implementation).

*** 5 year Amortization of Adjusted Reserve related to implementation of Amortization Accounting.

Duke Energy Carolinas, LLC Docket No. E-7, Sub 1214 Annualize retail revenues for current rates For the test period ended December 31, 2018 NC-0104 Page 1 of 1 Application

2018 Calculation of Tax Rates

Current (Statutory) Tax Rate Per "Provision" - Year 2019

Line <u>No.</u> 1	<u>Description</u>	<u>Total</u>	Statutory Rate (a)	Allocation Factor (b)	Composite Rate (a) x (b)
2		100.0000%		, ,	, , , ,
3	North Carolina	1.6750%	2.50%	67.0000%	1.67500%
4	South Carolina	1.3000%	5.00%	26.0000%	1.30000%
5	Federal Taxable Income (L2 - L3 - L4)	97.0250%	_		
6	Federal Tax Rate	21.0000%	<u>)</u>		
7	Federal Net of State (L5 x L6)	20.3753%	_		
8	North Carolina (L3)	1.6750%			
9	South Carolina (L4)	1.3000%	<u>.</u>		
10	Composite Tax Rate (L7 + L8 + L9)	23.3503%			

Source: Duke Energy Carolinas Tax Department

Duke Energy Carolinas, LLC Docket No. E-7, Sub 1214 Annualize property taxes on year end plant balances For the test period ended December 31, 2018 (Dollars in thousands) NC-0901 Page 1 of 1

Line					
No. Description	Sta	te - NC	Sta	ate - SC	
1 12/31/2017 System Balances Subject to Property Tax					
2 Utility Plant (101-106, 114)	\$	38,269,626 [1]	\$	38,269,626 [1]	
3 Less: Asset Retirement Obligations		(198,027) [2]		(198,027) [2]	
4 Construction Work in Progress (107)		2,610,346 [1]		- [3]	
5 Net Nuclear Fuel (120.1-5)		842,653 [1]		- [3]	
6 Fuel Stock (151)		229,301 [1]		- [3]	
7 Materials & Supplies (154)		474,672 [4]		222,870 [4]	
8 Store Expenses Undistributed (163) [M & S Burdens]		24,528 [4]		19,892 [4]	
9 Other Materials & Supplies (156)		66 [4]		5 [4]	
10 Property Subject to Property Tax (Sum L2 through L8)	\$	42,253,166	\$	38,314,366	
11					
12 2018 Property Tax Expense Paid	\$	90,787 [5]	\$	117,894 [6]	Combined
13 Average Property Tax Rate (L12 / L10)		0.21486%		0.30770%	0.259%
14					
15 12/31/2018 System Balances Subject to Property Tax					
16 Utility Plant (101-106, 114)	\$	41,161,863 [1]	\$	41,161,863 [1]	
17 Less: Asset Retirement Obligations		(567,718) [2]		(567,718) [2]	
18 Construction Work in Progress (107)		1,632,658 [1]		- [3]	
19 Net Nuclear Fuel (120.1-5)		814,296 [1]		- [3]	
20 Fuel Stock (151)		220,761 [1]		- [3]	
21 Plant Materials & Operating Supplies (154)		464,250 [7]		217,976 [7]	
22 Store Expenses Undistributed (163) [M & S Burdens]		24,952 [7]		20,236 [7]	
23 Other Materials & Supplies (156)		96 [7]		8 [7]	
24 Property Subject to Property Tax (Sum L16 through L22)	\$	43,751,062	\$	40,832,357	
25					
26 Average Property Tax Rate (L13)		0.21486%		0.30770%	
27 Annualized Property Tax Expense (L24 x L26)	\$	94,005	\$	125,641	
28	_		_		
29 Test Year Property Tax Expense (Excluding Deferrals) (L12)	\$	90,787	\$	117,894	
30 Property Tax Expense Adjustment (L27 - L29)	\$	3,218	\$	7,748	
31					
32 Total Property Tax Adjustment (NC Col. L30 + SC Col. L30)	\$	10,966			
33 Allocation Factor - Gross Plant		68.3083% [8]			
34 Impact to general taxes (L32 x L33)	\$	7,491			
35 Statutory tax rate	•	23.3503% [9]			
36 Impact to income taxes (-L34 x L35)	\$	(1,749)			
37 Impact to operating income (-L34 - L36)	\$	(5,742)			

- [1] NC-0902 FERC Form 1, Comparative Balance Sheet, Page 110, Lines 2, 3, 13, and 45
- [2] NC-0903 Asset Retirement Obligations
- [3] There is no property tax applied for these items in SC Per DEC Property Tax Department
- [4] NC-0904 Duke Energy Carolinas Materials and Supplies By State, Line 16, Line 17 and Line 18
- [5] NC-0905 2018 Property Tax Expense NC, Col. (b) + Col. (c)
- [6] NC-0906 2018 Property Tax Expense SC, Col. (a)
- [7] 2018 FERC 154, 156 and 163 accounts are spread across NC and SC based on 2017 distribution.
- [8] COSS NC retail percentage of gross plant in service
- [9] NC-0104 2019 Calculation of Tax Rates Statutory Tax Rate, Line 10

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 8

Docket No. E-7, Sub 1214

Date of Request: Date of Response:		• /
	CONFID	ENTIAL
X	NOT CO	NFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 8-24, was provided to me by the following individual(s): <u>Karen Ann Ralph</u>, <u>Lead Planning and Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Carolinas

NCJC Data Request No. 8 DEC Docket No. E-7, Sub1214 Item No. 8-24 Page 1 of 1

Request:

- 8-24. Refer to DEC's targeted undergrounding program generally.
- a. How many miles of residential "Backyard" overhead lines does DEC estimate it has today?
- b. What percentage of the miles DEC proposes to underground in its proposed targeted undergrounding program are shared with telecom, internet, or cable TV providers?

Response:

- a) The amount is not quantifiable using GIS attributes
- b) We have assumed all, although there will be exceptions

Duke Energy Progress Response to NCJC Data Request Data Request No. 5

Docket No. E-2, Sub 1219

Date of Re		February 10, 2020
	CONFIL	DENTIAL
X	NOT CO	ONFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-22, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Progress

NCJC Data Request No. 5 DEP Docket No. E-2, Sub 1219 Item No. 5-22 Page 1 of 1

Request:

- 5-22. Refer to DEP's targeted undergrounding program generally.
- a. How many miles of residential "Backyard" overhead lines does DEP estimate it has today?
- b. What percentage of the miles DEC proposes to underground in its proposed targeted undergrounding program are shared with telecom, internet, or cable TV providers?

Response:

- a) The amount is not quantifiable using GIS attributes
- b) We have assumed all, although there will be exceptions

Alvarez Exhibit - 4

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 8

Docket No. E-7, Sub 1214

Date of	Request:	January 31, 2020
Date of	Response:	February 10, 2020
	_	•
	CONFID	ENTIAL
X	NOT CO	NFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 8-1, was provided to me by the following individual(s): <u>Karen Ann Ralph</u>, <u>Lead Planning and Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Carolinas

NCJC Data Request No. 8 DEC Docket No. E-7, Sub1214 Item No. 8-1 Page 1 of 1

Request:

- 8-1. Refer to forthcoming responses from DEC for NCJC DRs 6-08 and 6-09.
- a. How many miles of 44kV does DEC have today?
- b. How many miles of 44kV upgrades will deliver a capacity increase, and to what capacity?
- c. How many distribution circuits does DEC have? DEP?

Response:

- a. Approximately 2,800 miles
- b. In the 3-year Grid Improvement Plan there are no capacity increase projects associated with the 44kV rebuilds. 44kV line rebuilds in the 3-year plan total approximately 80 miles and are all driven by reliability improvements, these rebuilds will reduce the probability of circuit failures that could result in customer outages. This work is all part of Phase I as described in Oliver Exhibit 4 page 36. These 44kV circuits are rebuilt to 100kV standards with regards to structure design, insulation level, and conductor sizing. There is no timeline established for Phase II, voltage conversions to 100kV, which would deliver the capacity increase.
- c. DEC NC has 2,093 circuits as of November 2019. DEP NC has 1,077 circuits as of November 2019.

Duke Energy Progress Response to NCJC Data Request Data Request No. 5

Docket No. E-2, Sub 1219

Date of Ro	equest: esponse:	January 31, 2020 February 10, 2020
	CONFIL	DENTIAL
X	NOT CO	ONFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-1, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Progress

NCJC Data Request No. 5 DEP Docket No. E-2, Sub 1219 Item No. 5-1 Page 1 of 1

Request:

- 5-1. Refer to forthcoming responses from DEC for NCJC DRs 6-08 and 6-09.
- a. How many miles of 44kV does DEP have today?
- b. How many miles of 44kV will be upgraded, and to what capacity, in DEP if the current GIP is approved?

Response:

- a. 0 miles. Voltages in the DEP Transmission system are 230kV, 115kV, and 69kV.
- b. N/A

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 8

Docket No. E-7, Sub 1214

Date of Request: January 31, 2020

ate o	f Response:	February	10, 2020
	CONFID	ENTIAL	
X	NOT CO	NFIDENT	IAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 8-26, was provided to me by the following individual(s): <u>Karen Ann Ralph</u>, <u>Lead Planning and Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Carolinas

NCJC Data Request No. 8 DEC Docket No. E-7, Sub1214 Item No. 8-26 Page 1 of 1

Request:

- 8-26. Refer to DEC's response to NCJC DR 5-49, which states "in the past 5 years in the DEC system there have been 88,739 customer outages totaling 18,442,020 customer minutes interrupted as a result of transformer equipment failures."
- a. How many individual distribution transformer failures are represented in these statistics?
- b. How many distribution transformers does DEC have?
- c. How many individual transmission transformer failures are represented in these statistics?
- d. How many transmission transformers does DEC have?

Response:

Note, in answering the question Duke Energy assumed it related to substation transformer banks. "Distribution" would be T to D banks and "Transmission" would be T to T banks. Upon re-running the query from the Transmission Reliability Reporting System it was identified that the original numbers provided in DR 5-49 were incorrect and lower than actual. Updated numbers applicable to DR 5-49: in the past 5 years in the DEC system there have been 157,682 customer outages totaling 36,134,492 customer minutes interrupted as a result of transformer equipment failures. The below responses are associated with these updated numbers.

- a. Individual transformer assets are not tracked to specific outages in the Transmission Reliability Reporting System, although there were 57 unique events that comprised the above-mentioned customer interruptions and customer minutes interrupted. 35 of these events are associated with distribution class transformers.
- b. DEC has approximately 4,500 distribution class substation transformers
- c. Individual transformer assets are not tracked to specific outages in the Transmission Reliability Reporting System, although there were 57 unique events that comprised the above-mentioned customer interruptions and customer minutes interrupted. 22 of these events are associated with transmission class transformers.
- d. DEC has approximately 400 transmission class substation transformers

Duke Energy Progress Response to NCJC Data Request Data Request No. 5

Docket No. E-2, Sub 1219

Date of Ro	lequest: esponse:	January 31, 2020 February 10, 2020
	CONFIL	DENTIAL
X	NOT CO	ONFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-17, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Progress

NCJC Data Request No. 5 DEP Docket No. E-2, Sub 1219 Item No. 5-17 Page 1 of 1

Request:

- 5-17. Refer to DEP's response to NCJC DEP DR 2-16(c), which states "in the past 5 years in the DEP system there have been 290,450 customer outages totaling 28,539,477 customer minutes interrupted as a result of transformer equipment failures."
- a. How many individual distribution transformer failures are represented in these statistics?
- b. How many distribution transformers does DEP have?
- c. How many individual transmission transformer failures are represented in these statistics?
- d. How many of transmission transformers does DEP have?

Response:

For this response, it is assumed that "distribution transformer" refers to a substation T to D bank, and "transmission transformer" refers to a substation T to T bank.

- a. Individual transformer assets are not tracked to specific outages in the Transmission Reliability Reporting System, although there were 65 unique events that comprised the above-mentioned customer interruptions and customer minutes interrupted. 56 of these events are associated with distribution class transformers.
- b. DEP has approximately 900 distribution class substation transformers
- c. Individual transformer assets are not tracked to specific outages in the Transmission Reliability Reporting System, although there were 65 unique events that comprised the above-mentioned customer interruptions and customer minutes interrupted. 9 of these events are associated with transmission class transformers.
- d. DEP has approximately 117 transmission class substation transformers

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 8

Docket No. E-7, Sub 1214

Date of	Request:	January 31, 2020
Date of	Response:	February 11, 2020
	_	•
	CONFID	ENTIAL
X	NOT CO	NFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 8-25, was provided to me by the following individual(s): <u>Karen Ann Ralph</u>, <u>Lead Planning and Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

NCJC Data Request No. 8 DEC Docket No. E-7, Sub1214 Item No. 8-25 Page 1 of 1

Request:

- 8-25. Refer to DEC's response to NCJC DR 5-44, which states "in the past 5 years in the DEC system there have been 77,515 customer outages totaling 8,642,573 customer minutes interrupted as a result of breaker equipment failures."
- a. How many individual distribution breaker failures are represented in these statistics?
- b. How many distribution breakers does DEC have?
- c. How many of DEC's distribution breakers are oil filled?
- d. How many individual transmission breaker failures are represented in these statistics?
- e. How many transmission breakers does DEC have?
- f. How many of DEC's transmission breakers are oil filled?

Response:

Upon re-running the query from the Transmission Reliability Reporting System it was identified that the original numbers provided in DR 5-44 were incorrect and lower than actual. Updated numbers applicable to DR 5-44: in the past 5 years in the DEC system there have been 123,103 customer outages totaling 11,242,664 customer minutes interrupted as a result of breaker equipment failures. The below responses are associated with these updated numbers.

- a. Individual breaker assets are not tracked to specific outages in the Transmission Reliability Reporting System, although there were 50 unique events that comprised the above-mentioned customer interruptions and customer minutes interrupted. 37 of these events are associated with distribution class breakers.
- b. DEC has approximately 4,600 distribution class substation breakers
- c. DEC has approximately 1,500 distribution class substation oil breakers
- d. Individual breaker assets are not tracked to specific outages in the Transmission Reliability Reporting System, although there were 50 unique events that comprised the above-mentioned customer interruptions and customer minutes interrupted. 13 of these events are associated with transmission class breakers.
- e. DEC has approximately 3,400 transmission class substation breakers
- f. DEC has approximately 2,000 transmission class substation oil breakers

Duke Energy Progress Response to NCJC Data Request Data Request No. 5

Docket No. E-2, Sub 1219

Date of R Date of Re	equest: esponse:	January 31, 2020 February 10, 2020						
	CONFIL	DENTIAL						
X	NOT CO	ONFIDENTIAL						

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-16, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Progress

NCJC Data Request No. 5 DEP Docket No. E-2, Sub 1219 Item No. 5-16 Page 1 of 1

Request:

- 5-16. Refer to DEP's response to NCJC DEP DR 2-15 (g), which states "in the past 5 years in the DEP system there have been 46,085 customer outages totaling 2,549,341 customer minutes interrupted as a result of breaker equipment failures."
- a. How many individual distribution breaker failures are represented in these statistics?
- b. How many of these distribution breakers were oil-filled?
- c. How many distribution breakers does DEP have?
- d. How many oil-filled distribution breakers does DEP have?
- e. How many individual transmission breaker failures are represented in these statistics?
- f. How many of these transmission breakers were oil filled?
- g. How many transmission breakers does DEP have?
- h. How many oil-filled transmission breakers does DEP have?

- a. Individual breaker assets are not tracked to specific outages in the Transmission Reliability Reporting System, although there were 8 unique events that comprised the above-mentioned customer interruptions and customer minutes interrupted. 5 of these events are associated with distribution class breakers.
- b. Individual breaker assets are not tracked to specific outages in the Transmission Reliability Reporting System, therefore it is unknown how many of these breakers were oil-filled.
- c. DEP has approximately 1,700 distribution class substation breakers
- d. DEP has approximately 800 distribution class substation oil breakers
- e. Individual breaker assets are not tracked to specific outages in the Transmission Reliability Reporting System, although there were 8 unique events that comprised the above-mentioned customer interruptions and customer minutes interrupted. 3 of these events are associated with transmission class breakers.
- f. Individual breaker assets are not tracked to specific outages in the Transmission Reliability Reporting System, therefore it is unknown how many of these breakers were oilfilled.
- g. DEP has approximately 940 transmission class substation breakers
- h. DEP has approximately 350 transmission class substation oil breakers

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 2

Docket No. E-7, Sub 1214

	Request: December 30, 2019 Response: January 9, 2020
	CONFIDENTIAL
X	NOT CONFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 2-5, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

NCJC Data Request No. 2 DEC Docket No. E-7, Sub1214 Item No. 2-5 Page 1 of 1

Request:

- 2-5. Please refer to DEC's responses to NCSEA DR 2-19, which indicates that the physical security of substations will be upgraded at a rate of 11-13 per year.
- a. How many substations does DEC have in North Carolina?
- b. Which ones will be upgraded in the proposed 3-year Grid Improvement Plan period?
- c. How many substations does DEP have in North Carolina?
- d. Which ones will be upgraded in the proposed 3-year Grid Improvement Plan period?
- e. How did (or how will) DEC and DEP (collectively, "Duke") go about prioritizing and selecting substations for physical security upgrades?
- f. How did Duke come to determine the \$110 million budget for physical substation security upgrades? How does the value of this spending compare to the value to be delivered by other types of spending in the Grid Improvement Plan? How does Duke know it shouldn't spend less on substation security and more on other investments, or more on substation security and less on other investments?

- a) 1759 in DEC NC
- b) 12
- c) 356 in DEP NC
- d) 15
- e) The Transmission Security Working Group determined the physical security requirements needed for substations that fell into the tiering for CIP-014 compliance, Tier 1 and Tier 2 classifications.
- f) Duke Energy Transmission determined the \$110M budget based on a threat and vulnerability assessment as well as the prioritization of the sites based on CIP-014, Tier 1 and Tier 2 classifications. Each project and program contained in the Grid Improvement Plan has unique and complementary value that address the megatrends described in witness Oliver testimony and Exhibits. The rate of investment mix contained within the Grid Improvement Plan was informed by Company experts and input from stakeholders.

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 5

Docket No. E-7, Sub 1214

		January 16, 2020 January 27, 2020
	CONFID	ENTIAL
X	NOT CO	NFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-4, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

NCJC Data Request No. 5 DEC Docket No. E-7, Sub1214 Item No. 5-4 Page 1 of 1

Request:

- 5-4. Refer to the Oliver testimony regarding the Grid Improvement Plan generally.
- a. For what Grid Improvement Plan capital amount, over what years, is Duke requesting approval from the North Carolina Utilities Commission?
- b. Is Duke requesting approval from the NCUC for 2019 Grid Improvement Plan capital spending in this rate case? If so, please provide amounts and detail by program, as well as where the total can be found in test year adjustments or other rate case detail.
- c. Is Duke requesting approval from the NCUC for Grid Improvement Plan capital spending beyond 2022?
- d. Explain how Duke intends to secure approval to recover a return of and on Grid Improvement Plan capital spending beyond 2022.
- e. If Duke is not requesting approval for spending beyond 2022, explain why several benefit-cost analyses include benefits for capital spending beyond 2022.

- a. Refer to attachment PS DR 36-3 for the GIP capital investments included in the current rate request. The amount is subject to update through January 31, the capital cut-off date for this case. Additionally, Duke is requesting deferral accounting for 2020 -2022 GIP capital assets placed in service until they can be requested for recovery in the next rate case.
- b. See a. above.
- c. No
- d. This has not been determined.
- e. The GIP CBA's used a 30-year evaluation period for the 3-year capital investment. The exception being DEC IVVC as it has an estimated deployment timeframe of 4 years.

Duke Energy Carolinas Response to North Carolina Sustainable Energy Association Data Request Data Request No. NCSEA 2

Docket No. E-7, Sub 1214

	Response:	November 25, 2019
	CONFIDE	ENTIAL
X	NOT CON	NFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCSEA Data Request No. 2-52, was provided to me by the following individual(s): <u>Karen Ann Ralph, Senior Financial Analyst, Distribution Finance</u> - <u>Carolinas</u>, and was provided to NCSEA under my supervision.

NCSEA Data Request No. 2 DEC Docket No. E-7, Sub 1214 Item No. 2-52 Page 1 of 1

Request:

- 52. Refer to Oliver Exhibit 10, page 50 (Enterprise Communications). Regarding "Mission Critical Voice" capital spending of \$52.5 million:
- a. Describe the existing Land Mobile Radio systems in place for DEC.
- b. Describe any shortcomings associated with these systems.
- c. Explain how the new system will avoid any shortcomings described.
- d. Provide any analysis the Company completed comparing the cost of cellular service over the public cellular network to a new, proprietary voice network. If the Company has not completed such an analysis, please explain why not.

Response:

[Note: Clarification, the \$52.5 million referenced in the question is for both DEC-NC and DEP-NC together; the correct value for just DEC-NC is \$10.3 million]

- a. The existing DEC Land Mobile Radio (LMR) system is a 2008 Harris Opensky 800MHz trunked-radio platform.
- b. The existing Harris Opensky trunked-radio system will not be compatible with Duke Energy's enterprise wide communications strategy that is meant to migrate all jurisdictions onto a single LMR platform and improve operational excellence.
- c. This platform provides enterprise wide interoperability, improves reliability, sustainability and portability.
- d. A cost comparison of cellular services over the public cellular network was not performed. Cellular carriers could not meet the minimum requirements for mission critical communications.

Duke Energy Carolinas Response to North Carolina Sustainable Energy Association Data Request Data Request No. NCSEA 2

Docket No. E-7, Sub 1214

	Request: Response:	November 18, 2019 November 25, 2019
	CONFIDE	ENTIAL
X	NOT CON	FIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCSEA Data Request No. 2-53, was provided to me by the following individual(s): <u>Karen Ann Ralph, Senior Financial Analyst, Distribution Finance</u> - <u>Carolinas</u>, and was provided to NCSEA under my supervision.

NCSEA
Data Request No. 2
DEC Docket No. E-7, Sub 1214
Item No. 2-53
Page 1 of 2

Request:

- 53. Refer to Oliver Exhibit 10, page 50 (Enterprise Communications). Regarding "Mission Critical (data) Transport" capital spending of \$107.1 million:
- a. Describe the existing (data) transport network.
- b. Provide the annual operations and maintenance cost associated with the existing (data) transport network.
- c. Describe any shortcomings associated with these systems.
- d. Provide details regarding all the various upgrades anticipated, the locations and counts of each upgrade, and the cost of each upgrade such that the total equals \$107.1 million.
- e. Provide any analysis the Company completed comparing the cost of its proposed (data) Transport upgrades to other alternatives, including the use of new 4G LTE and Cat M-1 networks now available from public carriers. If the Company has not completed such an analysis, explain why not.

Response:

a. The Duke Energy (data) transport network is comprised of many components of various technologies. These include fiber, optical electronics, data management and routing platforms, as well as microwave and wireless technologies.

b.

RU	O&M
DEC	\$21,700,431
DEP	\$15,119,010

- c. Aging physical infrastructure
- and technological advances have rendered many of the existing data transport platforms obsolete, with most no longer supported by vendors.
- d. Data networks are systems comprised of multiple, various components; details regarding final locations and counts are subject to final engineering and design completion, which may occur once approved. The primary transport networks types, site counts and associated cost are included below. Specific location information about communications infrastructure of any kind is generally limited or not publicly available due to security concerns, from both physical and cyber perspectives.

NCSEA Data Request No. 2 DEC Docket No. E-7, Sub 1214 Item No. 2-53 Page 2 of 2

	DEC		
Site count	Technology	Co	st
204	Microwave	\$1	4,100,000
29	Fiber	\$4	9,450,000
7	MAS Cambium	\$	750,000

	DEP		
Site count	Technology	ŭ	ost
26	Microwave	\$	1,800,000
17	Fiber	\$	33,910,000
62	MAS Cambium	\$	7,100,000

Region total \$ 42,810,000 Program total \$107,110,000

Alternatives like 4G LTE and Cat M-1 do not have the capacity nor can they satisfy mission critical requirements to support an enterprise core data network. Given the inability to meet the requirements a cost analysis wasn't performed.

Program/Asset (Asset Life)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	204	7 2048	2049 Source
Program/Asset (Asset Life) Self-Optimizing Grid (30)			2021	2022	2023	2027	2023	2020	2021	2020	2023	2030	2001	2032		2007		2000	2007	2000		2040	2071	2072	2043	2077	2073	2010	204	2070	
DEC (ADMS) DEP	65,770,946 40,493,079	98,489,790 65,917,601	161,566,334 90,482,882	177,074,120 155,070,517	-	-	-	-	-	-	-	- -	-	62,369,028 -	- -	-	-	-	-	- -	-	-	-	79,837,629 -	-	-	-	-	-	-	 SOG_DEC_NC_19-22_vF_rev8 9-2-19.xlsx; tab "DEC North Carolina_SOG"; cells F17-I17 SOG_DEP_NC_19-22_vF_rev4 9-2-19.xlsx; tab "DEP North Carolina_SOG"; cells F17-I17
Integrated Volt-VAr Control (25)	307,933	40,407,172	118,498,991	117,499,135	93,937,955	-	-	-	2,172,641	6,426,808	6,323,677	8,969,071	11,262,013	11,723,951	9,205,802	2,480,782	29,681,046	63,149,599	65,804,226	50,242,793	-	5,299,110	17,483,816	23,749,355	20,357,427	6,889,842	-	-	-	-	- IVVC_DEC_NC Only_19-23_vF_rev2 7-12-19.xlsx; tab "DEC-NC IVVC", cells G20-AF20
DSDR (25)	1,736,340	1,778,434	1,815,788	1,856,302	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- DSDR_DEP_NC Only_19-21_vF 5-6-19.xlsx; tab " "; cells
Transmisison H&R (30) DEC Line Projects (18.7% SC removed) DEP Line Projects (9.3% SC removed) DEC Rebuilds (18.7% SC removed) DEP Rebuilds (9.3% SC removed) DEP Substation Flooding (9.3% SC removed) Transmission H&R: NC Only	6,262,483 1,553,725 - - 3,085,614	12,925,171 42,231 - - 6,778,918 19,746,320	22,132,318 4,717,592 - - - 26,849,910	75,207,031 8,524,708 - - - 83,731,739	39,681,222 12,250,931 - - - 51.932.153	2,494,164 5,281,623 - - - - 7,775,787	- 1,061,338 - - - - - 1.061,338	- - - - -	- - - -	- - - - -	- - - - -	- - - -	- - - - -	- - - - -	- - - - -	- - - -	- - - - -	- - - - -	- - - -	- - - - -	- - - -	- - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - -	- - - - -	- - - -	- - - - -	 Trans_Line Projects_DEC_NC-SC_19-21_multiple_vF_rev2 7-28-19. xlsx line 12 *81.3% (NC Portion) Trans_Line Projects_DEP_NC-SC_19-21_multiple_vF_rev2 7-28-19.xlsx line 12 *90.7% (NC Portion) Trans_44kV Rebuilds_DEC_NC-SC_19_multiple_vF 1-26-19.xlsx line 12 * 81.3% Trans_Line Rebuilds_DEP_NC-SC_19_multiple_vF 2-19-19.xlsx line 12 * 90.7% Trans_Flood Sub_Reinforce_DEP_NC-SC_19-20_All Program_vF 5-3-19.xlsx * .907 (NC Portion)
Subs Flooding Whiteville Relo (30; 9.3% remov		13,740,320	20,043,310	10,918,256	31,332,133	7,773,707	1,001,330																								Trans_Flood Sub_Rebuild_DEP_NC-SC_22_Whiteville_vF_rev1 7-17-19.xlsx & NCJC DR DEP x-xx
Targeted Undergrounding (35)	7,702,700	14,070,688	32,978,930	60,193,878	45,789,443	22,059,886	8,473,416	4,421,436	4,531,971																						TUG_DEC-DEP_NC_19-22_Consolidated_vF rev1 8-9-19.xlsx, tab "All Years Summary", line "Project Capital".
Energy Storage (30?)		16,321,000	30,321,000	82,361,000																											
Distribution Trans Retrofit (35)	31,560,900	36,515,625	53,948,963	62,262,585																											HR_Transformer Retro_DEC-DEP_NC_19-22_vF_rev2 8-2-19.xlsx, tab "NPV - Tx Retrofit NC", cells E20-H20
Long Duration/High Impact Sites (35)	29,604,302	18,154,000	12,715,000	5,378,500	1,460,000																										LDI_DEC-DEP_NC_2019-2022_Summary_v1_rev1 7-9-19.xlsx, tab "2019-2022 Summary", cells D20-H20
Transformer Bank Replacement (30) DEC total Less: DEC SC (18.7%) DEC NC	5,712,000 1,068,144 4,643,856	6,537,040 1,222,426 5,314,614	1,645,292	1,094,210																											Trans_Transformer Bank_DEC_NC-SC_19-22_vF_rev3 8-2-19.xlsx, tab "NPV", cells D18-G18 NCJC DR DEC x-xx
DEP total Less: DEP SC (9.3%) DEP NC	17,632,000 1,639,776 15,992,224	7,219,280 671,393 6,547,887	14,799,524 1,376,356 13,423,168	10,868,842 1,010,802 9,858,040																											Trans_Transformer Bank_DEP_NC-SC_19-22_vF_rev3 8-2-19.xlsx, tab " NCJC DR DEP x-xx
Oil Breaker Replacements (30) DEC total Less: DEC SC (18.7%) DEC NC	21,460,870 4,013,183 17,447,687	14,852,260 2,777,373 12,074,887	4,940,698	20,304,256 3,796,896 16,507,360																											Trans_Oil Breaker_DEC_NC-SC_19-22_vF_rev3 8-2-19.xlsx, tab "NPV", cells D18-G18 NCJC DR DEC x-xx
DEP total Less: DEP SC (9.3%) DEP NC	9,051,260 841,767 8,209,493	816,902	6,055,939 563,202 5,492,737	19,182,760 1,783,997 17,398,764																											Trans_Oil Breaker_DEP_NC-SC_19-22_vF_rev3 8-2-19.xlsx, tab "NPV", cells D18-G18 NCJC DR DEP x-xx
	- - - - - - -	30,837,000 5,709,000 4,858,000 2,856,000 31,740,000 36,000	68,160,000 50,744,000 41,601,000 6,351,000 612,000 3,339,000 31,740,000 879,000 203,426,000	90,861,000 90,861,000 13,973,000 15,787,000 1,180,000 1,252,000 - 879,000 214,793,000					31,506,325 7,523,865 8,425,597					271,144,948 35,646,514 8,512,562 9,532,790					40,330,759 9,631,183 10,785,476					347,088,457 45,630,552 10,896,799 12,202,777					51,626,781 12,328,728 13,806,322	3	Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget) Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget) Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget) Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget) Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget) Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget) Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget) Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget)
Physical & Cyber Security	-	65,594,000	34,837,000	33,326,000																											Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget)
TOTALS	234,371,282	590,196,007	814,989,911	1,052,986,379	193,119,551	29,835,673	9,534,754	4,421,436	6,704,612	6,426,808	6,323,677	8,969,071	11,262,013	74,092,979	9,205,802	2,480,782	29,681,046	63,149,599	65,804,226	50,242,793	-	5,299,110	17,483,816	103,586,984	20,357,427	6,889,842	-	-	-	-	-
CHECK Remove Energy Storage Remove Electric Transportation COMPARE to OLIVER Exh. 10, p. 3 (cap budget)	- - 234 371 282	16,321,000 31,740,000 542,135,007	30,321,000 31,740,000 752 928 911	82,361,000 - 970,625,379	193 119 551	29 835 673	9 534 754	4 421 436	6 704 612																						
Oliver Exh. 10				978,786,170			- 9,534,754																								
Difference	(234,371,282)	12,366,711	33,012,201	8,160,791	(193,119,551)	(29,835,673)	(9,534,754)	(4,421,436)	(6,704,612)																						
FOR REVENUE REQUIREMENT CALCULATIONS total capital per BCAs	234,371,282	590,196,007	814,989,911	1,052,986,379	193,119,551	29,835,673	9,534,754	4,421,436	6,704,612	6,426,808	6,323,677	8,969,071	11,262,013	74,092,979	9,205,802	2,480,782	29,681,046	63,149,599	65,804,226	50,242,793	-	5,299,110	17,483,816	103,586,984	20,357,427	6,889,842	-	-	-	-	- line 71
Programs with 10-year lives ADMS portion of SOG Enterprise Communications Programs with 10-year lives total	-	15,435,027 52,796,973 68,232,000	14,511,506 68,159,906 82,671,412	18,927,210 90,860,239 109,787,449	-	- - -		- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -		-	- "Oliver Exh 10 Detail" - "Oliver Exh 10 Detail" -
Programs with 5-year lives Enterprise Applications ISOP Programs DER Dispatch Tool Programs with 5-year lives total	- - -	4,858,000	6,351,000 612,000 3,339,000 10,302,000	15,787,000 1,180,000 1,252,000 18,219,000			- - - -	- - -	- - - -	- - - -	- - -	- - -	- - -	- - -	- - - -	- - - -	- - -	- - - -	- - -	- - - -	- - - -	- - - -	- - - -	- - -	- - -	- - - -	- - - -	- - - -	- - -	- - - -	 "Oliver Exh 10 Detail" for 2020-2022; "Short-lived Asset Table" 2023+ "Oliver Exh 10 Detail" for 2020-2022; "Short-lived Asset Table" 2023+ "Oliver Exh 10 Detail" for 2020-2022; "Short-lived Asset Table" 2023+

2042 Assets -- **10** year Opening Balance

2042 Assets -- 30 year

Closing Balance

Depreciation (10 years)

256,155,652

42,692,609

42,692,609

341,540,869

42,692,609

298,848,260

42,692,609

256,155,652 213,463,043

42,692,609

42,692,609

170,770,434

42,692,609

128,077,826

128,077,826

42,692,609

85,385,217

Opening Balance Depreciation (30 years) Closing Balance 2043 Assets -- 30 year Opening Balance Depreciation (30 years) Closing Balance 2044 Assets -- 30 year Opening Balance Depreciation (30 years) Closing Balance 2047 Assets -- 5 year Opening Balance
Depreciation (5 years) Closing Balance

103,586,984 100,134,084 96,681,185 93,228,285 89,775,386 86,322,486 82,869,587 79,416,687 3,452,899 3,452,899 3,452,899 3,452,899 3,452,899 3,452,899 3,452,899 100,134,084 96,681,185 93,228,285 89,775,386 86,322,486 82,869,587 79,416,687 75,963,788 20,357,427 19,678,846 19,000,266 18,321,685 17,643,104 16,964,523 16,285,942 678,581 19,678,846 678,581 678,581 678,581 678,581 678,581 19,000,266 18,321,685 17,643,104 16,964,523 16,285,942 678,581 15,607,361 6,889,842 229,661 6,660,181 6,200,858 229,661 5,971,196 229,661 5,741,535 6,660,181 6,430,519 229,661 229,661 6,430,519 6,200,858 229,661 5,971,196 5,741,535 5,511,874 77,761,831 62,209,465 46,657,099 15,552,366 15,552,366 62,209,465 46,657,099 15,552,366

31,104,733

RELIABILITY	Residential	Small C&I	Large C&I	Not Defined	Total Reliability	ASSETS	Energy & Demand	D&M	Emissions (CO2)	TOTAL PRIMARY	Oliver Exh. 8
TUG	30,213,660	374,938,080	1,476,355,783	4,959,802	1,886,467,325	47,287,983		107,410,608		2,041,165,916	2,041,165,916
Transformer Retrofit	7,172,999	149,957,793	82,802,426		239,933,218			10,071,665		250,004,883	250,004,884
IVVC					-		359,982,087	100,266,070	86,256,721	546,504,878	546,504,878
DSDR					-		192,539,000	16,619,000	57,192,000	266,350,000	232,348,694
SOG - DEC	46,986,086	623,932,977	379,618,459		1,050,537,522		78,997,663			1,129,535,185	1,129,535,184
SOG - DEP	46,312,439	739,265,853	139,399,592		924,977,884		34,251,650			959,229,534	959,229,534
DEP Oil Breaker Replacements	4,452,812	25,111,390	50,624,840		80,189,042	40,183,659				120,372,701	54,341,285
DEC Oil Breaker Replacements	4,132,045	27,771,507	12,178,530		44,082,082	15,833,130				59,915,212	97,863,006
DEP Trans Bank Replacements	1,790,862	4,141,082	1,340,491		7,272,435	29,355,623				36,628,058	33,221,648
DEC Trans Bank Replacements	2,493,132	7,434,531	4,521,460		14,449,123	14,102,246				28,551,369	23,212,261
Substation Flooding Reinforce					-	21,817,816	-	-		21,817,816	19,788,759
LDI/HIS	16,226,891	720,539,386	1,122,837,611		1,859,603,888	-	-	-		1,859,603,888	1,859,603,889
substation Relo Whiteville	1,110,580	375,873			1,486,453	4,964,803				6,451,255	5,851,288
Trans DEP line projects (less 9.7% SC)				88,673,349	88,673,349					88,673,349	89,066,144
Trans DEC line projects (less 18.3% SC)				1,908,658,683	1,908,658,683					1,908,658,683	1,899,313,965
Trans Upgrades DEP (less 9.7% SC)				-	-					-	
Trans Upgrades DEC (less 18.3% SC)				-	-					-	
TOTALS	160,891,506 2.64%	2,673,468,472 43.80%	3,269,679,192 53.57%	2,002,291,835	8,106,331,004	173,545,259	665,770,400	234,367,343	143,448,721	9,323,462,727	9,241,051,335

Reliability Benefits as a % of Total:

86.9%

Program/Sub-Component	Present Value	2027	2032	2037	2042	2047
ADMS (Self-Optimizing Grid)	53,722,192	-	62,369,028	-	79,837,629	-
Enterprise Communications	233,553,437	-	271,144,948	-	347,088,457	-
Enterprise Applications	78,380,613	31,506,325	35,646,514	40,330,759	45,630,552	51,626,781
ISOP Programs	18,717,674	7,523,865	8,512,562	9,631,183	10,896,799	12,328,728
DER Dispatch Tool	20,960,980	8,425,597	9,532,790	10,785,476	12,202,777	13,806,322
Total	405,334,895	47,455,786	387,205,842	60,747,418	495,656,214	77,761,831

Oliver Exh. 10 Capital Detail NC ONLY		DEC			DEP			TOTAL		
	2020	2021	2022	2020	2021	2022	2020	2021	2022	GIP TOTAL
TOTALS	326,766,615	454,473,324	550,147,959	227,735,103	331,467,788	428,638,211	554,501,718	785,941,112	978,786,170	2,319,229,000
Self-Optimizing Grid (Total)	90,604,000	153,733,000	175,802,000	61,528,000	86,057,000	154,752,000	152,132,000	239,790,000	330,554,000	722,476,000
Fixed Costs (ADMS and POC)	9,417,344	8,853,752				7,410,399		, ,	18,927,210	48,873,743
·			11,516,811	6,017,683	5,657,754		15,435,027	14,511,506		
Variable Costs (segments/capacity/conn)	81,186,656	144,879,248	164,285,189	55,510,317	80,399,246	147,341,601	136,696,973	225,278,494	311,626,790	673,602,257
Integrated Volt-VAr Control (total)	30,797,000	86,311,000	89,550,000	-	5,000,000	5,000,000	30,797,000	91,311,000	94,550,000	216,658,000
Transmission H & R (Total)	13,985,730	20,417,670	68,058,900	8,933,625	9,568,905	12,785,010	22,919,355	29,986,575	80,843,910	133,749,840
Line H&R (Trans + Distribution)	11,966,400	20,417,670	68,058,900	595,575	8,735,100	10,799,760	12,561,975	29,152,770	78,858,660	120,573,405
Substation Flooding	-	-	-	8,338,050	794,100	1,588,200	8,338,050	794,100	1,588,200	10,720,350
Substation Animal Mitigation	2,019,330	-	-	-	39,705	397,050	2,019,330	39,705	397,050	2,456,085
Targeted Undergrounding	6,424,000	15,313,000	38,104,000	8,628,000	19,524,000	26,550,000	15,052,000	34,837,000	64,654,000	114,543,000
Distribution Transformer Retrofit	-	-	8,293,000	30,105,000	42,053,000	37,568,000	30,105,000	42,053,000	45,861,000	118,019,000
Long Dur Interruption/High Impact Sites	2,354,000	5,725,000	3,245,000	6,881,000	4,978,000	3,912,000	9,235,000	10,703,000	7,157,000	27,095,000
Transmission Transformer Bank Replace	6,193,000	18,174,000	9,274,000	25,019,000	38,514,000	19,217,000	31,212,000	56,688,000	28,491,000	116,391,000
Oil Breaker Replacements	28,244,000	53,998,000	33,415,000	19,654,000	20,051,000	44,925,000	47,898,000	74,049,000	78,340,000	200,287,000
Enterprise Communications Total	26,989,547	35,877,788	40,895,277	25,807,426	32,282,118	49,964,962	52,796,973	68,159,906	90,860,239	211,817,118
Next Gen Cellular	1,765,025	2,918,856	1,430,751	2,617,183	2,617,183	255,978	4,382,208	5,536,039	1,686,729	11,604,976
Mission Critical Voice	227,406	2,310,030	10,084,885	146,103	12,948,245	29,061,474	373,509	12,948,245	39,146,359	52,468,113
POC		0	10,084,883		12,948,243	23,001,474		12,940,243	-	
	394,315			256,149			650,464	200.246		650,464
Biz WAN	0	149,505	149,505	0	158,741	158,741	-	308,246	308,246	616,492
Grid WAN	4,214,704	1,208,846	747,900	5,198,889	2,617,544	79,410	9,413,593	3,826,390	827,310	14,067,293
Mission Critical Data Transport	16,784,625	24,107,526	23,408,744	13,322,647	11,355,628	18,129,300	30,107,272	35,463,154	41,538,044	107,108,470
Towers Shelters Pow Sup	2,450,868	6,961,068	4,815,343	3,515,481	2,317,612	2,110,765	5,966,349	9,278,680	6,926,108	22,171,137
Network Asset Systems	312,240	407,387	258,149	202,832	267,165	169,294	515,072	674,552	427,443	1,617,067
Vehical Area Network	840,364	124,600	-	548,142	-	-	1,388,506	124,600	-	1,513,106
Distribution Automation	36,142,000	17,863,000	61,382,000	16,322,000	32,881,000	29,696,000	52,464,000	50,744,000	91,078,000	194,286,000
Transmission System Intelligence	24,008,000	30,290,000	8,414,000	6,829,000	11,311,000	5,559,000	30,837,000	41,601,000	13,973,000	86,411,000
Enterprise Applications	4,348,000	3,140,000	9,555,000	1,361,000	3,211,000	6,232,000	5,709,000	6,351,000	15,787,000	27,847,000
Integrated Systems Operations Planning	3,028,000	379,000	749,000	1,830,000	233,000	431,000	4,858,000	612,000	1,180,000	6,650,000
DER Dispatch Tool	1,738,000	2,032,000	762,000	1,118,000	1,307,000	490,000	2,856,000	3,339,000	1,252,000	7,447,000
Power Electronics for Volt/VAr Control	-	347,000	347,000	36,000	532,000	532,000	36,000	879,000	879,000	1,794,000
Physical and Cyber Security Total	51,911,338	10,872,866	2,301,782	13,683,052	23,964,765	31,024,239	65,594,390	34,837,631	33,326,021	133,758,042
Substation Phys Security	47,117,700	7,254,630	-	7,742,475	20,170,140	28,428,780	54,860,175	27,424,770	28,428,780	110,713,725
Windows Based Unit Change outs	822,690	-	_	,,	-	-,,	822,690	-	-, -,	822,690
Device Entry Alert System	1,197,327	745,237	0	770,410	479,416	0	1,967,737	1,224,653	_	3,192,390
Secure Access Device Mgmt	1,728,621	1,512,999	1,021,782	1,112,267	973,527	657,464	2,840,888	2,486,526	1,679,246	7,006,660
Line Device Protection**	1,045,000	1,360,000	1,280,000	4,057,900	2,341,682	1,937,995	5,102,900	3,701,682	3,217,995	12,022,577
Mission Critical Voice & Data Total	17,012,031	24,107,526	33,493,629	13,468,750	24,303,873	47,190,774	30,480,781	48,411,399	80,684,403	159,576,583
Enterprise Comm's Total w/o	309,754,584	430,365,798	516,654,330	214,266,353	307,163,915	381,447,437	524,020,937	737,529,713	898,101,767	2,159,652,417

Program/Subcomponent	Oliv	pital \$ per ver Exh. 10 millions)		Suggested djustments	NCJ	pital \$ per C/NCSEA If GIP Not Rejected
Merits Approval w/Conditions	\$	374.16	Ś		\$	374.16
Integrated Volt/VAr Control	\$	216.66	\$		\$	216.66
Transmission H&R Flood & Animal Mitigation Components	۶ \$	13.18	•	-	\$	13.18
· · · · · · · · · · · · · · · · · · ·		27.10	\$ \$	-		27.10
Long Duration Interruption/High Impact Sites	\$		•	-	\$	
Enterprise Applications/ISOP Software/DER Software	\$	41.94	\$	-	\$	41.94
Cyber and Physical Security, excluding substation physical	\$	23.04	\$	-	\$	23.04
Enterprise Comm's excluding new data and voice networks	\$	52.24	\$	-	\$	52.24
Merits Approval w/Material Modifications & Conditions	\$	843.05	\$	(336.80)	\$	506.25
Self-Optimizing Grid/Advanced Dist Mgmt System	\$	722.48	\$	(336.80)	\$	385.67
Transmission H&R (DER Capacity Upgrades ONLY)	\$	120.57	\$	-	\$	120.57
Merits Rejection	\$	659.95	\$	(659.95)	\$	
Targeted Undergrounding	\$	114.54	\$	(114.54)	\$	-
Distribution Transformer Retrofit	\$	118.02	\$	(118.02)	\$	-
Transfomer Bank Replacement	\$	116.39	\$	(116.39)	\$	-
Oil-Filled Breaker Replacement	\$	200.29	\$	(200.29)	\$	-
Substation Perimeter Security	\$	110.71	\$	(110.71)	\$	-
Merits Rejection Pending Further Evaluation	\$	440.27	\$	(440.27)	\$	-
Enterprise Comm's, new data & voice (tech/econ make/buy analyses)	\$	159.58	\$	(159.58)	\$	-
Distribution Automation (benefit-cost analysis)	\$	194.29	\$	(194.29)	\$	-
Transmission System Intelligence (benefit-cost analysis)	\$	86.41	\$	(86.41)	\$	-
GIP Components Being Considered in Other Dockets	\$	192.48	\$	(192.48)	\$	-
Energy Storage (NCUC #E-100, Sub 164)	\$	129.00	\$	(129.00)	\$	-
Electric Transportation (NCUC #E-2 Sub 1197 & E-7 Sub 1195)	\$	63.48	\$	(63.48)	\$	-
TOTALS	\$	2,509.92	\$	(1,629.51)	\$	880.41

		DEC			DEP			TOTAL		
	2020	2021	2022	2020	2021	2022	2020	2021	2022	GIP TOTAL
TOTALS	51,911,338	10,872,866	2,301,782	13,683,052	23,964,765	31,024,239	65,594,390	34,837,631	33,326,021	133,758,042
Substation Phys Security	47,117,700	7,254,630	-	7,742,475	20,170,140	28,428,780	54,860,175	27,424,770	28,428,780	110,713,725
Windows Based Unit Change outs	822,690	-	-	-	-	-	822,690	-	-	822,690
Device Entry Alert System	1,197,327	745,237	0	770,410	479,416	0	1,967,737	1,224,653	-	3,192,390
Secure Access Device Mgmt	1,728,621	1,512,999	1,021,782	1,112,267	973,527	657,464	2,840,888	2,486,526	1,679,246	7,006,660
Line Device Protection**	1,045,000	1,360,000	1,280,000	4,057,900	2,341,682	1,937,995	5,102,900	3,701,682	3,217,995	12,022,577

		DEC			DEP			TOTAL		
	2020	2021	2022	2020	2021	2022	2020	2021	2022	GIP TOTAL
TOTALS	26,989,547	35,877,788	40,895,277	25,807,426	32,282,118	49,964,962	52,796,973	68,159,906	90,860,239	211,817,118
Next Gen Cellular	1,765,025	2,918,856	1,430,751	2,617,183	2,617,183	255,978	4,382,208	5,536,039	1,686,729	11,604,976
Mission Critical Voice	227,406	-	10,084,885	146,103	12,948,245	29,061,474	373,509	12,948,245	39,146,359	52,468,113
POC	394,315	0	0	256,149	0	0	650,464	-	-	650,464
Biz WAN	0	149,505	149,505	0	158,741	158,741	-	308,246	308,246	616,492
Grid WAN	4,214,704	1,208,846	747,900	5,198,889	2,617,544	79,410	9,413,593	3,826,390	827,310	14,067,293
Mission Critical Data Transport	16,784,625	24,107,526	23,408,744	13,322,647	11,355,628	18,129,300	30,107,272	35,463,154	41,538,044	107,108,470
Towers Shelters Pow Sup	2,450,868	6,961,068	4,815,343	3,515,481	2,317,612	2,110,765	5,966,349	9,278,680	6,926,108	22,171,137
Network Asset Systems	312,240	407,387	258,149	202,832	267,165	169,294	515,072	674,552	427,443	1,617,067
Vehical Area Network	840,364	124,600	-	548,142	-	-	1,388,506	124,600	-	1,513,106
Mining City IV in C. But Total	47.042.024	24.407.526	22 402 620	42.460.750	24 202 072	47 400 774	20 400 704	40 444 300	00.604.403	450 576 500
Mission Critical Voice & Data Total	17,012,031	24,107,526	33,493,629	13,468,750	24,303,873	47,190,774	30,480,781	48,411,399	80,684,403	159,576,583
Enterprise Comm's Total w/o	9,977,516	11,770,262	7,401,648	12,338,676	7,978,245	2,774,188	22,316,192	19,748,507	10,175,836	52,240,535

TOTALS

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049 Source
Optimizing Grid																															
	-	23,289	65,005	190,110	2,221,548	409,125	409,469	514,657	628,598	1,006,095	1,012,559	411,319	411,718	412,126	537,161	672,605	1,121,291	1,128,851	414,326	414,799	415,284	563,911	724,911	1,258,312	1,267,455	417,899	418,462	419,039	595,711	702,941	732,729 SOG_DEC_NC_19-22_vF_rev8 9-2-19.xlsx; tab "DEC North Carolina_SOG"; line 25 (Total O&M)
	-	9,274	85,879	108,828	136,147	323,341	323,577	365,567	602,160	661,573	707,160	324,845	325,118	325,398	375,311	656,551	727,133	781,247	326,906	327,230	327,563	386,893	721,197	805,149	869,573	329,355	329,741	330,136	400,662	762,201	603,144 SOG_DEP_NC_19-22_vF_rev4 9-2-19.xlsx; tab "DEP North Carolina_SOG"; line 25 (Total O&M)
ed Volt-VAr Control	-	1,073,108	3,209,001	3,321,881	3,143,520	3,524,838	3,737,059	3,952,553	4,168,963	4,387,872	4,572,842	4,721,124	4,783,182	4,846,791	4,911,991	4,978,821	5,047,322	5,117,535	5,189,503	5,263,271	5,338,882	5,416,384	5,495,824	5,577,250	5,660,711	5,746,259	=	-	-	=	- IVVC_DEC_NC Only_19-23_vF_rev2 7-12-19.xlsx; tab "DEC-NC IVVC", line 29 (Total O&M)
	20,000	20,000	21,000	21,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- DSDR_DEP_NC Only_19-21_vF 5-6-19.xlsx; tab "DSDR", line 28
ison H&R																															
rojects (18.7% SC removed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	 Trans_Line Projects_DEC_NC-SC_19-21_multiple_vF_rev2 7-28-19. xlsx & NCJC DR DEC x-xx
ojects (9.3% SC removed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	 Trans_Line Projects_DEP_NC-SC_19-21_multiple_vF_rev2 7-28-19.xlsx \$ NCJC DR DEP x-xx
lds (18.7% SC removed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	 Trans_44kV Rebuilds_DEC_NC-SC_19_multiple_vF 1-26-19.xlsx & NCJC DR DEC x-xx
ilds (9.3% SC removed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- Trans_Line Rebuilds_DEP_NC-SC_19_multiple_vF 2-19-19.xlsx & NCJC DR DEP x-xx
n Flooding (SC?)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- Trans_Flood Sub_Reinforce_DEP_NC-SC_19-20_All Program_vF 5-3-19 & NCHC DR DEP x-xx
sion H&R: NC Only	-	<u>-</u>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<u>-</u>	-	-	-	-	-	-	-	<u>-</u>	-	
n Flooding Whiteville Relo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- Trans_Flood Sub_Rebuild_DEP_NC-SC_22_Whiteville_vF_rev1 7-17-19.xlsx & NCJC DR DEP x-xx
Jndergrounding	231,081	424,333	1,001,167	1,821,590	1,450,840	819,083	459,417	367,936	377,135	276,780	283,699	290,792	298,062	305,513	313,151	320,980	329,004	337,229	345,660	354,302	363,159	372,238	381,544	391,083	400,860	410,881	421,153	431,682	442,474	453,536	464,874 TUG_DEC-DEP_NC_19-22_Consolidated_vF rev1 8-9-19.xlsx, tab "All Years Summary", line 20 (O&M).
rage		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
n Trans Retrofit	946,827	1,095,469	1,618,469	1,867,878	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- HR_Transformer Retro_DEC-DEP_NC_19-22_vF_rev2 8-2-19.xlsx, tab "NPV - Tx Retrofit NC", line 22 (Program 0
on/High Impact Sites	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	 LDI_DEC-DEP_NC_2019-2022_Summary_v1_rev1 7-9-19.xlsx, tab "2019-2022 Summary"
er Bank Replacement																														26	27 Turn Turning and DEC NO CO 40 22 For 20 240 June 1990/1991 with D40 C40
SC (18.3%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	27 Trans_Transformer Bank_DEC_NC-SC_19-22_vF_rev3 8-2-19.xlsx, tab "NPV", cells D18-G18 NCJC DR DEC x-xx
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Communications	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	 Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget) Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget)
n System Intelligence	_	-	-	-	- -	-	-	-	- -	- -	-	- -	- -	-	- -	-	- -	- -	-	- -	- -	-	-	- -	-	-	-	-	-	-	- Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget) - Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget)
Applications	-	-	-	-	-	-	-	-	-	-	_	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	- Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget)
d Systems Operation Plan	-	_	-	-	-	-	-	_	-	-	-	-	-	-	-	_	-	-	-	-	-	-	-	-	-	-	_	_	-	-	- Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget)
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ransportation ectronics for Volt/VAr Control		-													-					<u>-</u>	<u>-</u>	<u>-</u>			-	<u>-</u>	-	-		-	-
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27 Oliver Exh. 10, page 3 (GIP Capital Budget Summary, NC Budget)

 $1,197,908 \qquad 2,645,472 \qquad 6,000,521 \qquad 7,331,287 \qquad 6,952,054 \qquad 5,076,388 \qquad 4,929,521 \qquad 5,200,713 \qquad 5,776,856 \qquad 6,332,320 \qquad 6,576,261 \qquad 5,748,080 \qquad 5,818,079 \qquad 5,889,829 \qquad 6,137,614 \qquad 6,628,957 \qquad 7,224,750 \qquad 7,323,476 \qquad 8,031,794 \qquad 8,198,598 \qquad 6,904,394 \qquad 1,169,356 \qquad 1,180,857 \qquad 1,438,848 \qquad 1,918,808 \qquad 1,800,883 \qquad 1,80$

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 8

Docket No. E-7, Sub 1214

Date of Request: January 31, 2020

Oate o	f Response:	February 10, 2020
	CONFID	ENTIAL
X	NOT CO	NFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 8-27, was provided to me by the following individual(s): <u>Karen Ann Ralph</u>, <u>Lead Planning and Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

NCJC Data Request No. 8 DEC Docket No. E-7, Sub1214 Item No. 8-27 Page 1 of 1

Request:

- 8-27. Refer to DEC's response to NCJC DR 5-53, which states "In the last 5 years, Conductor failures on the DEC 44kV Transmission system have resulted in 14,008 customer outages, totaling 2,180,102 customer minutes interrupted."
- a. How many individual conductor failures are represented in these statistics?
- b. How many miles of 44kV lines does DEC have?

- a. Individual conductor assets are not tracked to specific outages in the Transmission Reliability Reporting System, although there were 8 unique events that comprised the above-mentioned customer interruptions and customer minutes interrupted.
- b. Approximately 2,800 miles

Duke Energy Progress Response to NCJC Data Request Data Request No. 5

Docket No. E-2, Sub 1219

Date of Res	equest: sponse:	January 31, 2020 February 10, 2020
	CONFIL	DENTIAL
X	NOT CO	ONFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-18, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Progress

NCJC Data Request No. 5 DEP Docket No. E-2, Sub 1219 Item No. 5-18 Page 1 of 1

Request:

- 5-18. Refer to DEP's response to NCJC DEP DR 2-17(f), which states "In the last 5 years, Conductor failures on the DEC 44kV Transmission system have resulted in 14,008 customer outages, totaling 2,180,102 customer minutes interrupted."
- a. How many individual instances of 44kV conductor failure are represented in these statistics?
- b. How many miles of 44kV lines does DEP have?

- a. This question is not applicable to DEP since DEP has no 44kV transmission lines.
- b. 0 miles

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 8

Docket No. E-7, Sub 1214

	-	January 31, 2020 February 10, 2020
	CONFID	ENTIAL
X	NOT CO	NFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 8-28, was provided to me by the following individual(s): <u>Karen Ann Ralph</u>, <u>Lead Planning and Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

NCJC Data Request No. 8 DEC Docket No. E-7, Sub1214 Item No. 8-28 Page 1 of 1

Request:

- 8-28. Refer to DEC's response to NCJC DR 5-54, which states "... in the last 5 years, line equipment failures on the DEC 44kV Transmission system have resulted in 111,477 customer outages, totaling 21,179,109 customer minutes interrupted."
- a. How many individual instances of line equipment failures are represented in these statistics?
- b. How many individual pieces of 44kV line equipment does DEC have today?

- a. 85 unique events are represented in the referenced statistics.
- b. Line equipment assets are not all uniquely tracked and identified as pieces of equipment in the Duke Energy Transmission Asset Management system, therefore a number cannot be provided. Example of line equipment include: Conductor, Static, Crossarms, Poles, Guy Wire, Insulators, Connectors, Clamps, Jumpers, Cross Braces, Switches, Hardware. A 44kV line rebuild project replaces all of these assets on a given line.

Duke Energy Progress Response to NCJC Data Request Data Request No. 5

Docket No. E-2, Sub 1219

Date of Re	equest: esponse:	January 31, 2020 February 10, 2020
	CONFIL	DENTIAL
X	NOT CO	ONFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-19, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Progress

NCJC Data Request No. 5 DEP Docket No. E-2, Sub 1219 Item No. 5-19 Page 1 of 1

Request:

- 5-19. Refer to DEP's response to NCJC DEP DR 2-18(d), which states "In the last 5 years, DEP Line Equipment failures have resulted in 155,091 customer outages, totaling 10,707,502 customer minutes interrupted."
- a. How many individual instances of 44kV conductor failure are represented in these statistics?
- b. How many miles of 44kV lines does DEP have?

- a. This question is not applicable to DEP since DEP has no 44kV transmission lines. b. 0 miles
- With regards to NCJC DEP DR 2-18(d), which states "In the last 5 years, DEP Line Equipment failures have resulted in 155,091 customer outages, totaling 10,707,502 customer minutes interrupted" the following is applicable:
- 14 unique events are represented in the referenced statistics.
- Line equipment assets are not all uniquely tracked and identified as pieces of equipment in the Duke Energy Transmission Asset Management system, therefore a number cannot be provided. Examples of line equipment include: Conductor, Static, Crossarms, Poles, Guy Wire, Insulators, Connectors, Clamps, Jumpers, Cross Braces, Switches, Hardware.

Duke Energy Carolinas Response to North Carolina Sustainable Energy Association Data Request Data Request No. NCSEA 3

Docket No. E-7, Sub 1214

	Request: Response:	December 20, 2019 January 2, 2020
	CONFIDE	ENTIAL
X	NOT CON	FIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCSEA Data Request No. 3-11, was provided to me by the following individual(s): <u>Karen Ann Ralph, Senior Financial Analyst, Distribution Finance</u> – <u>Carolinas</u>, and was provided to NCSEA under my supervision.

NCSEA Data Request No. 3 DEC Docket No. E-7, Sub 1214 Item No. 3-11 Page 1 of 1

Request:

Refer to Duke's response to NCSEA DR2-38, which defines multiplier for cleared operations as "This is the relationship between sustained operations and momentary operations such that for every 1 sustained interruption we would expect to have 2.7 momentary interruptions. It is used to estimate the Annual Momentary Events in the calculation of the customer Momentary Interruption Cost Avoided values."

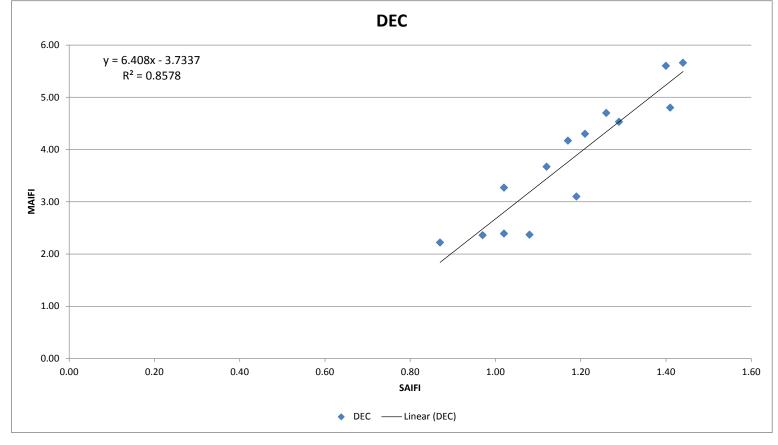
- a. Provide all data sources, work sheets and calculations, including all relay settings, coordination curves, work processes, policies, and other information used to justify 2.7 momentaries per sustained outage.
- b. Use an example to explain how 2.7 momentaries would typically result from one sustained outage.

- a. See attached file "1997-2010 DEC SAIFI and MAIFI.xlsx"
- b. The attached file shows the very strong correlation between SAIFI & MAIFI with a R2 of 86%. If SAIFI is set equal to 1 in the trendline formula the MAIFI equals approximately 2.7 which means that for every 1 sustained interruption the average customer experiences they will experience 2.7 momentary interruptions.



Based on DEC data from 1997 through 2010 (13 years) for every 1 sustained interruption the average customer experiences they will experience 2.7 momentary interruptions

DEC	SAIFI	MAIFI _(Breaker)
1997	1.40	5.60
1998	1.44	5.66
1999	1.41	4.80
2000	1.29	4.53
2001	1.17	4.17
2002	1.21	4.30
2003	1.26	4.70
2004	1.02	3.27
2005	1.12	3.67
2006	1.19	3.10
2007	0.97	2.36
2008	1.08	2.37
2009	0.87	2.22
2010	1.02	2.39



Duke Energy Carolinas Response to NCJC Data Request Data Request No. 5

Docket No. E-7, Sub 1214

	-	January 16, 2020 January 27, 2020
	CONFID	ENTIAL
X	NOT CO	NFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-32, was provided to me by the following individual(s): <u>Karen Ann Ralph, Senior Financial Analyst, Distribution Finance</u> – <u>Carolinas</u>, and was provided to NCJC under my supervision.

NCJC Data Request No. 5 DEC Docket No. E-7, Sub1214 Item No. 5-32 Page 1 of 1

Request:

- 5-32. Refer to DEC's response to NCSEA DR 3-26 (b), which states: "Duke does not currently track, record, or report momentary outages. For estimation of momentary interruptions refer to the responses for NCSEA 3-11." Refer also to NCSEA DR 3-11, which indicates that momentaries per sustained outage are calculated using a MAIFI (momentary) per SAIFI ratio.
- a. Explain how DEC derived the MAIFI values employed in the response to NCSEA DR 3-11 if it is does not track momentary outages.
- b. Provide MAIFI(Breaker) and SAIFI data for each year from 2011 to 2018 for DEC. If this data is not available, explain why DEC stopped tracking MAIFI data after 2010.

- a. As indicated in the Excel spreadsheet supporting the company's response to NCSEA DR 3-11 (titled NCSEA 3-11 1997-2010 DEC SAIFI and MAIFI) the MAIFI is the substation breakers in DEC where momentary operations were recorded & stored from 1997-2010.
- b. MAIFIBreaker is not available after 2010. The company stopped the manual process of capturing & storing MAIFIBreaker after 2010 because the program used to store the data became obsolete.

Duke Energy Carolinas Response to NCJC Data Request Data Request No. 5

Docket No. E-7, Sub 1214

Date of	Request:	January 16, 2020			
Date of	Response:	January 27, 2020			
	_	•			
	CONFID	ENTIAL			
X	NOT CO	NFIDENTIAL			

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 5-10, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

NCJC Data Request No. 5 DEC Docket No. E-7, Sub1214 Item No. 5-10 Page 1 of 1

Request:

5-10. Refer to the Oliver testimony regarding the Grid Improvement Plan generally. Assume that all aspects of Duke's Grid Improvement Plan are approved. Provide the improvement over 2018 DEC SAIDI, with and without major event days, Duke expects the Plan will deliver, as well as the year by which Duke expects the improvements to be reflected.

Response:

See attached Excel spreadsheet titled "PS DR 36-5 DEC GIP SAIFI-SAIDI Savings By Year 2019 - 2025 (Revised 11-19-19)". The Company has not done any GIP SAIDI reduction analysis associated with MEDs because their frequency and impact are highly variable from year-to-year.



PS DR 36-5 DEC GIP SAIFI-SAIDI Savings B

Duke Energy Carolinas, LLC Docket No. E-7, Sub 1214 Public Staff Data Request No. 36-5 (Revised 11-19-19)

	Estimated						
	Incremental						
	SAIDI Minutes						
	Reduction in						
DEC 2019 - 2024 Scope	2019	2020	2021	2022	2023	2024	2025
Total	2.07	1.75	4.78	8.75	10.52		
SOG	2.07	0.99	3.38	6.65	6.81		
TUG	0.00	0.05	0.22	0.33	0.55		
Transformer Retrofit	0.00	0.09	0.00	0.00	0.00	N/A*	N/A*
LDO/ HIS	0.00	0.55	0.75	1.01	1.15	IV/A	N/A
Hydraulic Recloser Replacement	0.00	0.07	0.21	0.00	0.10		
Fuse Replacement	0.00	0.00	0.23	0.75	1.90		
Projected # of Customers Served	2,598,518	2,631,647	2,665,198	2,699,177	2,733,589		

DEC 2019 - 2024 Scope	Estimated Incremental SAIFI Reduction in 2019	Estimated Incremental SAIFI Reduction in 2020	Estimated Incremental SAIFI Reduction in 2021	Estimated Incremental SAIFI Reduction in 2022	Estimated Incremental SAIFI Reduction in 2023	Estimated Incremental SAIFI Reduction in 2024	Estimated Incremental SAIFI Reduction in 2025
Total	0.0166	0.0091	0.0224	0.0460	0.0660		
SOG	0.0166	0.0077	0.0178	0.0379	0.0472		
TUG	0.0000	0.0002	0.0010	0.0015	0.0024		
Transformer Retrofit	0.0000	0.0005	0.0000	0.0000	0.0000	N/A*	N/A*
LDO/ HIS	0.0000	0.0003	0.0006	0.0009	0.0012	IV/A	N/A
Hydraulic Recloser Replacement	0.0000	0.0004	0.0013	0.0000	0.0006		
Fuse Replacement	0.0000	0.0000	0.0017	0.0057	0.0145		
Projected # of Customers Served	2,598,518	2,631,647	2,665,198	2,699,177	2,733,589		

^{*} The current GIP scope ends in 2022 so there are no estimated incremental SAIDI/SAIFI savings beyond 2023

NOTE: We have not included the effect of transmission programs in these estimates, although transmission Grid Improvement programs will certainly improve system reliability. These programs are not quantified because transmission failures occur on a much more infrequent basis and therefore we cannot accurately predict short term impacts on SAIDI and SAIFI. However, when transmission outages do occur they typically affect a large number of customers.

Duke Energy Progress Response to NCJC Data Request Data Request No. 2

Docket No. E-2, Sub 1219

Date of Request: Date of Response:		January January	16, 2020 24, 2020
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Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCJC Data Request No. 2-7, was provided to me by the following individual(s): <u>Karen Ann Ralph, Lead Planning & Regulatory Support Specialist</u>, and was provided to NCJC under my supervision.

Camal O. Robinson Senior Counsel Duke Energy Progress

NCJC Data Request No. 2 DEP Docket No. E-2, Sub 1219 Item No. 2-7 Page 1 of 1

Request:

2-7. Refer to the Oliver testimony regarding the Grid Improvement Plan generally. Assume that all aspects of Duke's Grid Improvement Plan are approved. Provide the improvement over 2018 DEP SAIDI, with and without major event days, Duke expects the Plan will deliver, as well as the year by which Duke expects the improvements to be reflected.

Response:

See attached Excel spreadsheet titled "PS DR 21-11 for the DEP GIP SAIFI-SAIDI Savings By Year 2019 - 2025". The Company has not done any GIP SAIDI reduction analysis associated with MEDs because their frequency and impact are highly variable from year-to-year.



	Estimated						
	Incremental						
	SAIDI Minutes						
	Reduction in						
DEP 2019 - 2023 Scope	2019	2020	2021	2022	2023	2024	2025
Total	13.00	2.88	10.69	12.02	12.99		
SOG	13.00	2.28	7.91	7.25	8.00		
TUG	0.00	0.00	0.04	0.15	0.27		
Transformer Retrofit	0.00	0.37	0.52	0.73	0.72	N/A*	N/A*
LDO/ HIS	0.00	0.08	1.68	2.22	2.56	IV/A	N/A
Hydraulic Recloser Replacement	0.00	0.12	0.20	0.11	0.06		
Fuse Replacement	0.00	0.03	0.34	1.57	1.39		
Projected # of Customers Served	1,572,852	1,594,854	1,617,163	1,639,785	1,662,723		

	Estimated						
	Incremental						
	SAIFI Reduction						
DEP 2019 - 2023 Scope	in 2019	in 2020	in 2021	in 2022	in 2023	in 2024	in 2025
Total	0.0823	0.0190	0.0694	0.1032	0.0880		
SOG	0.0823	0.0141	0.0457	0.0652	0.0495		
TUG	0.0000	0.0000	0.0005	0.0014	0.0022		
Transformer Retrofit	0.0000	0.0037	0.0052	0.0073	0.0072	N/A*	N/A*
LDO/ HIS	0.0000	0.0002	0.0141	0.0167	0.0181	IV/A	IN/A
Hydraulic Recloser Replacement	0.0000	0.0008	0.0013	0.0007	0.0004		
Fuse Replacement	0.0000	0.0002	0.0026	0.0119	0.0106		
Projected # of Customers Served	1,572,852	1,594,854	1,617,163	1,639,785	1,662,723		

 $[\]hbox{* The current GIP scope ends in 2022 so there are no estimated } \textbf{incremental SAIDI/SAIFI savings beyond 2023}$

NOTE: We have not included the effect of transmission programs in these estimates, although transmission Grid Improvement programs will certainly improve system reliability. These programs are not quantified because transmission failures occur on a much more infrequent basis and therefore we cannot accurately predict short term impacts on SAIDI and SAIFI. However, when transmission outages do occur they typically affect a large number of customers.

Duke Energy Carolinas Response to North Carolina Sustainable Energy Association Data Request Data Request No. NCSEA 2

Docket No. E-7, Sub 1214

Date of Request: Date of Response:		November 18, 2019 November 25, 2019
	CONFIDE	ENTIAL
X	NOT CON	NFIDENTIAL

Confidential Responses are provided pursuant to Confidentiality Agreement

The attached response to NCSEA Data Request No. 2-16, was provided to me by the following individual(s): <u>Karen Ann Ralph, Senior Financial Analyst, Distribution Finance</u> - <u>Carolinas</u>, and was provided to NCSEA under my supervision.

NCSEA
Data Request No. 2
DEC Docket No. E-7, Sub 1214
Item No. 2-16
Page 1 of 1

Request:

- 16. Refer to the Oliver testimony regarding stakeholder engagement generally, pages 45-50.
- a. Indicate where in any stakeholder engagement presentation or materials Duke Energy presented the likely rate impact of its \$2.5 billion Grid Improvement Plan.
- b. Indicate where in any stakeholder engagement presentation or materials Duke Energy presented the impact on the average residential customer's bill of its \$2.5 billion Grid Improvement Plan.
- c. Describe any input Duke Energy received from Stakeholders regarding the overall size of the Grid Improvement Plan, which Duke Energy estimated at \$1.6-\$2.5 billion over 3 years in stakeholder engagement presentations and materials.
- d. Describe any changes Duke Energy made to the overall size of the Grid Improvement Plan, which Duke Energy estimated at \$1.6-\$2.5 billion over 3 years in stakeholder engagement presentations and materials, as a result of stakeholder feedback.

- a. None.
- b. None.
- c. Please see Witness Oliver's direct testimony, Exhibits 11, 13, 16, and 17
- d. No changes were made to that estimated range.