



Duke Energy Progress

2020 Resource Adequacy Study

CONFIDENTIAL APPENDIX (REDACTED)

9/1/2020

PREPARED FOR

Duke Energy

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Table CA1. DEP Import Capability including TRM

DEP-E	Total Summer Capability (MW)	Total Winter Capability (MW)	DEP-W	Total Summer/Winter Capability (MW)
PJM South to DEP-E	■	■	DEP-E to DEC to DEP-W	■
PJM West to DEP-E	■	■	DEC to DEP-W	■
SCEG to DEP-E	■	■	TVA to DEP-W	■
SC to DEP-E	■	■	PJM West to DEP-W	■
DEC to DEP-E	■	■		
Yadkin to DEP-E	■	■		
Total	■	■	Total	■

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Table CA2. DEP Purchase Contract Modeling

Unit Name	Summer Capacity (MW)	Winter Capacity (MW)
NUG Poultry, Swine, Non-Hydro, Wholesale Non-Hydro	8	8
NUG Hydro	6	6
[REDACTED]	345	375
[REDACTED]	168	168
[REDACTED]	11	11
[REDACTED]	1	1
[REDACTED]	53	53
[REDACTED]	75	75
[REDACTED]	241	241
[REDACTED]	510	510
[REDACTED]	340	340
[REDACTED]	178	178
[REDACTED]	158	158
Total	2,094	2,124

Table CA3. Fuel Prices

Fuel Type	2024 Average Delivered Price	
Uranium	[REDACTED]	\$/MMBtu
Delivered Coal	[REDACTED]	\$/MMBtu
Delivered Natural Gas	[REDACTED]	\$/MMBtu
Delivered Oil	[REDACTED]	\$/MMBtu

Table CA4. System EFOR¹

Unit Name	Resource Type	Annual EFOR	Summer EFOR	Winter EFOR
Mayo 1	Coal	■	■	■
Roxboro 1	Coal	■	■	■
Roxboro 2	Coal	■	■	■
Roxboro 3	Coal	■	■	■
Roxboro 4	Coal	■	■	■
Brunswick 1	Nuclear	■	■	■
Brunswick 2	Nuclear	■	■	■
Harris 1	Nuclear	■	■	■
Robinson 2	Nuclear	■	■	■
Smith CC 4	Natural Gas - Combined Cycle	■	■	■
Smith CC 5	Natural Gas - Combined Cycle	■	■	■
Lee/Wayne CC 1	Natural Gas - Combined Cycle	■	■	■
Sutton CC 1	Natural Gas - Combined Cycle	■	■	■
Asheville CC	Natural Gas - Combined Cycle	■	■	■
Blewett CT 1	Oil Peaker	■	■	■
Blewett CT 2	Oil Peaker	■	■	■
Blewett CT 3	Oil Peaker	■	■	■
Blewett CT 4	Oil Peaker	■	■	■
Asheville CT 3	Natural Gas Peaker	■	■	■
Asheville CT 4	Natural Gas Peaker	■	■	■
Darl CT 12	Natural Gas Peaker	■	■	■
Darl CT 13	Natural Gas Peaker	■	■	■
LM6000 (Sutton)	Natural Gas Peaker	■	■	■
LM6000 (Sutton)	Natural Gas Peaker	■	■	■
Smith CT 1	Natural Gas Peaker	■	■	■
Smith CT 2	Natural Gas Peaker	■	■	■
Smith CT 3	Natural Gas Peaker	■	■	■
Smith CT 4	Natural Gas Peaker	■	■	■
Smith CT 6	Natural Gas Peaker	■	■	■
Wayne CT 1	Oil Peaker	■	■	■

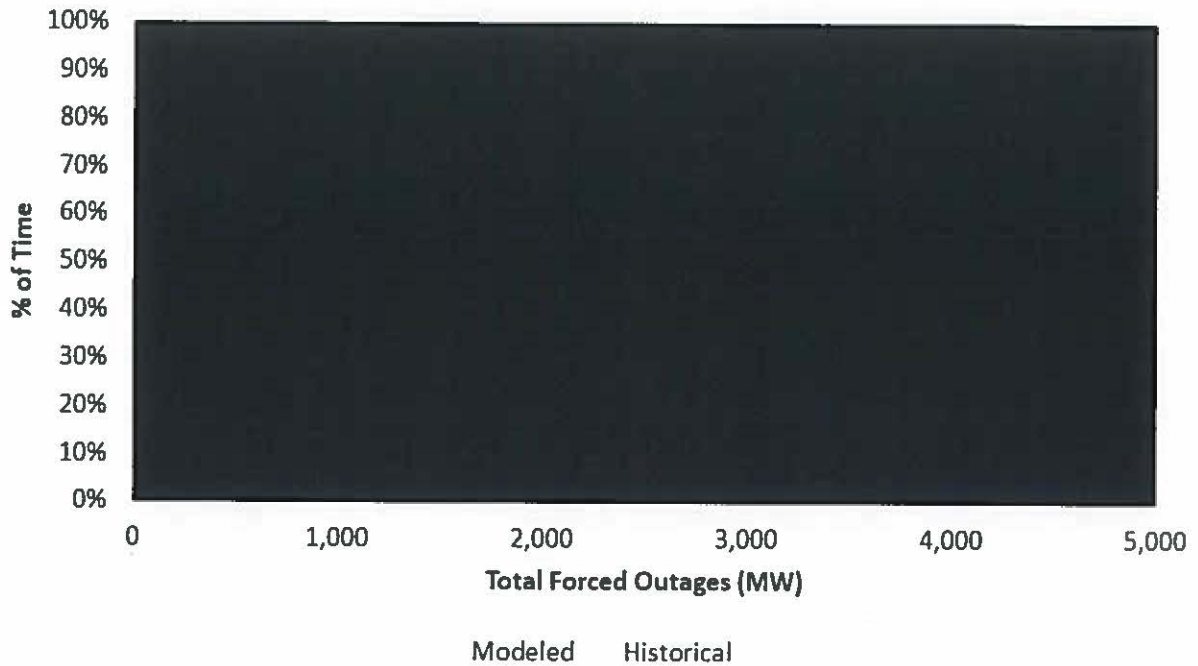
¹ If a unit did not have forced outage events in one of the 4 seasons (summer, winter, spring, fall) during the historical period, then the events of one season were duplicated for other seasons which explains why the annual, summer, and winter EFOR are identical for some units. CT EFOR values were capped at 15% because generators that only operated a few hours have high historical EFOR values that are not representative of future operation during years with significant high load periods. However, if the CT EFORs were not capped, the system weighted EFOR would increase to 5.5% causing an increase in 1.5% in reserve margin results. The annual EFORs were scaled to 15% so seasonal values may be lower or higher than the 15%.

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Wayne CT 2	Oil Peaker			
Wayne CT 3	Oil/Gas Peaker			
Wayne CT 4	Oil/Gas Peaker			
Wayne CT 5	Oil/Gas Peaker			
Weatherspoon CT 1	Oil Peaker			
Weatherspoon CT 2	Oil Peaker			
Weatherspoon CT 3	Oil Peaker			
Weatherspoon CT 4	Oil Peaker			
Capacity Weighted Average EFOR				

Figure CA1. Resources on Unplanned Outage as a Percentage of Time



The total MWs offline produced by the model calibrated very closely to the 2014 – 2019 historical values. Figure CA1 demonstrates that in any given hour, the DEP system can have between 0 and 1,000 MW of its thermal resources offline due to forced outages, forced derates, and maintenance outages. The figure further shows that in 10% of all hours, DEP has greater than 1,000 MW of its thermal resources in an unplanned outage condition.

Figure CA2. 2014-2019 Outage Summary Chart (Combined DEC and DEP)

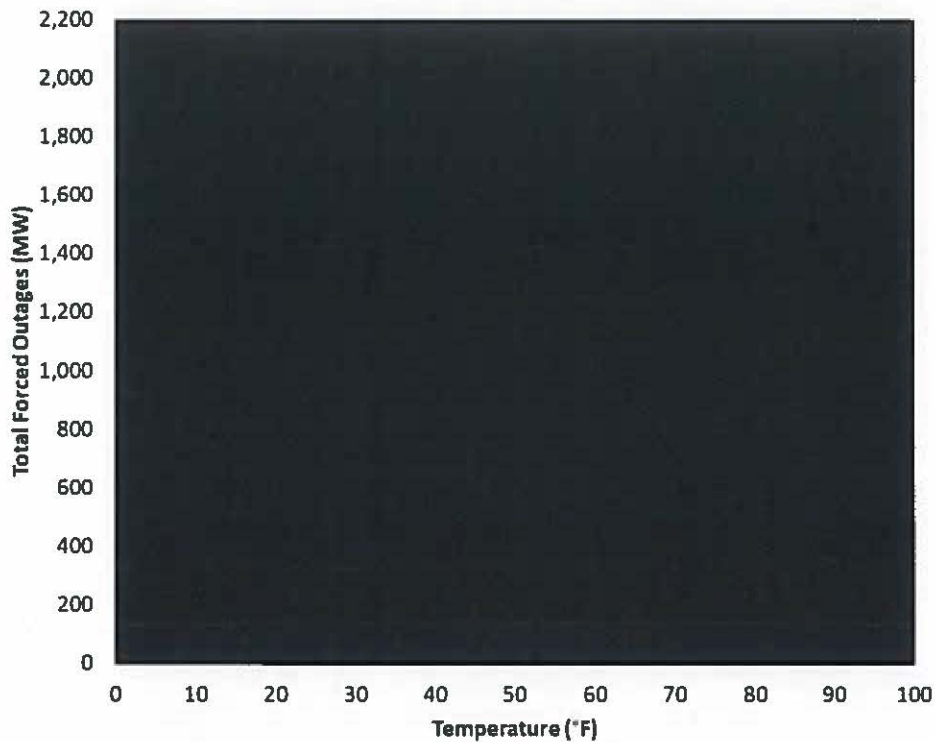
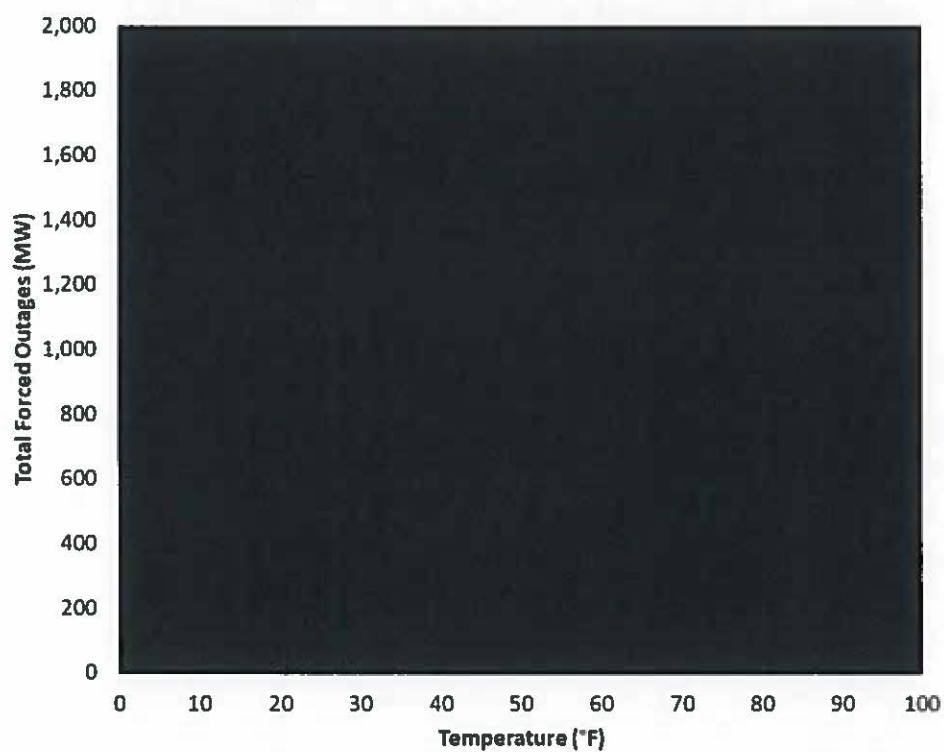


Figure CA3. 2016-2019 Outage Summary Chart (Combined DEC and DEP)



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Table CA5. MWs of Outage on 10 Coldest Days Only Due to Cold Weather (Combined DEC and DEP)

Hour	MWs of Outage Due to Cold Weather									
	1/7/2014	2/20/2015	1/8/2015	1/24/2014	1/2/2018	1/6/2014	1/9/2017	1/8/2017	1/8/2014	1/1/2018
1										
2										
3										
4										
5										
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Min Temp (°F)	6	8	9	10	10	12	15	16	16	17

Figure CA4. 2015 & 2018 Historical and Modeled Purchases

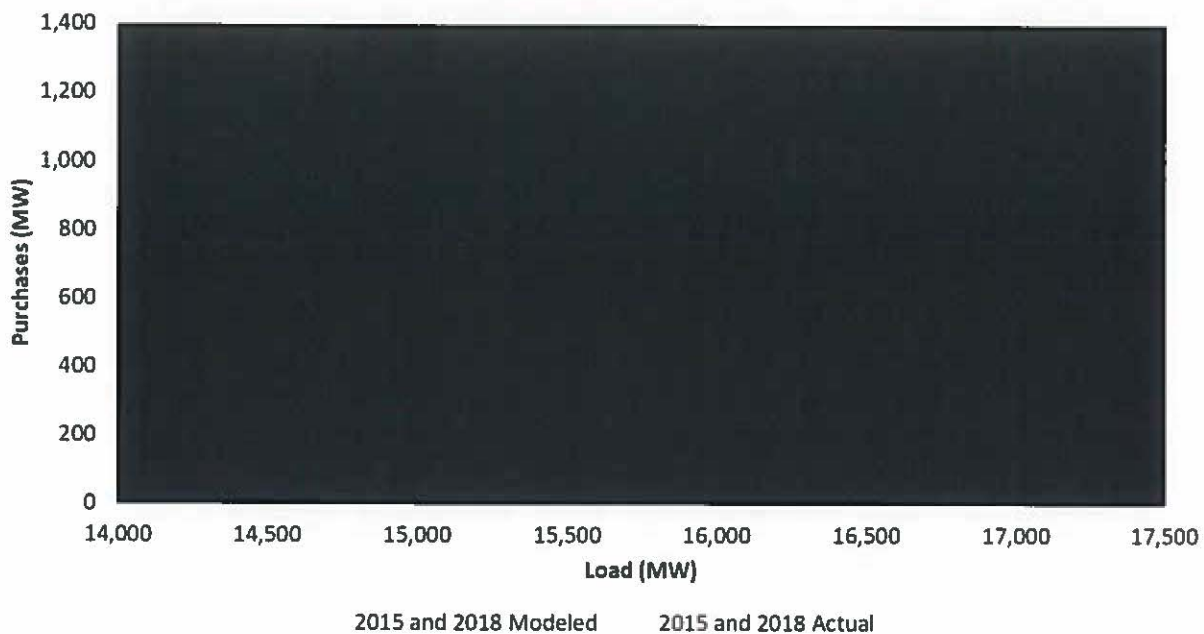


Table CA6. Economic Carrying Cost (based on Summer Rating)

Study Year	ECC Capacity Costs (\$/kW-yr)	FOM (\$/kW-yr)	ECC plus FOM (\$/kW-yr)
2024	■	■	■