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December 12, 2019

Ms. Kimberley A. Campbell, Chief Clerk
North Carolina Utilities Commission
430 N. Salisbury Street
Raleigh, NC 27603

RE: Application for Certificate of Public Convenience and Necessity for Friesian Holdings, LLC to construct a 70-MW Solar Facility in Scotland County, North Carolina NCUC Docket No. EMP-105, Sub 0

Dear Ms. Campbell:

On behalf of Friesian Holdings, LLC, we herewith submit the Rebuttal Testimony of Rachel S. Wilson in the above-referenced EMP docket.

Pursuant to Commission Rule R1-28(e), the Company plans to deliver 16 copies of its testimony and exhibits on December 13, 2019.

Should you have any questions concerning this testimony or exhibits attached thereto, please do not hesitate to contact me.

Sincerely,

/s/ Karen M. Kemerait

Karen M. Kemerait

skb

CC: All Parties of Record
Enclosures

BEFORE THE

NORTH CAROLINA UTILITIES COMMISSION

RE: In the Matter of Application of Friesian Holdings, LLC for a Certificate of Convenience and Necessity to Construct a 70-MW Solar Facility in Scotland County, North Carolina	Docket No. EMP-105, SUB 0

Rebuttal Testimony of Rachel S. Wilson

PUBLIC VERSION

On Behalf of
Friesian Holdings, LLC

December 12, 2019

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

A My name is Rachel Wilson and I am a Principal Associate with Synapse Energy Economics, Incorporated ("Synapse"). My business address is 485 Massachusetts Avenue, Suite 2, Cambridge, Massachusetts 02139.

Q Are you the same Rachel Wilson that submitted Direct Testimony in this proceeding?

A Yes.

Q What is the purpose of your rebuttal testimony?

My rebuttal testimony responds to the testimony of Mr. Lawrence and Mr. Metz, witnesses for Public Staff of the North Carolina Utilities Commission, regarding the Friesian Holdings, LLC application for a Certification of Public Convenience and Necessity (CPCN) for a proposed 70 MW solar facility.

Q Does the Public Staff take a position on whether there is a need for the Friesian facility?

A Not conclusively. At pages 6-13 of its testimony, the Public Staff discusses the need for the Friesian facility and suggests that Friesian's power purchase agreement (PPA) with the North Carolina Electric Membership Cooperative (NCEMC) may not be sufficient to demonstrate need, but it states no conclusion on this issue.

Q Do you believe that Friesian's PPA with NCEMC is sufficient to demonstrate a need for the facility?

A Yes, I do. NCEMC is charged with serving its member distribution cooperatives and "…continuously strives to supply power to its members that is affordable, reliable, and safe," as well as increasingly low carbon.[1] Prior to entering into the

[1] NCEMC's Initial Comments Before the North Carolina Utilities Commission. July 18, 2019. Docket No. EMP-105, Sub 0.

PPA Friesian, NCEMC likely analyzed its generation supply requirements, including renewable generation supply needed for REPS compliance, and concluded that contracting with Friesian was a cost-effective way to meet those needs. This inference is consistent with the comments filed by NCEMC in this docket on July 18, 2019, attached hereto as Exhibit RW-3.

Q Are capacity needs identified in DEP's IRP relevant to the need for the Friesian facility?

A No. The Friesian generation facility has been proposed to serve NCEMC via the PPA mentioned above. The Public Staff seems to assert, incorrectly, that Friesian has relied on DEP's capacity needs as evidence of a need for its proposed facility. Rather, Friesian has asserted, through my direct testimony and that of other witnesses, that construction of the Friesian network upgrades serves the public interest, because they are necessary to support DEP's identified needs for new generation, among other reasons.

Q How does the Public Staff evaluate the cost of the network upgrades associated with the Friesian project?

A The Public Staff calculates a levelized cost of transmission (LCOT) in terms of $/MWh associated with the network upgrade costs needed to bring the Friesian project online. Costs are calculated by dividing the annualized cost of the transmission assets over the typical transmission asset lifetime. It uses the Friesian nameplate capacity of 70 MW and the network upgrade cost of $223 million to arrive at a cost of $3,186 $/kW. The associated LCOT cost is $62.94 $/MWh. Staff then compares these numbers to integration costs found in a study from the Lawrence Berkeley National Laboratory (LBNL), which range from $56 - $116 $/kW and $1.56 - $3.22 $/MWh in LCOT.[2]

[2] Joint Testimony of Evan D. Lawrence and Dustin R. Metz, Public Staff – North Carolina Utilities Commission. Docket No. EMP-105, Sub 0. Table 1.

Q Is this a reasonable comparison to make?

A No. The range of costs that the Public Staff presents for comparison purposes come from three sources: the MISO interconnection queue, the PJM interconnection queue, and historical U.S. Energy Information Administration (EIA) data. These data sources sum the total volume of renewable generation, in MW, and compare it to the average LCOT.

Q How should the Public Staff's calculation be adjusted?

A Rather than including just the number of MW associated with the Friesian project, the Public Staff should have included all of the projects in the interconnection queue that are behind Friesian and summed the total number of MW associated with those projects. Any additional transmission costs associated with those projects could have also been included.

Q What effect would that have on the Public Staff's LCOT estimate?

The resulting LCOT estimate would be much lower if the projects in the queue behind Friesian were also included. The Direct Testimony of Brian C. Bednar references a DEP assessment for interconnection requests showing 108 requests totaling 1,561 MW that are directly dependent on the Friesian upgrades, provided as part of Duke's Response to Data Request No. 2. Duke further states that "In addition to the projects specifically identified to date by DEP as interdependent on the Friesian upgrades, there are likely many additional later-queued projects that are also technically interdependent on the Friesian upgrades."[3]

If those additional projects are included, the cost per kW associated with the upgrades declines substantially, as shown in Table 1. When the projects in the interconnection queue are included, "Friesian + Queue," the $/kW cost of the upgrades falls to $137/kW. If we assume an additional 900 MW of resources are constructed, "Friesian + Queue + Future," the cost of upgrades is only $89/kW, which is well within the range shown in the LBNL report.

[3] Duke Response to Data Request No. 2.

Table 1. Comparison of integration costs

	Friesian	Friesian + Queue	Friesian + Queue + Future	MISO (Solar)	PJM (Solar)	EIA (Solar)
Nameplate (MW_{AC})	70	1,631	2,500	3,277	10,057	2,187
Network Upgrades ($M)	$223	$223	$223	$180	$1,170	$220
Network Upgrades ($/kW)	$3,186	$137	$89	$55	$116	$101

Q Did you calculate an associated LCOT that includes all the projects behind Friesian in the interconnection queue?

A No. The LCOT calculation depends on the resource type. It is my understanding that there are a number of different types of generators in the queue behind Friesian and I do not have the details as to which generator types make up the volume of MW in the queue.

Q Isn't it true that generators drop out of the interconnection queue, and that not all of these projects will materialize?

A Yes. However, it is also almost certain that other generation projects will seek to interconnect in this region, taking the place of the generators that drop out.

Q Did the LBNL study on which the Public Staff relied for its cost comparison suggest any other methodologies for evaluating the transmission costs associated with renewables integration?

A Yes. The authors state in the report that "Some capacity-expansion models, such as the Regional Energy Deployment System (ReEDS), consider generation and

transmission capacity costs and aim to minimize busbar and system-level costs for electric-sector planning purposes."[4]

Q Has any such analysis been done using the ReEDS model mentioned above?

A Yes. The ReEDS model was developed by the National Renewable Energy Laboratory (NREL), which states that "The ReEDS model in particular has been designed with special emphasis on capturing the unique traits of renewable energy, including variability and grid integration requirements."[5] NREL recently produced its *2018 Standard Scenarios Report: A U.S. Electricity Sector Outlook*, which defines a set of prospective scenarios that bound ranges of technology, market, and policy assumptions and assesses these scenarios in NREL's ReEDS model to understand the range of resulting outcomes.[6]

Q What does the ReEDS model show for North Carolina?

A The ReEDS 2018 Standard Scenarios results show 5.34 GW of Utility PV by 2022 in its Mid-Case Scenario.[7] North Carolina currently has 4.4 GW of solar capacity.[8] In an optimized scenario, North Carolina adds another 900 MW of solar, and associated transmission necessary for integration, by 2022.

While not specific to North Carolina, one of the key themes of the report is that flexibility and diversity in the resource mix is valuable to future system operations. Transmission capacity grows in all scenarios, providing an additional mode of flexibility to the system.[9]

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[4] Lawrence/Metz Exhibit 2. Gorman, W. et al. 2019. Improving estimates of transmission capital costs for utility-scale wind and solar projects to inform renewable energy policy. Lawrence Berkeley National Laboratory.

[5] NREL. 2018. 2018 Standard Scenarios Report: A U.S. Electricity Sector Outlook. Page vii. Available at: https://www.nrel.gov/docs/fy19osti/71913.pdf

[6] NREL. 2018. 2018 Standard Scenarios Report: A U.S. Electricity Sector Outlook. Page iv.

[7] NREL. Standard Scenarios Results Viewer. Available at: https://openei.org/apps/reeds/#

[8] North Carolina Sustainable Energy Association. 2019. *Installed renewable energy systems.* Available at: https://energync.org/maps/

[9] NREL. 2018. 2018 Standard Scenarios Report: A U.S. Electricity Sector Outlook. Page vii.

Q Does this conclude your rebuttal testimony?

A Yes, it does.

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. EMP-105, SUB 0

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of the Application of
Friesian Holdings, LLC for a Certificate
of Public Convenience and Necessity

NCEMC'S INITIAL COMMENTS

On May 15, 2019, Friesian Holdings, LLC ("Friesian") filed an application for a certificate of public convenience and necessity ("CPCN") for a 70-MW_{AC} solar photovoltaic facility in Scotland County, North Carolina ("Project"). Therein, Friesian indicated that it anticipated execution of a Project-related purchase power agreement ("Project PPA") between it and North Carolina Electric Membership Corporation ("NCEMC"). The Project PPA has now been executed.

NCEMC is a generation and transmission ("G&T") cooperative. To supply power to its member distribution cooperatives, NCEMC produces and sells power that it produces at NCEMC-owned electric generation resources; NCEMC also purchases and resells power, pursuant to wholesale contracts, from power providers such as Duke Energy Carolinas, LLC, Duke Energy Progress, LLC, Dominion Energy North Carolina, and others like Friesian.

As a G&T cooperative, NCEMC continuously strives to supply power to its members that is affordable, reliable, and safe. Beginning a decade ago, NCEMC also began assisting its members with their compliance obligations under the North Carolina Renewable Energy and Energy Efficiency Portfolio Standard ("REPS"). This assistance frequently took the form of purchasing renewable energy certificates from utility-scale

solar facilities. More recently, NCEMC developed and began to pursue strategic business objectives under an initiative it christened "*A Brighter Energy Future*" ("BEF"), which entails supplying power that is not only affordable, reliable, and safe, but also increasingly low carbon (see attached BEF overview). Once constructed, the Project – specifically, the parties' execution of the Project PPA – will simultaneously advance NCEMC's pursuit of BEF and further its ability to achieve REPS compliance.

For the foregoing reasons, NCEMC supports issuance of a CPCN for the Project.

This the 18th day of July, 2019.

NORTH CAROLINA ELECTRIC MEMBERSHIP CORPORATION

By: _____

Michael D. Youth
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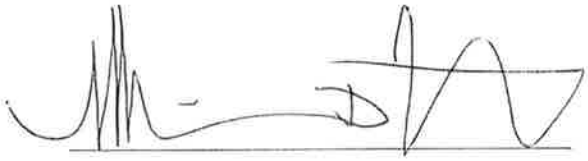
CERTIFICATE OF SERVICE

It is hereby certified that the foregoing document has been served upon all parties of record by electronic mail, or depositing the same in the United States mail, postage prepaid.

This the 18th day of July, 2019.



Driven by service and inspired by innovation, North Carolina's Electric Cooperatives are building a brighter energy future for 2.5 million North Carolinians. Working together, this group of 26 electric cooperatives is developing and delivering new energy solutions that put cooperative consumers and the vitality of our state first. The roots of these forward-focused energy solutions grow from three values North Carolina's Electric Cooperatives believe in:

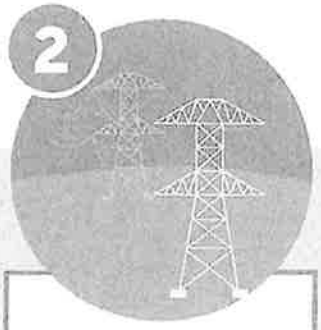
1. Creating a low-carbon emissions environment through sustainability and continued investment in low- and zero-emissions resources.
2. Integrating technology to make distribution grids more resilient, robust and flexible for an energy future that includes consumers' participation through demand response programs and new energy resources distributed across the grid.
3. Improving efficiency of the overall energy sector by electrifying processes formerly powered by fossil fuels. Electric vehicles are a primary example of this conversion.

Low Carbon

Low Carbon Intensity

Industrial Process Conversion

Sustainability

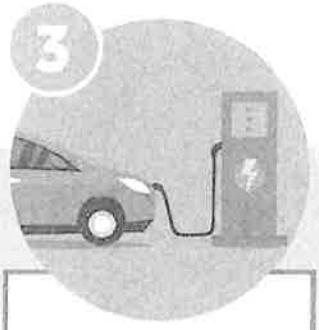


Grid Flexibility

Distributed Energy Resources

Microgrids

Distribution Operators



Beneficial Electrification

Electric Transportation

Agribusiness

Economic Development