



TAG Meeting

March 22, 2021

Webinar



TAG Meeting Agenda

- 1. Administrative Items – Rich Wodyka**
- 2. 2020 Off-shore Wind Study Report – Bill Quaintance**
- 3. 2021 Study Activities and Study Scope Report – Mark Byrd**
- 4. Regional Studies Update – Bob Pierce**
- 5. 2021 TAG Work Plan – Rich Wodyka**
- 6. TAG Open Forum – Rich Wodyka**



2020 Offshore Wind Study

Bill Quaintance
Duke Energy Progress



SE Wind Coalition Public Policy NC Offshore Wind Study

2020 Wind Study Scope

- **Determine 3 least cost injection points somewhere along the NC coast**
- **Also analyze the potential for 2,400 MW of wind generation injecting into Dominion's Landstown 230 kV area to be wheeled into DEC/DEP**
- **Determine the transmission cost breakpoints for varying amounts of generation injection up to 5000 MW**



2020 Offshore Wind Study – Assumptions and Limitations

- **NCTPC 2030 Summer Peak Model**
 - Other hours of the year could be important
- **No Interconnection Queues are Included**
 - DEP, DEC, and PJM Queues Not Modeled
 - Actual Offshore Wind Projects must go through the queue(s)
- **Power Flow Only**
 - Stability, Short Circuit, etc. not studied
- **Non-simultaneous Injections**
 - Interactions among multiple simultaneous injection points not studied
- **Monitoring Only Duke Energy Areas**
 - PJM not monitored



Offshore Wind - Initial Screening

- **Screening of 29 possible injection sites in eastern DEP and 2 in Dominion VA**
- **Screening reviewed with sponsors in Fall 2020**

Sweet Spots by Substation*

Point of Interconnection (POI)	MW Limit	Total Cost (\$M)	Total Cost (\$/W)	Point of Interconnection (POI)	MW Limit	Total Cost (\$M)	Total Cost (\$/W)
8FENTRES (DVP**)	2307	\$ 100	\$ 0.04	6CLINTON230T	853	\$ 321	\$ 0.38
6LANDSTN (DVP**)	2257	\$ 65	\$ 0.03	6KINDUP230TT	851	\$ 154	\$ 0.18
8CUMBLND500T	1700	\$ 380	\$ 0.22	6WSPOON230T	788	\$ 302	\$ 0.38
6CUMBLND230T	1461	\$ 375	\$ 0.26	6WHITEVL230T	770	\$ 175	\$ 0.23
6WAKE230TT	1458	\$ 464	\$ 0.32	6SUTNORTH230	695	\$ 25	\$ 0.04
6NEWBERN230T	1449	\$ 181	\$ 0.12	6KINGSTR230T	667	\$ 225	\$ 0.34
6WOMMACK230T	1432	\$ 259	\$ 0.18	6MTOLV230T	637	\$ 312	\$ 0.49
8WAKE500TT	1417	\$ 460	\$ 0.32	6SUMTER230T	558	\$ 375	\$ 0.67
6GREENVIL230	1106	\$ 425	\$ 0.38	6MORHDWW230T	550	\$ 27	\$ 0.05
6JACKSON230T	1049	\$ 118	\$ 0.11	6WALLACE230T	548	\$ 160	\$ 0.29
6DELCO230T	1036	\$ 183	\$ 0.18	6AURORASST	544	\$ 230	\$ 0.42
6CASTLEH230T	994	\$ 34	\$ 0.03	6FOLKSTN230T	518	\$ 7	\$ 0.01
6GRNTSCK230T	966	\$ 79	\$ 0.08	6LATTASST	425	\$ 265	\$ 0.62
6FLOSUB230T	911	\$ 400	\$ 0.44	6BRUN1230T	387	\$ 26	\$ 0.07
6MARION230T	876	\$ 288	\$ 0.33	6BRUN2230T	277	\$ 30	\$ 0.11
6HAVELOK230T	859	\$ 20	\$ 0.02				

** PJM/Dominion costs not included

* Indicative Only, and Non-simultaneous

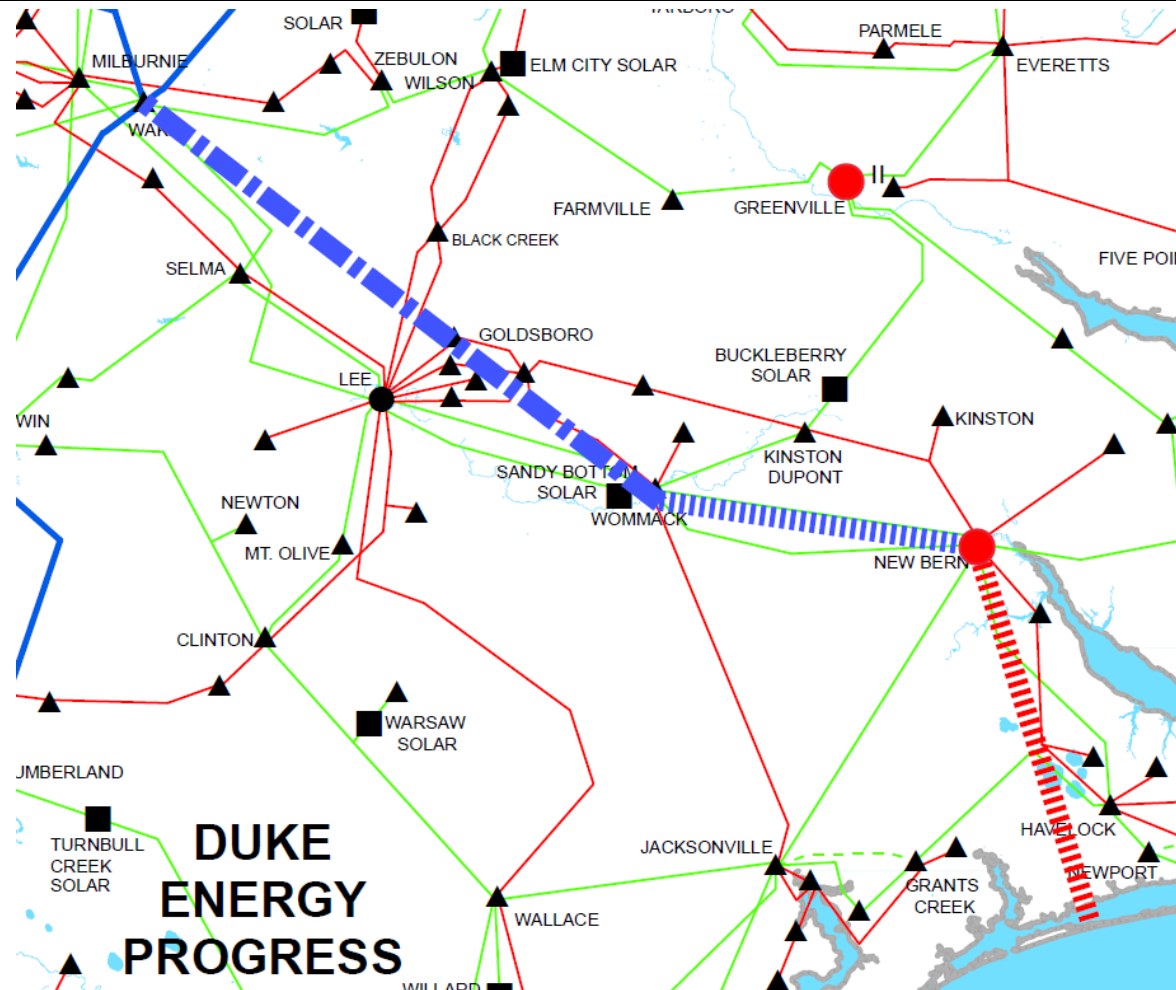


Offshore Wind – 3 Sites, More MW

- **Selected 3 sites for higher MW injections with 500kV build-out:**
 - **New Bern**
 - **Greenville**
 - **Wilmington (Sutton North)**

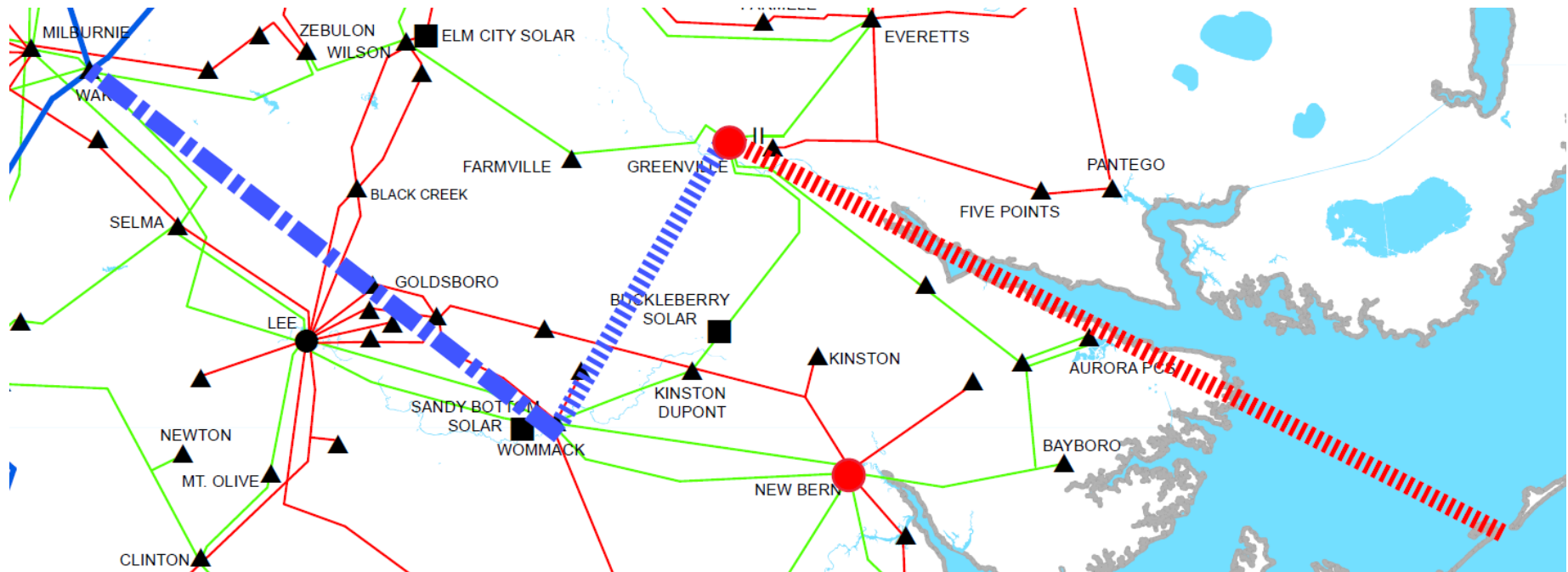


New Bern-Wommack-Wake 500kV



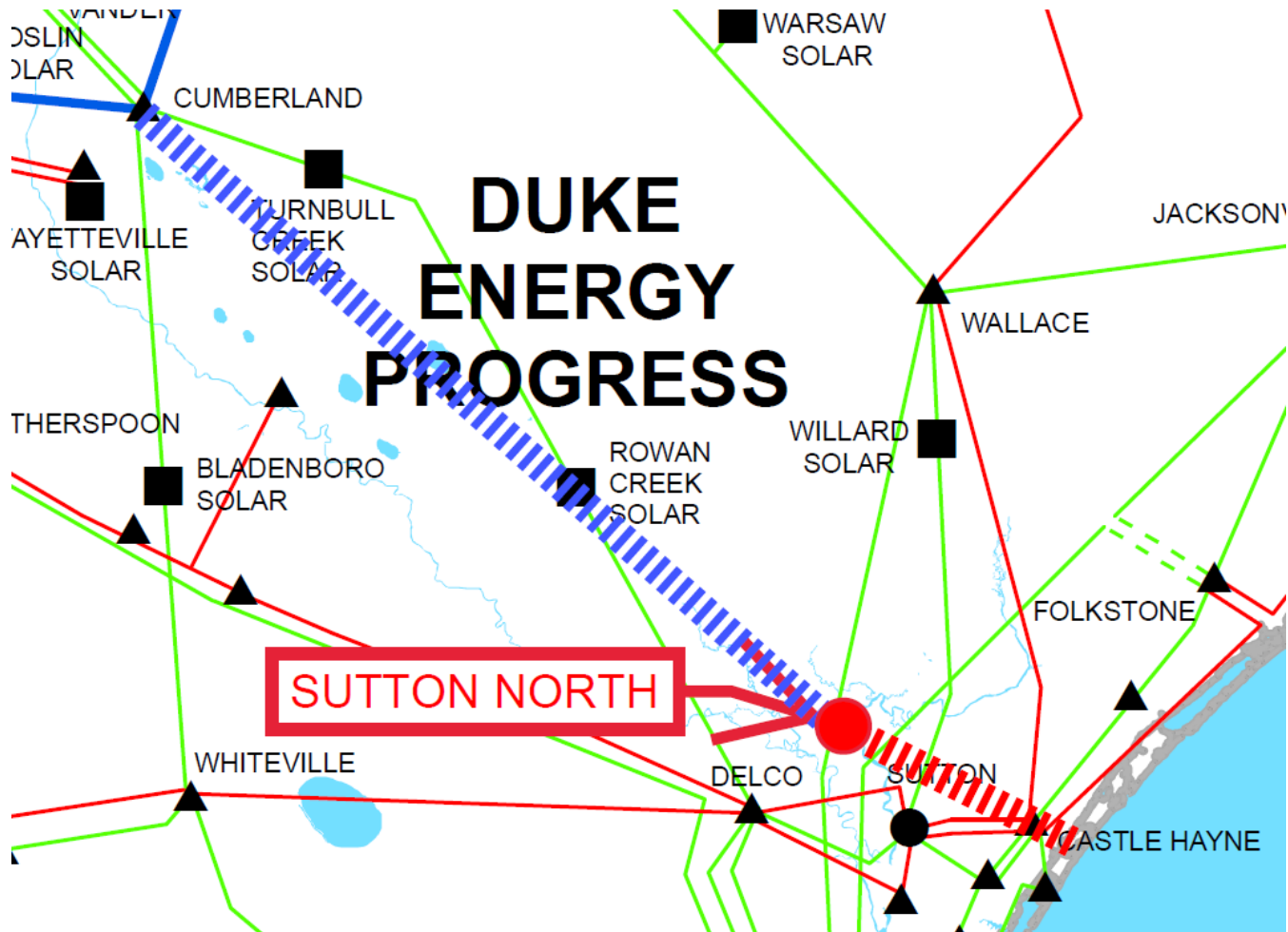


Greenville-Wommack-Wake 500kV





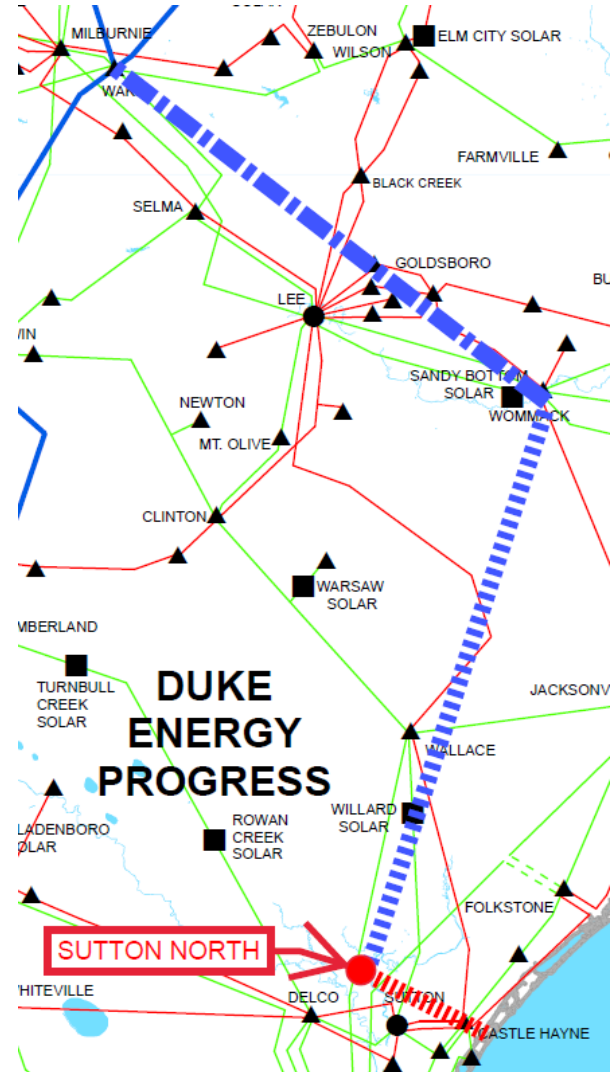
Sutton North-Cumberland 500kV





North Carolina Transmission Planning Collaborative

Sutton North- Wommack-Wake 500kV



Sweet Spots - 500kV Options*

Point of Interconnection (POI)	MW Limit	Total Cost (\$M)	Total Cost (\$/W)		Point of Interconnection (POI)	MW Limit	Total Cost (\$M)	Total Cost (\$/W)
New Bern, without 500kV					Greenville, without 500kV**			
New Bern 230kV Bus	825	\$ 170	\$ 0.21		Greenville 230kV Bus	1106	\$ 425	\$ 0.38
New Bern 230kV Bus	1449	\$ 181	\$ 0.12		Greenville 230kV Bus	1902	\$ 786	\$ 0.41
New Bern 230kV Bus	1773	\$ 243	\$ 0.14					
Build New Bern - Wommack - Wake 500kV					Build Greenville - Wommack - Wake 500kV			
New Bern 230kV Bus	2324	\$ 936	\$ 0.40		Greenville 230kV Bus	1940	\$ 1,710	\$ 0.88
New Bern 230kV Bus	2814	\$ 1,095	\$ 0.39		Greenville 230kV Bus	2916	\$ 1,935	\$ 0.66
New Bern 230kV Bus	3252	\$ 1,228	\$ 0.38		Greenville 230kV Bus	3587	\$ 2,010	\$ 0.56
New Bern 500kV Bus	2372	\$ 933	\$ 0.39		Greenville 500kV Bus	2163	\$ 1,710	\$ 0.79
New Bern 500kV Bus	2814	\$ 1,091	\$ 0.39		Greenville 500kV Bus	2916	\$ 1,935	\$ 0.66
New Bern 500kV Bus	3252	\$ 1,177	\$ 0.36		Greenville 500kV Bus	3374	\$ 2,010	\$ 0.60

** PJM/Dominion costs not included

* Indicative Only, and Non-simultaneous

Sweet Spots - 500kV Options*

Point of Interconnection (POI)	MW Limit	Total Cost (\$M)	Total Cost (\$/W)		Point of Interconnection (POI)	MW Limit	Total Cost (\$M)	Total Cost (\$/W)
Wilmington Sutton North, without 500kV								
Sutton North 230kV Bus	695	\$ 25	\$ 0.04					
Sutton North 230kV Bus	927	\$ 63	\$ 0.07					
Sutton North 230kV Bus	1217	\$ 270	\$ 0.22					
Build Sutton North - Cumberland 500kV					Build Sutton North - Wommack - Wake 500kV			
Sutton North 230kV Bus	1961	\$ 899	\$ 0.46		Sutton North 230kV Bus	2273	\$ 1,355	\$ 0.60
Sutton North 230kV Bus	2113	\$ 966	\$ 0.46		Sutton North 230kV Bus	2486	\$ 1,520	\$ 0.61
Sutton North 230kV Bus	2258	\$ 1,088	\$ 0.48		Sutton North 230kV Bus	2709	\$ 1,671	\$ 0.62
Sutton North 500kV Bus	2045	\$ 873	\$ 0.43		Sutton North 500kV Bus	2273	\$ 1,355	\$ 0.60
Sutton North 500kV Bus	2272	\$ 917	\$ 0.40		Sutton North 500kV Bus	2482	\$ 1,461	\$ 0.59
Sutton North 500kV Bus	2453	\$ 1,035	\$ 0.42		Sutton North 500kV Bus	2564	\$ 1,561	\$ 0.61

** PJM/Dominion costs not included

* Indicative Only, and Non-simultaneous



2021 Study Activities and Study Scope Report

Mark Byrd
Duke Energy Progress



Studies for 2021

- **Annual Reliability Study**
 - **Assess DEC and DEP transmission systems' reliability and develop a single Collaborative Transmission Plan**
- **Resource Supply Option - Biennially - Assess DEC and DEP interfaces with neighboring systems by modeling hypothetical transfers**
- **Local Economic Studies / Public Policy Studies**
 - **No Local Economic Study Requests Received**
 - **Received one Public Policy Request**



2021 Proposed Study Scope

- **Base reliability case analysis – 2026 summer and 2026/2027 winter and 2031 winter**
 - **An “All Firm Transmission” Case(s) will be developed which will consider all confirmed long term firm transmission reservations with roll-over rights applicable to the study year(s)**
 - **DEC and DEP generation down cases will be created from the common Base Case**
- **Assess DEC and DEP interfaces with neighboring systems – 2031 winter**
- **Public Policy Study Scope Being Refined**



Resource Supply Scenario

- **Hypothetical Imports/Exports to be Re-evaluated - 1000 MW transfers**
 - The PWG will analyze cases to determine the impacts of fourteen different hypothetical transfers into and out of the DEC and DEP systems. These fourteen hypothetical transfer scenarios are identified in the following tables



2031W Hypothetical Import/Export

Resource From	Sink	Test Level (MW)
PJM	CPLE	1,000
SOCO	DUK	1,000
CPLE ²	DUK	1,000
TVA ³	DUK	1,000
PJM	CPLE	1,000

1 – DUK is the Balancing Authority Area for DEC

2 – CPLE is the eastern Balancing Authority Area for DEP

3 - This hypothetical transfer is intended to evaluate the impact of a 1,000 MW TVA transaction through the SOCO transmission system into DUK



2031W Hypothetical Import/Export

Resource From	Sink	Test Level (MW)
DUK	CPLE	1,000
DUK	SOCO	1,000
PJM	DUK/CPLE	1,000/1,000
DUK/CPLE	PJM	1,000/1,000
CPLE	PJM	1,000



2031W Hypothetical Import/Export

Resource From	Sink	Test Level (MW)
DUK	PJM	1,000
SOCO ⁴	CPLE	1,000
DUK ⁵	TVA	1,000
PJM ⁶	DOM SC/SCPSA	500/500

4 – This hypothetical transfer is intended to evaluate the impact of a 1,000 MW Southern Co transaction through the DEC transmission system into CPLE

5 – This hypothetical transfer is intended to evaluate the impact of a 1,000 MW DUK transaction through the SOCO transmission system into TVA

6 – This hypothetical transfer is intended to evaluate the impact of a 1,000 MW PJM transaction through the CPLE transmission system into DOM SC (500 MW) and to SCPSA (500 MW)



Local Economic Study Requests

- **No economic hypothetical scenarios to be studied as part of the transmission planning process were received**



Public Policy Study Requests

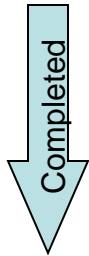
➤ **Call was held on March 8 with Requestor to discuss the details**

There are four components that Requestor proposes to evaluate:

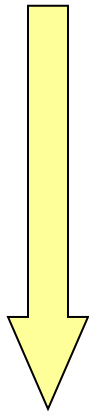
- 1) Transmission impacts with accelerated retirement of coal generation, **Challenge is that we don't know locations of replacement generation**
- 2) Dominion Energy's recent state law and the increase of renewable generation, **Don't have specific locations for large amounts of renewables that may be connected in Dominion**
- 3) Recent increase of solar merchant power plants located in North Carolina within Dominion's service territory (PJM), and **Duke is formally processing these requests under its existing Affected System process**
- 4) Wind generation. **Offshore wind study in 2020/21, Importing onshore wind could be added to hypothetical import analysis.**



Study Process Steps



- 1. Assumptions Selected**
- 2. Study Criteria Established**
- 3. Study Methodologies Selected**
- 4. Models and Cases Developed**
- 5. Technical Analysis Performed**
- 6. Problems Identified and Solutions Developed**
- 7. Collaborative Plan Projects Selected**
- 8. Study Report Prepared**





Study Assumptions Selected

- **Study Year's for reliability analyses:**
 - Near-term: 2026 Summer, 2026/2027 Winter
 - Longer-term: 2031 Winter
- **LSEs provided:**
 - Input for load forecasts and resource supply assumptions
 - Dispatch order for their resources
- **Adjustments may be made based on additional coordination with neighboring transmission systems**



Study Criteria Established

- **NERC Reliability Standards**
 - Current standards for base study screening
 - Current SERC Requirements
- **Individual company criteria**



Study Methodologies Selected

- **Thermal Power Flow Analysis**
- **Each system (DEC and DEP) will be tested for impact of other system's contingencies**



Models and Cases Developed

- **Start with 2020 series MMWG cases**
- **Latest updates to detailed models for DEC and DEP systems will be included**
- **Planned transmission additions from updated 2020 Plan will be included in models**

Technical Analysis

- **Conduct thermal screenings of the cases**



Problems Identified and Solutions Developed

- **Identify limitations and develop potential alternative solutions for further testing and evaluation**
- **Estimate project costs and schedule**



Collaborative Plan Projects Selected

- **Compare all alternatives and select preferred solutions**

Study Report Prepared

- **Prepare draft report and distribute to TAG for review and comment**



Questions ?





Regional Studies Reports

Bob Pierce
Duke Energy Carolinas



SERC Long Term Working Group Update



SERC Long Term Working Group

- Have begun work on 2021 series of LTWG cases
- DEC assisting with hosting DBU under new LTWG process where more members take on that role



SERTP



SERTP

- 1st Quarter Meeting was held virtually on March 18th.
- Determined Economic Planning Studies to be performed for 2021
- Training session topic – Energy Storage



<http://www.southeasternrtp.com/>



National EHV AC/DC GRID



National EHV AC/DC GRID

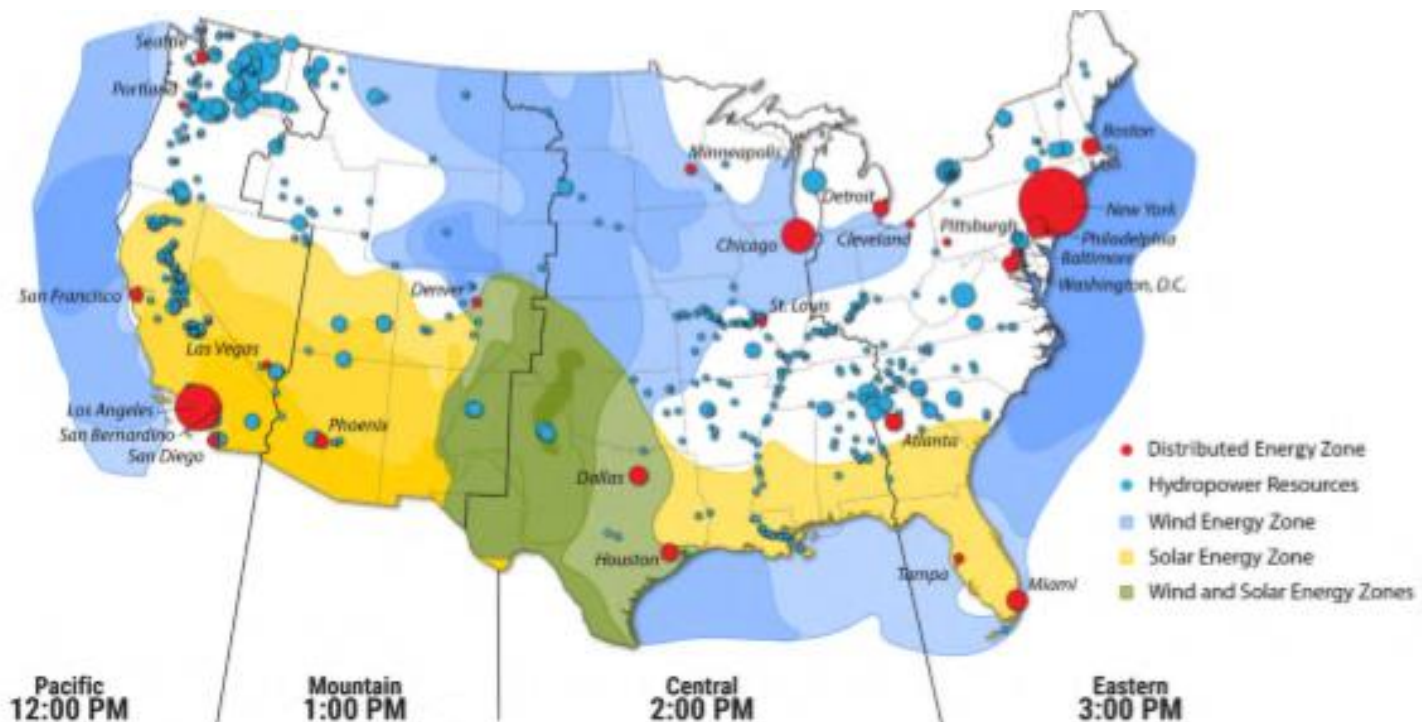
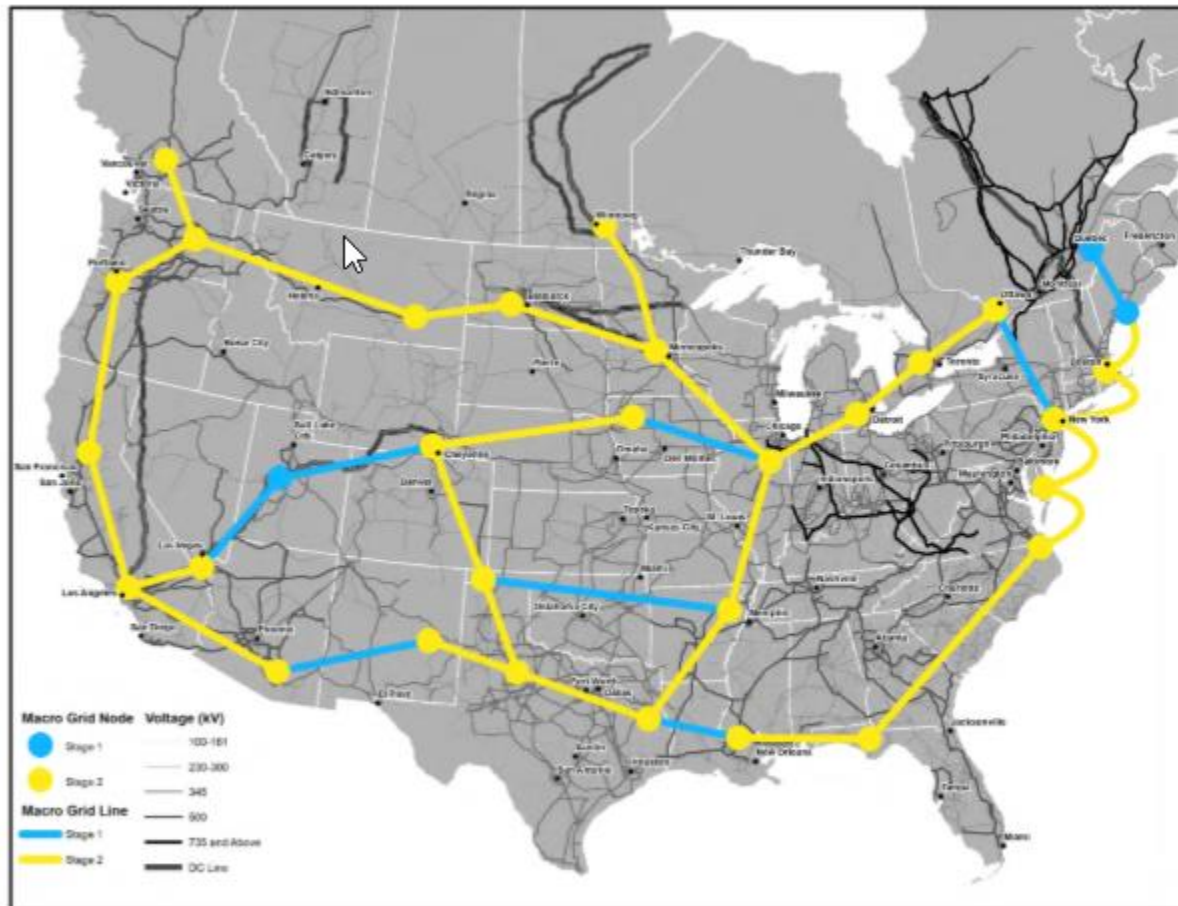


Figure 6. Renewable energy zones that must be connected to efficiently transition to a clean energy economy.



National EHV AC/DC GRID





National EHV AC/DC GRID

<https://www.esig.energy/wp-content/uploads/2021/02/Transmission-Planning-White-Paper.pdf>



Questions ?





2021 TAG Work Plan

Rich Wodyka
Administrator



2021 NCTPC Overview Schedule

Reliability Planning Process

- Evaluate current reliability problems and transmission upgrade plans
 - Perform analysis, identify problems, and develop solutions
 - Review Reliability Study Results

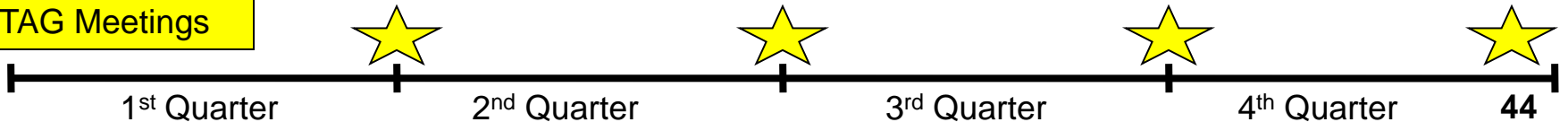
Local Economic Planning Process

- Propose and select Local Economic Studies and Public Policy Study scenarios
 - Perform analysis, identify problems, and develop solutions
 - Review Local Economic Study and Public Policy Results

Coordinated Plan Development

- Combine Reliability and Local Economic Study and Public Policy Results
 - OSC publishes DRAFT Plan
 - TAG review and comment

TAG Meetings





January - February – March

➤ **2020 Study Update**

- ✓ Receive Final 2020 Collaborative Transmission Plan Report
- Receive Draft 2020 Off-shore Wind Study Report
 - *TAG provide input to the OSC on Offshore Wind Study results*

➤ **2021 Study – Finalize Study Scope of Work**

- ✓ Receive request from OSC to provide input on proposed Local Economic Study scenarios and interfaces for study
 - *TAG provide input to the OSC on proposed Local Economic Study scenarios and interfaces for study*
- ✓ Receive request from OSC to provide input in identifying any public policies that are driving the need for local transmission
 - *TAG provide input to the OSC in identifying any public policies that are driving the need for local transmission for study*
- Receive final 2021 Reliability Study Scope for comment
 - *TAG review and provide comments to the OSC on the final 2021 Study Scope*



January - February – March

First Quarter TAG Meeting – March 22nd

- **2020 Off-shore Wind Study Analysis**
 - Receive report on and discuss the 2020 Off-shore Wind Study Results
- **2021 Study Update**
 - ✓ Receive a report on the Local Economic Study scope and any public policy scenarios that are driving the need for local transmission for study
 - ✓ Receive a progress report on the Reliability Planning study activities and the 2021 Study Scope



April - May – June

Second Quarter TAG Meeting – *TBD*

- **2021 Study Update**
 - **Receive a progress report on study activities**

 - **Receive update status of the upgrades in the 2020 Collaborative Plan**



July - August – September

Third Quarter TAG Meeting – **TBD**

➤ 2021 Study Update

- Receive a progress report on the study activities and preliminary results
- TAG is requested to provide feedback to the OSC on the technical analysis performed, the problems identified as well as proposing alternative solutions to the problems identified



October - November - December

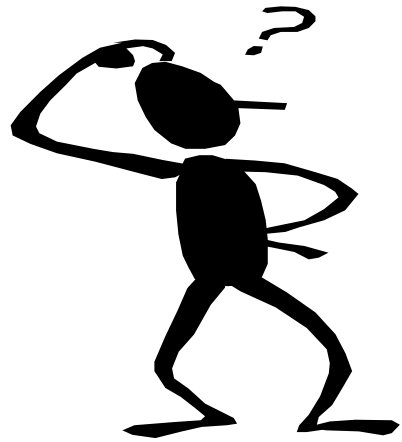
Fourth Quarter TAG Meeting – *TBD*

➤ 2021 Selection of Solutions

- TAG will receive feedback from the OSC on any alternative solutions that were proposed by TAG members

➤ 2021 Study Update

- Receive and discuss final draft of the 2021 Collaborative Transmission Plan Report
- Discuss potential study scope scenarios for 2022 studies



Questions ?





TAG
Open Forum Discussion

Comments or Questions?