

2015 Economic Studies Strategic Transmission Analysis - On Shore Wind Integration Scope of Work – Revised Draft



Planning Advisory Committee Meeting

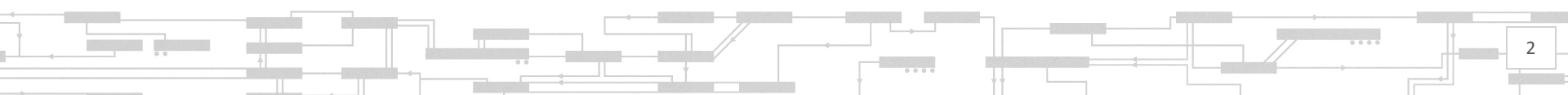
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Outline

- Goal
- 2015 Economic Study Request
- Scope of Work
- Scenarios and Cases



Background: Strategic Transmission Analysis - Wind Integration (STA-WI)

- ISO-NE Strategic Transmission Analysis for Wind Integration (STA-WI)
 - Ongoing series of studies
 - Designed to understand transmission constraints in Maine affecting wind resources in northern New England
- Competition for transmission access
 - Results in bottlenecked energy
 - Inhibits development of additional wind resources
- STA-WI focused on upgrades that
 - Would not require major new transmission construction



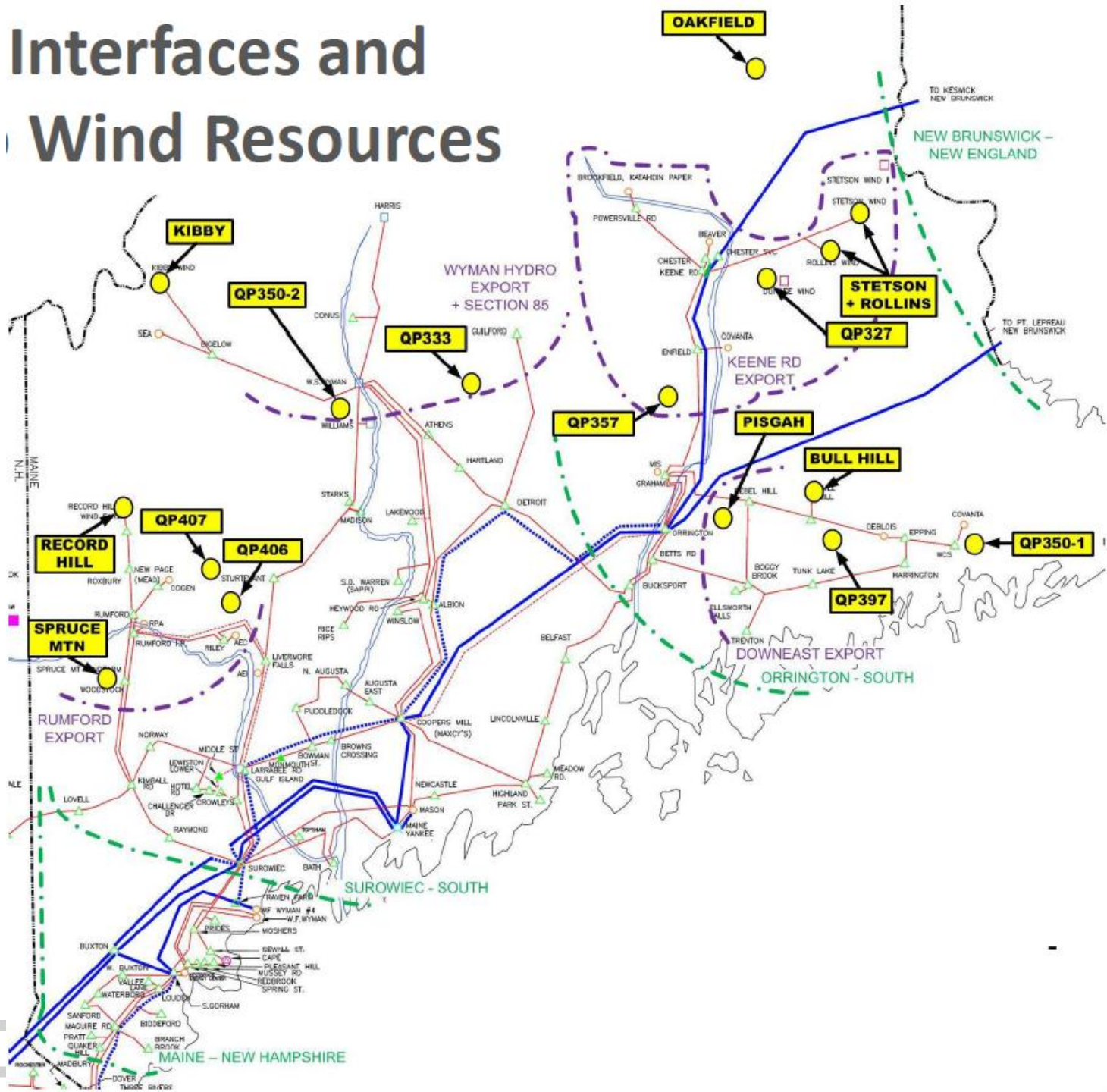
Goal: Strategic Transmission Alternatives – Wind Integration (STA-WI)

- Develop economic and environmental metrics
 - Transmission improvements that increase wind deliverability from Maine
 - Reduce bottled-in wind energy
 - Reduce fossil fuel consumption in New England
- Evaluation period
 - Ten year period
 - Based on 2021 network model (with / without STA-WI upgrades)
- Identify transmission elements creating economic congestion
- The results *may* be used to
 - Identify the need for future Market-Efficiency Transmission Upgrades (METU) in the area of onshore wind resources in ME
 - Inform Public Policy requests for projects facilitating the integration of wind resources

SCOPE OF WORK

Strategic Transmission Analysis – Wind Integration (STA-WI)

Interfaces and Wind Resources



Wind Units Considered

- Maine wind included in STA-WI
 - Downeast: 34 MW existing, 152 MW additional
 - Keene Road: 144 MW existing, 85 MW additional
 - North of Orrington: 0 MW existing, 150 MW additional
 - Wyman Hydro: 134 MW existing, 284 MW additional
 - Rumford: 73 MW existing, 57 MW additional
 - Total: 385 MW existing, 728 MW additional



STA-WI Transmission Upgrades

- Conceptual transmission upgrades consistent with those identified in the Strategic Transmission Analysis – Wind Integration
- Regional transmission upgrades
 - 275 MVAR of 115kV shunt capacitors for voltage support in Western and Southern Maine
 - Two 25 ohm, Thyristor-Controlled Series Compensation devices in Sections 388 and 3023



STA-WI Transmission Upgrades

- Local transmission upgrades already in Regional System Plan
 - Rebuild of Section 242 from Heywood Road to Winslow
- Local transmission upgrades not in Regional System Plan
 - Addition of series breakers at:
 - Albion Road
 - Coopers Mills
 - Livermore Falls
 - 115kV shunt capacitors for voltage support:
 - 205 MVAR in Western Maine
 - 30 MVAR in Downeast Maine
 - 500 MVAR Static VAR Compensator (SVC) at Maine Yankee 345 kV S/S
 - Rebuild of Wyman Hydro substation
 - Rebuild of Section 59 from Epping to Columbia (3 miles)
 - Rebuild of Section 66 from Rebel Hill to Epping
 - 50% series compensation on Line 64

Post MPRP Limits Increased with STA-WI Upgrades

- Maine stability / voltage interface limit increases
 - 275 MW improvement in Orrington-South
 - Post MPRP limit is 1375 MW
 - Post MPRP plus STA-WI limit is 1650 MW
 - 500 MW improvement in Surowiec-South
 - Post MPRP limit is 1600 MW
 - Post MPRP plus STA-WI limit is 2100 MW
 - 300 MW improvement in ME-NH
 - Post MPRP limit is 2000 MW
 - Post MPRP plus STA-WI limit is 2300 MW
- With higher interface limits for stability / voltage, thermal limitations may become binding under contingencies for certain dispatches

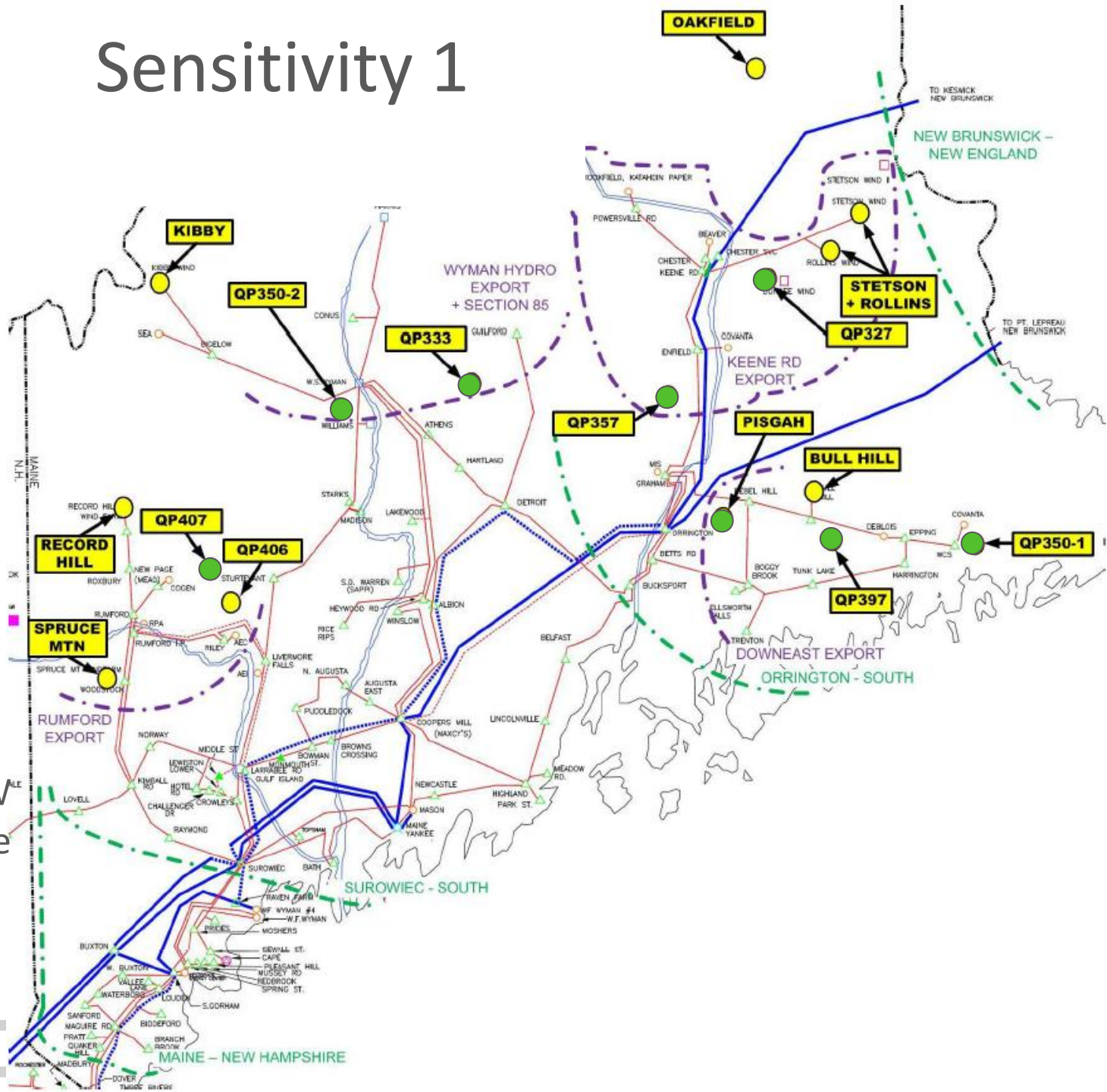


Scenarios

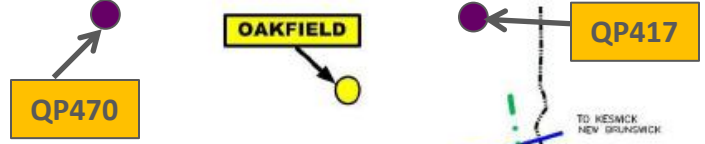
- Evaluate the economic impact of adding the identified upgrades that are not already part of the RSP Project List
- The base case would use the same generation assumptions as the STA-WI and evaluate the system with and without the new transmission upgrades
- Two sensitivities would evaluate the impact with less/more wind development
 - Sensitivity 1 – reflects only wind units in service as of April 1, 2015
 - Sensitivity 2 – use STA-WI wind unit assumptions plus three large representative projects in the queue

Sensitivity 1

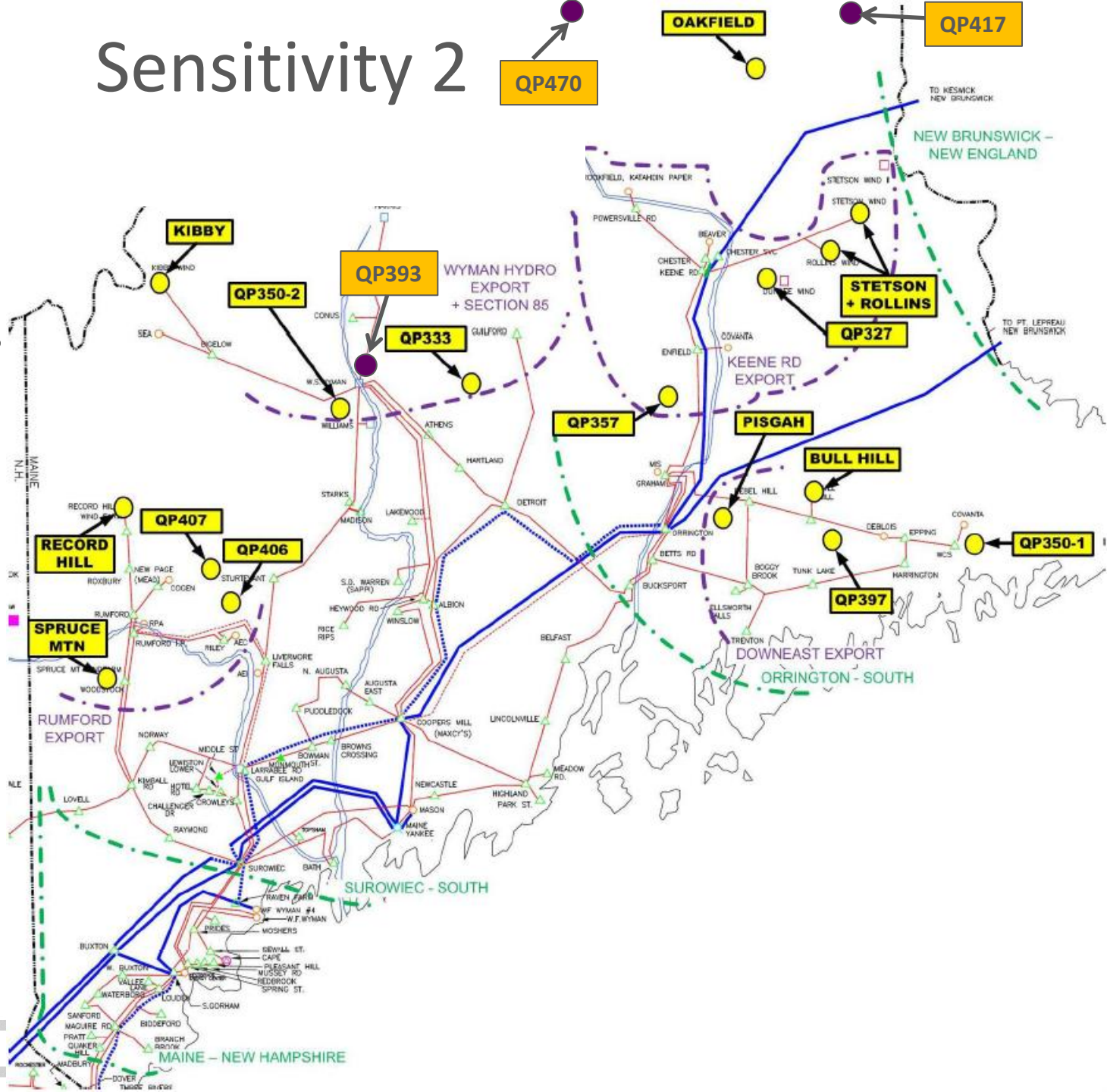
- Exclude those wind farms that were neither operational nor under construction as of April 1, 2015
- These projects are shown here in green
- Excludes 522 MW from STA-WI base case



Sensitivity 2



- Include all wind from STA-WI plus three representative large projects in the queue
- Shown here in purple in their approximate location
- Additional 934 MW



Scenario Summary – Table of Year 2024 Metrics

	Post -MPRP Transmission System (including identified upgrades that are already in the RSP)	Post -MPRP Transmission System Plus Upgrades Identified in the Wind Integration Study
Generation Included in the the Wind Integration Study	A (benchmark)	B
Sensitivity 1 Generation (Wind Integration Study minus wind that is not yet under construction as April 1, 2015)	C	D
Sensitivity 2 Generation (Wind Integration Study plus a few large wind projects in the queue)	E	F
Sensitivity 2 Generation with 1000 MW of energy flow from New Brunswick	G	H

Questions

