Nova Scotia POWER
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MAY 24, 2019

2019-2020 Integrated Resource Plan: Stakeholder Session #1

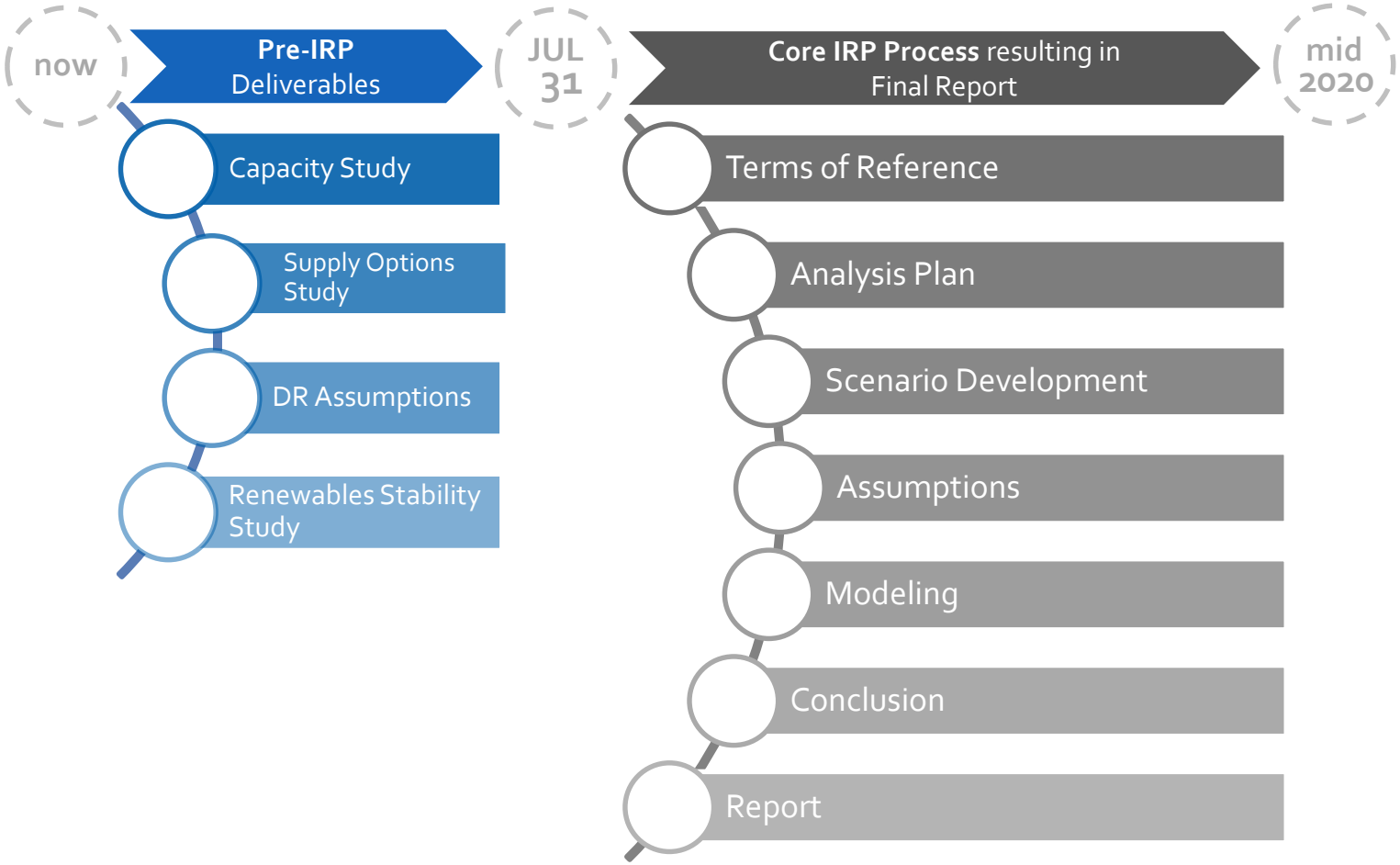
Today's Agenda

1. Overview of the IRP Regulatory Process

2. NSP Pre-IRP Deliverables for July 31
   a) Capacity Study
   b) Bulk Grid Supply Options Study
   c) Demand Response Assumptions
   d) Renewables Stability Study

3. Plan for June & July Stakeholder Engagement Sessions

Overview of the IRP Regulatory Process



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NS Power's IRP Consultants

NS Power has engaged E3 (Energy Environmental Economics) to assist with completion of some of its pre-IRP analysis and to help guide the utility through the IRP process.

- E3 is a San Francisco-based consultancy specializing in electricity economics
- E3 consults extensively for utilities, developers, government agencies and environmental groups on clean energy issues:
  - United Nations Deep Decarbonization Pathways Project
  - Planning for California's climate and renewable energy goals
  - 100% renewables studies for California, Hawaii, and New York

NS Power has also engaged PSC (Power Systems Consultants) to complete the Transmission Planning work assessing increased renewables requirements.

- PSC is a global firm providing specialized consulting exclusively to the electrical power industry
- PSC has extensive expertise in generator, load and transmission interconnection studies in the US, Canada, Australia, New Zealand, the UK, and Ireland.

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NSP Pre-IRP Deliverables

1. Capacity Study

DESCRIPTION:
Consultant LOLE study which calculates the required Planning Reserve Margin, wind capacity value, and requirements for storage durations for capacity for the NSP system.

DELIVERABLE TYPE: Report

STATUS: ON TRACK

2. Supply Options Study

DESCRIPTION:
Consultant study which estimates the initial and sustaining costs and performance of new bulk grid supply options and future trends. NSP study of expected sustaining capital and performance of existing assets.

DELIVERABLE TYPE: Report

STATUS: ON TRACK

NSP Pre-IRP Deliverables

3. Demand Response Assumptions

DESCRIPTION:
Draft modeling assumptions (cost and load impacts) for 1 to 3 specific DR programs.

DELIVERABLE TYPE: Assumptions Deck

STATUS: ON TRACK

4. Renewables Stability Study

DESCRIPTION:
Consultant report identifying transmission requirements and system design considerations for increased levels of renewables on the NSP grid based on technical system studies.

DELIVERABLE TYPE: Report

STATUS: ON TRACK

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NSP Pre-IRP Deliverables

Party	Recommendation	Expected Delivery
Synapse	1. Confirm costs and achievable potential for incremental energy efficiency.	E1 Potential Study
	2. Determine costs and achievable potential for peak-load reducing demand response. Construct specific cost and quantity curves to allow for either resource selection (in Plexos) based on specific demand side resources, or scenario analysis utilizing alternative peak load and annual energy projections.	DR Assumptions and/or E1 Potential Study
	3. Monitor and comprehensively investigate costs for bulk-scale battery storage of different durations.	Supply Options Study & Capacity Study
	4. Monitor, track and project sustaining capital costs for the thermal fleet.	Supply Options Study
	5. Establish requirements to allow increased levels of wind on NSPI system. … NSPI should determine, with specificity, the set of technical improvements required to allow different increments of additional wind on their system.	Renewables Stability Study
	6. Continue joint dispatch efforts and investigate increased planning, unit commitment and reserve sharing opportunities with New Brunswick, Newfoundland and Prince Edward Island.	Operations & Regional Studies
	7. Determine the capacity and unit commitment requirements needed in association with the Tufts Cove thermal units, to allow appropriate parameterization in Plexos to enable possible economic retirement.	Supply Options Study & IRP Assumptions
	8. Identify candidates for the "next" coal retirement alternative after Lingan 2.	Supply Options Study & IRP Modeling
	9. Monitor natural gas price and availability trends in the Maritimes.	IRP Assumptions

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NSP Pre-IRP Deliverables

Party	Recommendation	Expected Delivery
Bates White	Continue to evaluate new and existing wind resources in order to establish an appropriate firm capacity value for each installation.	Capacity Study
	The 2013 CT Asset Optimization Study does not fully inform the decision to invest in the preservation of these units vis-a-vis replacing them with more modern CTs or another type of fast ramping generation unit. NSPI should compare the economics of replacing them with newer CTs or another type of fast ramping generation.	Supply Options Study & IRP Modeling
	Determine the extent of any capital investment that may be required at Trenton 6 or the Point Tupper Marine Terminal after the current supply of domestic coal is no longer available at the end of 2019.	Supply Options Study
	Complete a detailed analysis to determine the lowest planning reserve margin necessary to meet NPCC requirements, rather then just assessing if 20% remains in compliance. Considering that NERC's current North American references range between 10.6% and 23.7%, perhaps the analysis should assess reliability and economics for a range of planning reserve margins.	Capacity Study

Proposed Pre-IRP Stakeholder Sessions

Session 1 (Today)	Session 2	Session 3
- IRP regulatory process overview - Pre-IRP deliverables update - Review of stakeholder sessions plan	- Overview of IRP exercise - NS Power System 101 - Uncertainties in the Planning Environment - Industry & Customer Trends to Consider - Pre-IRP Deliverables Status Update	- Review Draft Supply Options Study - Review Draft Capacity Study - Update on remaining pre-IRP Deliverables
May 24, 2019	**Late June (TBD)**	**Late July (TBD)**
~1 hour	~3 hours	~3 hours

Questions/Discussion