

# **Nova Scotia Power Integrated Resource Plan - 2014**

## **Terms of Reference**

### **Objective**

To develop a long-term Preferred Resource Plan that establishes the direction for NS Power to meet customer demand and energy requirements, and environmental obligations in a cost-effective, safe and reliable manner across a reasonable range of foreseeable futures; and to develop an Action Plan describing the major tasks required to implement a no regrets strategy<sup>1</sup> that aligns with the Preferred Resource Plan during the first five years of the planning horizon.

### **Preamble**

In its letter of December 18, 2013 the Nova Scotia Utility and Review Board (UARB, Board) directed NS Power to undertake Integrated Resource Plan (IRP) development. The Board provided that the IRP development process should follow a similar collaborative approach to that employed in the 2007 and 2009 IRP processes, with one significant change. The Board has directed NS Power to provide the Board's consultant, Synapse Energy Economics, with the input data Synapse will require to conduct modeling analyses using Strategist and Plexos in order to supplement the modeling prepared by NS Power. The Board also stated that stakeholder consultation is to be an integral component of the process. The Board anticipates that a final IRP report will be filed by Nova Scotia Power by October 15, 2014.

### **Approach**

In developing the Integrated Resource Plan, NS Power will:

- Apply the IRP framework as described below in collaboration with UARB staff and its consultants, and in consultation with customer representatives; and
- Engage interested parties in the development of assumptions, future scenarios and review of modeling results.

### **Scope**

The IRP will consider a 25-year Planning Horizon (2015-2039).

The primary steps of the Integrated Resource Planning process will be: establish evaluation criteria; develop input assumptions; evaluate potential resource plans; select the Preferred Resource Plan and Action plan; and File the IRP Report. Some degree of iteration may be required between steps. The steps are:

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<sup>1</sup> A 'no regrets' strategy is one in which future decisions are unlikely to be negatively affected by earlier decisions made.

1. Develop criteria for evaluation of various plans and selection of a Preferred Resource Plan.
2. Identify the major input assumptions which will drive evaluation and selection of the Preferred Resource Plan. Develop projections of the most likely values for each of those major input assumptions over the planning horizon, as well as projections of plausible high and low values of those assumptions over that horizon. These major input assumptions include, but are not necessarily limited to:
  - a. Load forecasts for a range of possible future supply requirements.
  - b. Ranges of operating, capital and financial assumptions for the planning horizon.
  - c. Technical and economic characteristics of realistic supply-side and demand-side alternatives to meet future load, emissions and other requirements.
  - d. Environmental regulations.
  - e. Renewable Electricity Standard requirements.
  - f. Develop planning “worlds” (i.e. sets of related assumptions to reflect reasonable potential planning scenarios).
  - g. Treatment of “end effects” for evaluation and Preferred Resource Plan selection.
3. Evaluation of potential resource plans:
  - a. Perform a screening analysis to determine which alternatives are to be evaluated further in the IRP process and which can be removed from further consideration. Resource options may exhibit synergistic effects on overall system costs or benefits that are difficult to discern at the screening stage, or that may be difficult to quantify. Thus, this step will aim for inclusivity, to avoid premature rejection of options.
  - b. Evaluate alternative plans in order to determine the Preferred Resource Plan.
  - c. Perform sensitivity analysis to determine the effect of realistic variations in input assumptions to test plan robustness. The results of these sensitivity analyses may lead to a more detailed analysis of certain of the assumption values developed in step two.
  - d. Assess preferred capacity plan to evaluate the proposed assets.
4. Select Preferred Resource plan and Develop Action Plan describing major tasks required to implement a no regrets strategy that aligns with the Preferred Resource Plan during the first five years of the planning horizon.
5. Prepare final report and Action Plan. File with UARB.

## **IRP Framework**

### Purpose

The IRP is a comprehensive and public utility planning exercise that integrates supply and demand-side options to develop a long-term Preferred Resource Plan for the utility. The resultant Preferred Resource Plan is a road-map to guide the utility’s strategy for meeting its resource needs over the planning horizon. It is directional, not prescriptive in nature. The Preferred Resource Plan does not commit the utility to certain courses of action or foreclose options determined to be in the interests of our customers subsequent to completion of the IRP

process. Instead, the Preferred Resource Plan is meant to provide the utility with sufficient flexibility to effectively accommodate a range of future uncertainties. As a result, the utility is expected to adhere to the strategy expressed through the Action Plan.

### Process

The objective function is the minimization of the cumulative present worth of the annual revenue requirements over the planning horizon adjusted for end-effects and subject to a number of considerations, including:

- System reliability requirements;
- Plan robustness - the ability of a plan to withstand realistic potential changes to key assumptions;
- Flexibility - the absence of constraints on future decisions arising from the selection of a particular plan;
- Future regulatory emissions outlook; and
- Timing and rates effects - the timing and magnitude of benefits relative to the timing and magnitude of required expenditures and/or rates impacts.

Modeling assumptions will include financial analysis assumptions, emissions constraints, renewable requirements, load forecast, supply-side options and demand-side options, fuel and purchased power cost forecasts. Where appropriate, NS Power will address contrasting views about reasonable assumptions through sensitivity analyses.

NS Power will consider technically and economically viable supply-side technologies by evaluating operating characteristics, capital and operating costs and operational assumptions.

The potential role and range of options of demand-side management in a resource plan will be assessed. Estimated DSM costs and related demand and energy effects will be included in the IRP analysis.

NS Power's planning models will be employed to evaluate a reasonable, but not unlimited, number of alternative plans as part of an Analysis Plan. The Analysis Plan will describe how Strategist (and when appropriate, Plexos) will be used to determine the relative value of different resource plans. The long-term resource planning tool Strategist will be employed to derive optimized resource plans for the planning horizon. Once specific, realistic plans are identified, they will be assessed against the objective and the final criteria. Additionally, the preferred plans will be evaluated for operational feasibility using Plexos where appropriate.

### IRP Deliverables

#### **1. Criteria for evaluation of various plans and selection of Preferred Resource Plan.**

The primary criterion will be cumulative present worth of the annual revenue requirements of the resource plan over the planning horizon. Additional criteria will include System reliability requirements, Plan robustness, Flexibility, Future regulatory

emissions outlook, Timing and rates effects, and consideration of “end effects” that extend beyond the planning horizon.

## 2. Major input assumptions

### ○ Load Forecast

NS Power has traditionally employed an econometric load forecast to provide annual energy consumption by customer sector and annual peak system demand. The Company has developed an End-Use Model forecast tool and will examine how best to utilize the models during the IRP process.

### ○ Supply-side Options

NS Power will provide a summary of viable supply-side options, including emissions abatement technologies. The summary will identify the cost and operating characteristics of the various technologies and discuss the opportunity and limitations of these within the power system.

A screening of the technologies will be completed using publicly available information and focusing on the following parameters:

- Cost;
- Flexibility;
- Available, commercialized technology;
- System stability;
- Fuel considerations; and
- Emissions outlook.

Included in the supply-side assessment will be:

- Optimization of existing generation;
- Renewables;
- Solid fuel generation;
- Gas-fired generation;
- Storage;
- Storage enhancements to existing hydroelectric facilities
- Market opening effects including distributed generation
- Emissions management options including abatement technologies, fuel choice and other options;
- Emerging technologies, particularly those expected to be commercially available by 2025; and
- Enhanced interconnection, Nova Scotia transmission expansion and power purchasing.

- **Demand-side Options**

This process will examine the role and approach to demand-side management initiatives in Nova Scotia in the coming years to develop assumptions regarding the quantity of reductions, the ability of DSM to contribute to load shaping and the optimal levels of DSM for different system conditions. NS Power will consider ENSC's input from its DSM potential assessment and other reports and studies when forecasting energy savings over the planning horizon. Nova Scotia Power will also consider input from stakeholders regarding the utilization of load as a resource.

Stakeholders will be engaged in the calculation methodology of the avoided costs of DSM. The avoided costs will be calculated based on the reference plan(s).

- **Basic Assumptions**

Nova Scotia Power will file a Basic Modeling Assumptions document containing a consolidation of all modeling assumptions. This will include the planning "worlds" (i.e. sets of related assumptions to reflect reasonable potential planning scenarios).

### **3. Evaluation of potential resource plans**

- **Plan Integration**

Plan scenarios will be developed based on combinations of supply-side and demand-side options as described above. The alternative plans will be assessed using the Company's planning software. Plans will be ranked according to cumulative net present worth of the revenue requirements with commentary on the rates impacts of the plans.

- **Sensitivity Analysis**

The IRP process involves adoption of a variety of assumptions, some of which may involve significant uncertainty. Views on these assumptions may vary significantly.

Reflecting this, sensitivities will be identified against which to assess the various competing resource plans. Ultimately the test of the soundness of the Preferred Resource Plan is its ability to enable NS Power to provide reliable service at reasonable cost/rates impact across a range of worlds/scenarios and assumption values.

### **4. Prepare Final Report and Action Plan. File with UARB.**

The IRP will culminate in a report to the UARB which will address the following areas:

1. Background/Process Overview.
2. Stakeholder engagement process.
3. Criteria for evaluation of the various plans.
4. Load forecast of future supply requirements.
5. Sets of alternative supply-side and DSM alternatives to meet future system requirements.
6. Screening analysis used to determine which alternatives were evaluated.
7. Evaluation of alternative plans in order to determine the least cost plans and rates impact.
8. Sensitivity analysis on the least cost plans and other selected plans to determine the robustness of the plans to variations in input assumptions.
9. Preferred Resource Plan.
10. Avoided cost of DSM methodology method utilized and results.
11. Action Plan. Actions required over the next 5 years to meet load projections and other regulatory and environmental requirements through implementation of a no regrets strategy that follows the Preferred Resource Plan.

### **Stakeholder Engagement**

The IRP framework and the resultant plan will form the foundation for demand-side and supply-side investments. Stakeholder input is an integral part of the process. The Company will promote transparency with stakeholders in assumption development and plan evaluation through the distribution of draft assumptions for stakeholder review and Technical conferences on assumptions and modeling results.

While the IRP process will provide structure and enable direct stakeholder input to NS Power's planning process, it is important to acknowledge that uncertainty will continue to exist in key areas. Despite this uncertainty, decisions will need to be made.

NS Power will consult with stakeholders at appropriate points in the planning process and in a manner which delivers value to all involved.

### **Confidential Information**

NS Power will make reasonable efforts to use publicly available information in the development of this IRP. With respect to transmission confidential information, NS Power will comply with the OATT Standards of Conduct.

## **IRP Process Timeline Summary**

## **No later than**

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|---|--------------------|
| 1. Terms of Reference submitted to UARB for approval  | January 22         |
| 2. Comments by interested parties   | January 29         |
| 3. UARB approval of Terms of Reference  | February 7         |
| 4. Public advertising   | February 15 and 19 |
| 5. Notice of Intention to Participate by Interested Parties   | February 28        |
| 6. Introduction to IRP Technical Conference and IRP Assumptions Session with Stakeholders   | March 7            |
| 7. Draft assumptions including load forecast, supply and demand side options compiled and issued to stakeholders along with discussion of approach to modeling analysis (i.e. Analysis Plan) (IRP Process Step 2) | March 14           |
| 8. Stakeholder comments on assumptions and Analysis Plan (IRP Process Step 2)   | March 26           |
| 9. Final consolidated modeling assumptions and Analysis Plan issued (IRP Process Step 2)  | April 11           |
| 10. Interim Analysis Progress Report Technical Conference   | June 25            |
| 11. Base scenarios for alternative Plans established and sensitivities identified (IRP Process Step 3)  | July 24            |
| 12. Develop analysis results and issue to stakeholders (IRP Process Steps 3 and 4)  | September 5        |
| 13. Stakeholder Technical Conference on Analysis Results (IRP Process Steps 3 and 4)  | September 12       |
| 14. Draft report filed with stakeholders  | September 30       |
| 15. Comments from stakeholders  | October 7          |
| 16. Final report filed with UARB (IRP Process Step 5)   | October 15         |