

## Commentary on Nova Scotia Power's Draft 2014 Integrated Resource Plan

### Key Planning Observations and Action Plan

#### Synapse Energy Economics

October 3, 2014

#### Introductory Comments

Synapse Energy Economics ("Synapse"), as consultant to the staff of the Nova Scotia Utility and Review Board ("UARB"), has worked in a collaborative fashion with Nova Scotia Power ("NSPI") since February 2014 on the development of NSPI's Integrated Resource Plan ("IRP"). Synapse's role has been to examine modeling assumptions, offer alternative assumptions where warranted, suggest an analysis plan for use of the Strategist modeling tool, and provide feedback to NSPI on the direction of their analytical efforts. On the whole, this collaborative process has resulted in an extensive analytical effort that led to the results reported in the NSPI September 30 draft IRP Report.

Synapse does not agree with all aspects of NSPI's interpretation of the results from the IRP analytical effort as presented in the September 30 draft report. This document summarizes the key planning observations and Action Plan elements on which Synapse differs with NSPI. Synapse provided NSPI with the essential analyses underlying these observations and the suggested Action Plan elements during the period when NSPI was developing its September 30 draft IRP.

#### Key Planning Observations

- 1. A Candidate resource Plan (CRP) with a "mid" DSM level has a lower NPV of planning period revenue requirements than any of the CRPs modelled during the IRP process through September 12.**

Subsequent to September 12, after reviewing the results of the full set of NSPI-modeled CRPs, Synapse used Strategist to model a CRP with mid-DSM achievable levels, as defined in the Navigant report. The program administrator ("PA") costs (per GWh saved) for the Navigant mid DSM achievable case were similar to the per-GWh-saved PA costs for base DSM; and the per-GWh-saved PA costs for the high DSM case were higher than either the base DSM or the mid DSM cases. Because of this observation, our expectation was that a CRP with a mid-DSM level would exhibit a lower planning period NPV<sup>1</sup> than CRP 5-1, which had a high DSM level. This was confirmed in our Strategist run for a CRP with a mid-DSM level.<sup>2</sup>

---

<sup>1</sup> We note that the planning period and study period NPVs include DSM Program Administrator costs, which would be a component of NSPI's revenue requirement. They do not include customer costs, which are not part of NSPI's revenue requirements.

<sup>2</sup> Synapse modified the system energy and firm peak load requirements in Strategist to align with the mid-DSM case savings, and ran the Strategist model with these modified inputs.

A CRP with a mid-DSM level exhibits the lowest planning period NPV cost, and is thus ranked #1 among “contender” preferred resource plans that also include CRP 2-1, 2-17, and 5-1, seen in Table 1 below. CRP 2-1 and CRP 2-17 are within 1.1% of the planning period NPV cost for the CRP with mid-DSM level. CRP 5-1 exhibits the lowest study period NPV cost, closely followed by the mid-DSM CRP, seen in Table 2 below. As noted elsewhere in these observations, Synapse hypothesizes that the sustaining capital differences between CRP 5-1 (and likely the CRP with mid-DSM) and CRP 2-1 and 2-17 may be underestimated, especially since for CRP 5-1, no specific sustaining capital calculation was made, but rather a “representative” computation was used that failed to capture the effect of the higher planning reserve margin associated with CRP 5-1. Since CRP 5-1 and CRP mid-DSM show planning reserve margin that significantly exceeds the threshold requirements (compared to CRP 2-1 and 2-17), there is room for savings on sustaining capital compared to what is shown here. Such an effect would further enhance the “winning” nature of CRP mid-DSM, and might also show CRP 5-1 to be ranked either higher than plans CRP 2-1 or CRP 2-17, or closer to those plans, over the planning period.

**Table 1. Planning Period NPVs - Highest Ranked Plans**

Planning Period NPV, \$ Millions [\$ 2015]						
	Raw Result, Strategist	w/ DSM Cust Cost Adj	Sustaining Capital	w/ DSM and Sust Cap Adjustments	Planning Period Rank	% change from #1
CRP 2-1	11,235	10,760	309	11,069	3	1.1%
CRP 2-17	11,206	10,731	324	11,055	2	1.0%
CRP 5-1	11,816	10,779	309	11,088	4	1.3%
CRP w/ Mid-DSM	NA*	10,641	309	10,950	1	0.0%

\*Note: CRP w/ mid-DSM was run w/ DSM Customer Cost Adjustment already in place in Strategist.

**Table 2. Study Period NPVs - Highest Ranked Plans**

Study Period NPV, \$ Millions [2015 \$]			
	Adjusted Study Period NPV	Study Period Rank	% change from #1
CRP 2-1	16,471	3	3.9%
CRP 2-17	16,568	4	4.6%
CRP 5-1	15,846	1	0.0%
CRP w/ Mid-DSM	15,870	2	0.2%

- A mid-level DSM CRP, compared to CRPs with a base level DSM, exhibits low incremental revenue requirement effects in the near term. This further supports a preferred resource plan with DSM levels consistent with the mid-DSM level.**

NSPI has used revenue requirements in the near-term (2015-2020) as its metric for the rate effects criterion. The NPV of revenue requirements for a CRP with mid-DSM is within 1% of

near-term revenue requirements associated with Base DSM CRPs, thus indicating minimal rate effect differences between the top CRPs with “base” DSM and a CRP with “mid” DSM levels. [see Table 3 below] Near-term revenue requirements for CRP 5-1 are 5.1% higher than CRP 2-17.

**Table 3. Near-Term (2015-2020) and Mid-Term (2015-2030) NPVs – Highest Ranked CRPs**

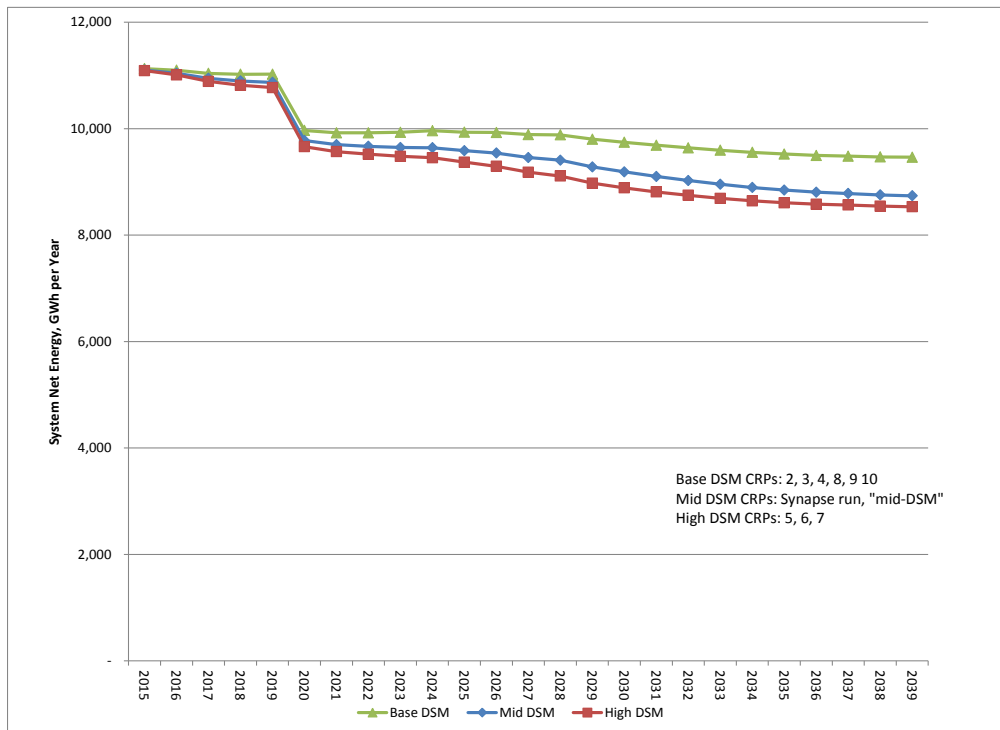
Nearer-Term NPV Calculations						
	NPV 2015-2020, \$ millions	rank	% change from #1	NPV 2015-2030, \$ millions	rank	% change from #1
CRP 2-1	3858	2	0.0%	8416	1	0.0%
CRP 2-17	3857	1	0.0%	8420	2	0.0%
CRP 5-1	4054	4	5.1%	8672	4	3.0%
CRP w/ Mid-DSM	3894	3	1.0%	8453	3	0.4%

\*Note: sustaining capital revenue requirement for mid-DSM CRP obtained from NSPI Sustaining Capital streams for "max" coal path.

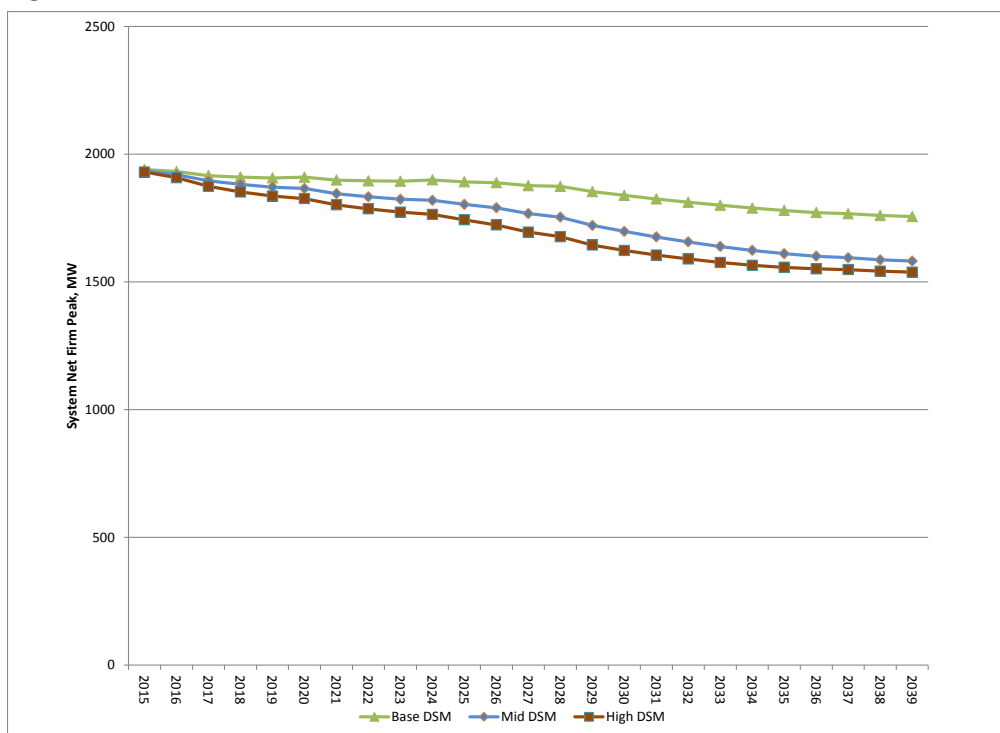
Nearer-term NPV #s for CRP 2-1, 2-17, 5-1 from Slide 26 of NSPI 9/12/2014 tech conf presentation. Mid-DSM #s from Synapse Strategist run.

- Figures 1 and 2 below show the effects of base, mid, and high levels of DSM on NSPI’s base load forecast for system energy and firm peak demand. Higher levels of DSM reduce system energy requirements and lower the projected firm peak demand. The CRPs exhibit different levels of planning reserve margin (seen in Figure 3) in part because of this effect.**

**Figure 1. Net Energy – base load forecast - for 3 different levels of DSM**

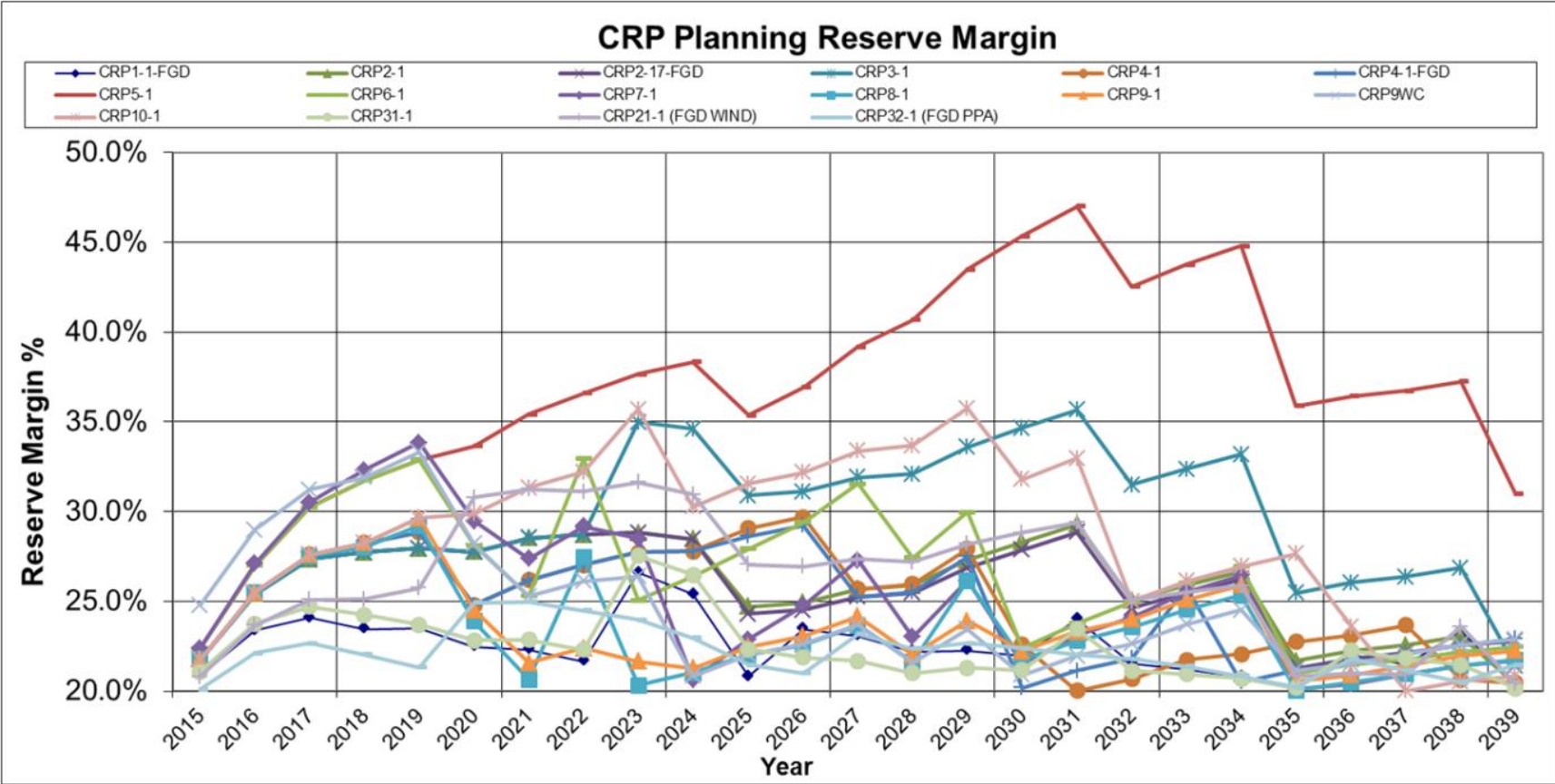


**Figure 2. Net Firm Peak – base load forecast - for 3 different levels of DSM**



Note for Fig. 1 and Fig. 2: System energy trends include “non-firm” PHP paper mill power needs through 2019. The decline in net energy seen from 2020 onward reflects “base” load forecast that assumes that load is no longer on the system. Firm peak trends do not include the peak load contribution from the PHP mill.

Figure 3. Planning Reserve Margin by CRP



Source: NSPI, slide 34, 9/12/2014 technical conference.

4. **Higher DSM plans (CRP 5-1, CRP mid-DSM) may fare better in planning period NPV rank (compared to plans CRP 2-1 and 2-17) than currently seen in the Strategist results if going-forward sustaining capital costs, and thermal plant retirement paths were optimized to reduce planning reserve margin towards levels closer to the required planning reserve margin, compared to those levels seen in Figure 3.**
5. **The incremental value of smaller-scale capacity additions (DR, Mersey increment, wind capacity accreditation) and the potential value of different thermal plant retirement paths are not fully captured in the IRP modeling.**

NSPI states at page 9, “this path [common, no regrets path forward for the Action Plan] requires minimal incremental capital spending for capacity, **while maximizing the lifespan of existing generation assets...**” and at page 58 “The Company believes that **maximizing coal plant life**, not adding incremental variable generation, and a focus on affordability to be a no regrets path and has tried to reflect that in the Action Plan.” [emphasis added]

NSPI, in collaboration with Synapse, constructed three scenarios of retirement dates for thermal plants as an input to Strategist, but no economic assessment was made to determine if such dates were “optimal”. Thus, Synapse is of the opinion that it is incorrect to draw broad conclusions at this time concerning the economically optimal lifespans for the thermal fleet based on the current Strategist results. Since the value of capacity additions from a Mersey capacity increment, demand response, and wind resources also depends on the overall level of system capacity, no conclusions can yet be drawn for the value of capacity increases from these sources, as such an assessment must proceed in tandem with assessing thermal plant retirement paths.

### **Synapse Proposed Action Plan Elements Additional to Those in NSPI’s Draft IRP**

NSPI has adopted many of Synapse’s suggested Action Plan elements, and they are reflected in the Draft IRP Report. The following summarizes the major additional Action Plan elements that Synapse recommends be included in the final action plan:

1. **Obtain DSM resource commitments (annual system energy and peak period capacity reductions) for the 2016-2018 period consistent with the mid-DSM achievable level from the Navigant report.**
2. **Include in NSPI’s continuing thermal generation asset analysis work an assessment of the industry “best practices” as pertaining to sustaining capital investments for applicably-sized systems and generation plant.**
3. **Include in NSPI’s Renewable Resource Actions:**
  - a. During 2015, determine the extent to which ERIS resources can count as capacity towards resource adequacy, and thus determine the appropriate level of capacity contributions from ERIS-interconnected wind plants during winter peak.