Efficiency Nova Scotia Corporation

2013 DSM Plan
NSUARB-E-ENSC-R-12

Before the
Nova Scotia Utility and Review Board

REDACTED
Evidence of Drazen Consulting Group, Inc.

on Behalf of
the Avon Group

DRAZEN CONSULTING GROUP
Energy & Regulatory Economics

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Table of Contents

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Overview

Overview

Q WHAT ARE THE MAIN POINTS AND RECOMMENDATIONS IN THIS EVIDENCE?

A **Impact:** ENSC has proposed a three-year demand-side management (DSM) plan that would cost ratepayers $144 million. Before approving this, the Board should review the impact of the programs. Although DSM is usually considered to be less expensive than adding new resources, that is not always the case. ENSC's own numbers show that the cost-effectiveness of DSM has decreased in the last few years. In the 2006 Summit Blue study, which appears to have formed the basis for DSM plan goals in both the 2007 and 2009 IRPs, the overall TRC ratio was 3.8. It decreased to 2.4 in 2011. The forecast for 2013 is 1.6. NSPI has excess capacity and excess energy capability and a diminished need for new resources in the future. The closing of PM1 at Port Hawkesbury will reduce energy usage by 550 GWh, equal to four years of the DSM goal. NSPI has forecast that general energy usage will decrease by about 400 GWh from 2012 to 2013, which is another three years of the target DSM energy reduction. Both DSM and new renewables are displacing lower-cost fossil generation. The effect, at least over the next several years, is further increases in NSPI's rates. We recommend that the Board direct ENSC and NSPI to provide estimates of the full impact on rates of the DSM programs, not just the surcharges. Until that information is available for review, any multi-year approval should apply only to the measures that are most cost-effective.

Avoided costs: ENSC and the Board should take a harder look at the avoided costs used to measure the benefit of DSM. The avoided costs estimated by NSPI over the past few years have been quite variable. The avoided costs used in this case appear to be overstated and the underlying data show some significant anomalies. NSPI has estimated that the avoided energy cost in 2012 is $75/MWh while in the recent Load Retention proceeding, it said that the avoided energy cost was only $54/MWh. The generating units that are backed down because of DSM have an average running cost of about $57/MWh. If the avoided costs are overstated, then the benefit of DSM is overstated. ENSC has said that it accepts the numbers provided by NSPI. That leaves it up to the Board and intervenors to analyze the reliability of those estimates. Were NSPI to propose investing $144 million in a new generating plant on the basis that it will reduce future generation costs, the Board and other stakeholders would want to be sure that the estimates of future costs are reliable. The same level of scrutiny is appropriate here. We recommend that the Board require NSPI to provide more detail about the assumptions and model runs that are used to estimate avoided costs, and provide it earlier in the process.

Calculated energy savings: Several DSM measures have TRC ratios below 1.0 or only marginally above that breakeven point. With lower avoided costs, they become even less cost-effective. The Board should take into account the directional impact of the "dual baseline" approach to estimating the energy savings from DSM. ENSC is correct that quantifying this requires more study, but the potential effect should be considered now for long-lived measures, especially those with Total Resource Cost (TRC) ratios close to 1.0. The combination of overstated avoided cost and overstated energy savings mean that the cost effectiveness of DSM (TRC ratio) is overstated.

Allocation: The allocation of DSM costs among the rate classes—75% direct assignment and 25% allocation among all classes--was agreed to by the parties in 2009. In late 2011, after conferring with stakeholders, Elenchus Research Associates recommended continuation of this method. We agree. In this case, ENSC has proposed using a similar approach for the "enabling strategies" costs. We recommend that these costs also be subject to a true-up and that ENSC provide documentation of the effectiveness of such programs.

Summary: DSM can be a cost-effective alternative to new supply. But that is true only up to a point. The information in this proceeding suggests that both the avoided costs and DSM-induced energy savings are overstated. Excess DSM, like excess generation supply, raises electric rates unnecessarily.

Reviewing the Goals

Why Review?

Q WHY SHOULD THE DSM PROGRAM BE REVIEWED?

A DSM is based on expectations and assumptions about the future. As conditions change, the original assumptions should be reviewed. The 2006 Summit Blue report stated:

> *It is important to review the level of DSM spending periodically. California calls for a review of DSM spending every three years, Texas requests annual DSM forecast and filings to ensure the 10% of growth is being obtained by the DSM programs offered, and Idaho and British Columbia conduct an IRP update every two years. It is important to update avoided costs used as the benchmark for determining cost effective DSM, and to incorporate any unforecasted events (e.g., the recent rise in the price of natural gas) that might change the economics of DSM versus other resources. (Nova Scotia Power Inc.: DSM Report*, Summer 2006, Page 57)

In the 2010 DSM proceeding, the Board said:

> *Well-intentioned efforts to promote DSM must be subject to critical analysis and planning to ensure that expenditures are justifiable and projected benefits will be realized as, ultimately, the public will pay the bill.* (2010 NSUARB 155, Para. 5, Page 6)

Certainly, conditions have changed. Fuel prices are lower. Load is lower. Prices for energy efficient equipment (e.g., photovoltaic panels and LED light bulbs) are decreasing. There is a large queue of renewable energy projects. This does not mean that no DSM is worthwhile. But it does mean the Board should evaluate how much DSM (and DSM spending) is cost-effective–and how much can Nova Scotia ratepayers afford.

Q PLEASE EXPLAIN YOUR EARLIER COMMENT THAT THE COST-EFFECTIVENESS OF DSM HAS DECREASED.

A The TRC ratio measures the benefit-to-cost relationship. Over the last few years, the overall ratio has decreased:

Table 1

Change in Total TRC Ratio

Year	**TRC Benefit/Cost Ratio**
2006*	3.6-4.1
2007	3.8
2008	6.5
2009	4.7
2010	2.3
2011	2.4
2012	1.9
2013	1.6
2014	1.7
2015	1.7

Sources:
2006: Summit Blue Report.
2007-2015: Annual DSM filings.

Three-Year Proposal

Q WHAT IS ENSC'S PROPOSAL?

A The proposal is for three years, 2013-2015. ENSC has also provided an "Outlook" for the following two years, 2016-2017:

Table 2

ENSC Proposal and Outlook

Year	Investment ($Millions)	Incremental Energy Saving (GWh)	Incremental Demand Saving (MW)	TRC Ratio
Proposed				
2013	$46.2	135.2	25.9	1.6
2014	47.7	137.8	27.0	1.7
2015	50.4	137.8	27.0	1.7
Total	$144.3	410.8	79.8	
Outlook				
2016	$53.9	139.9	27.6	1.7
2017	$55.1	141.7	28.0	1.7

To put this into perspective, the 2009 IRP update anticipated that with DSM savings of 305 GWh in 2013, the 2013 annual energy requirement would be over 12,000 GWh. NSPI's forecast for 2013 is now 10,721 GWh with 135 GWh of savings. The desired reduction in energy use is largely being achieved by economic factors. In its 2013 Rates Application, NSPI states that the decline in the Province's economic climate is expected to cause a 400 GWh reduction in load from the forecast in the 2012 General Rates Application. Without PM1, the load at the Port Hawkesbury paper mill will decreases by 550 GWh per year, assuming that the mill restarts under the requested Load Retention Rate. The cost of DSM, measured as investment dollars per MWh saved, has steadily increased:

Table 3

<u>Forecast 2013 DSM Cost and Saving</u>

	Cost ($Millions)	Incremental Energy Savings (GWh)	Unit Cost $/MWh
2008 Plan	$78.2	371.8	$210
2010 Plan	22.9	82.7	277
2013 Plan	$46.2	135.2	$341

At the same time, the value of DSM, as measured by avoided costs, has been decreasing and will most likely continue to do so. The main reason for this is that for the next several years reductions in load will be met by decreasing output of the fossil-fired plants. Yet another factor that will increase rates is the increasing amount of renewables. The Renewable Energy Administrator is soliciting new supply of 300 GWh per year. Since these projects are effectively “must take” (that is, cannot be dispatched down to meet decreasing load), the overall effect is to increase the proportion of high-cost renewables and reduce the proportion of low-cost fossil generation in the supply mix.

Q WHAT DO YOU RECOMMEND?

A *First*, the Board should not approve the three-year plan proposed by ENSC. At most, it should approve only a portion of that plan, comprising those measures that have the highest value (as measured by the TRC ratio). *Second*, the Board should request ENSC and NSPI to provide a forecast of the overall impact on rates of increasing costs and decreasing usage.

Avoided Cost Estimates

Issues

Q WHAT ARE THE CONCERNS ABOUT THE AVOIDED COST ESTIMATES?

A NSPI's estimates are quite variable from case to case. Next, there is a major difference between the 2012 avoided cost given in this DSM case and the numbers given in both the recent Load Retention Rate case and in the 2012 General Rate Application (GRA). Finally, the data underlying this year's estimate appear to exhibit some anomalies.

Changes From Case to Case

Q HOW HAVE THE AVOIDED COSTS CHANGED OVER TIME?

A The costs presented in DSM applications in the last few years have gone up and down:

Table 4

Avoided Costs Used in DSM Plans

Year	Energy ($/MWh)	Capacity ($/kW/yr)	Combined ($/MWh)
2006	$67	$41	
2008-10	95	63	
2011	166	79	$176
2012	166	79	176
2013	$97	$38	$135

Sources:
2006 Conservation and Energy Efficiency Plan, Page 37.
2008-2010: 2010 Application Exhibit N-7(c) Response to Multeese IR-8.
2011: 2011 DSM Evidence of NSPI, Page 12.
2012: 2011 Application, Response to Multeese IR-2(b).
2013: Derived from Ex. E-14(E) Avon IR-31, Att. 1.

The capacity cost and the long-run levelized cost in Table 4 are affected by assumptions about new capacity additions. For the next few years, though, the only avoided cost is energy generation; NSPI considers that no new capacity is needed at least through 2017. The avoided energy cost is the cost saved by reducing generation at existing units. The calculated energy costs on a year-by-year basis for the years 2012-2017 also show large variability:

Table 5

Avoided Energy Costs Estimated by NSPI ($/MWh)

	Cost Estimate From Proceeding		
	2008-10	**2011**	**2012**
Cost in Year			
2012	[redacted]		
2013			
2014			
2015			
2016			
2017			

Q WHAT IS THE CONCERN ABOUT THE 2012 AVOIDED COST?

A NSPI says that the avoided energy cost is $74.96/MWh. (The avoided capacity cost is zero.) But, the units that are backed off because of DSM all have running costs much less than $74.96/MWh (shown in bold).

Table 6

<u>DSM-Related Generation Redispatch</u>

Unit	Avg. Fuel Cost $/MWh	2012 Generation Without DSM	2012 Generation With DSM	Change
Tufts Cove 1	[redacted]			
Tufts Cove 2				
Tufts Cove 3				
Pt Aconi				
Lingan 1				
Lingan 2				
Lingan 3				
Lingan 4				
Trenton 5				
Trenton 6				
Pt Tupper				
Tufts Cove 6				
Total				

The average cost of the units backed down is $56/MWh (in bold). Adding in the variable non-fuel operating cost gives an avoided cost of about $57/MWh.

The $56-57/MWh avoided cost is consistent with the evidence that NSPI gave in the Load Retention Rate case.

Table 7

Avoided Costs From
<u>LRR Proceeding</u>

Cost in Year	Avoided Costs
2012	$59.5
2013	61.8
2014	63.9
2015	65.1
2016	$65.2

Source: Load Retention Application, Ex. NPB-3, App. C.

The above numbers include some capital cost. In fact, the avoided fuel cost in 2012 was calculated by NSPI to be $53.6/MWh.

Q IN THE LOAD RETENTION RATE PROCEEDING, NSPI STATED THAT THE AVOIDED COSTS FOR THAT PURPOSE WERE BASED ON A SHORTER TERM THAN THE LONG-TERM AVOIDED COSTS USED FOR DSM. DOES THAT EXPLAIN THE DIFFERENCE?

A No, because we are comparing the year-to-year energy-only costs in both cases.

Q IS THE DIFFERENCE EXPLAINED BY THE MAGNITUDE OF THE LOAD REDUCTION?

A No. The running costs of NSPI's base load fossil-fired units that are affected all fall in the range of about $50/MWh to $60/MWh. The most expensive units are Lingan 1 and Trenton 5. NSPI's 2013 GRA shows that Lingan 1 will have generation of [redacted] GWh in 2013 , as compared to the "with DSM" forecast of [redacted] GWh. Lingan 2, which is forecast to have 2013 output of [redacted] GWh in the "with DSM" forecast is now only forecast to have output of [redacted] GWh (a [redacted] capacity factor) in the 2013 GRA.

Another indication of avoided cost is the effect of a load reduction in 2012. In its Fuel Update evidence in the 2102 Rates Application, NSPI reduced its load forecast for its general customer base (that is, aside from the paper mill shutdown).

> *NSPI's 2012 load forecast has decreased 230 GWh resulting in forecasted fuel savings of $10.7 million. This savings in fuel expense is based on the assumption that the generation reduction would come from Lingan, as it is the marginal unit for the majority of the year.* (Appendix A, Page 1 of 3, [Non-confidential])

A cost reduction of $10.7 million for a load reduction of 230 GWh gives a cost of $46.5/MWh.

In summary, NSPI's estimated 2012 avoided energy cost appears too high.

Q WOULD THE CHANGE IN UNIT LOADING CHANGE HEAT RATES ENOUGH TO ACCOUNT FOR THE DIFFERENCE?

A That is unlikely. Schedule 1 shows that unit average heat rates change very little even when loading changes by large amounts.

Questions About the Latest Estimates

Q WHAT ARE THE ANOMALIES THAT YOU IDENTIFIED IN THE AVOIDED COST BACKUP DATA?

A One is a mismatch between the reduction in load from DSM and the forecast generation. Avon's Information Request 31 asked for the change in output, fuel cost and operating cost of each unit. The response provided information only on the fossil fuel units. The implication is that only the supply from fossil units changed. This does not appear to be the case. Schedules 2-12 summarize the information provided. This includes generation, capacity factor, fuel cost, fuel cost per MWh, operation and maintenance cost in the "without DSM" and "with DSM" cases. Comparing the change in load with the change in generation output gives an odd result:

Table 8

Effect of DSM on Generation and Load

Year	Generation Reduction	DSM Load Reduction	Difference
2012	[redacted]	135	[redacted]
2013		260	
2014		394	
2015		528	
2016		677	
2017		816	
2018		960	

For 2012 through 2014, the reduction in fossil plant output matches the reduction in load due to DSM. In 2015, however, the load reduction is [redacted] more than the reduction in fossil generation. This must mean that other supply resources are being backed down—or, that NSPI plans to sell that power off-system.

Note that on Table 5 we see that the avoided energy cost jumps from [redacted]/MWh in 2014 to [redacted]/MWh in 2015. This may be related to the mismatch between load reduction and generation reduction in 2015 shown in Table 8.

Reflect the Current Environment

Q HOW SHOULD AVOIDED COST CALCULATIONS BE MODIFIED TO REFLECT LOAD RETENTION RATE LOADS?

A Avoided costs should be measured from the level of system load without the LR customers. The avoided cost estimate provided in this proceeding is based on an increment above the total load including the Bowater load and NPPH operating with one paper machine. The application in the PWCC LRR proceeding proposes that NPPH effectively pay the real time incremental cost of generation. Given this proposed treatment, the NPPH load should not be included in the total load against which avoided costs are evaluated. Evaluating avoided costs from this lower load level will likely result in lower estimated avoided costs.

Summary

Q PLEASE SUMMARIZE THE CONCERNS ABOUT NSPI'S ESTIMATES OF AVOIDED COSTS.

A Over the last couple of years, we have seen that the outputs of the Strategist model vary widely from case to case. Part of this is due to changes in fuel cost. Part of it may be due to changes in the load forecast. However, without getting more detail about the assumptions and inputs into the Strategist runs, there is no way to tell what causes the variations. But the simple fact is that the variations raise questions about the reliability. All forecasts are subject to variation as conditions change. That is itself a reason for concern. ENSC proposes to spend hundreds of millions of dollars based on these forecasts. From the little information we have, there is reason to believe that the forecast costs are overstated and that, therefore, those investments might turn out to be uneconomic.

Q DO THESE ISSUES JUST AFFECT DSM?

A No. The impact is broader. Several proceedings affect NSPI rates and must consider the same information: This DSM application; the recent Load Retention rate application; the new PWCC load retention application; NSPI's Integrated Resource Plan; applications for approval of new renewable energy projects; Annual Capital Expenditure applications; the 2013 Rates Application and future ones; and Fuel Adjustment Mechanism proceedings. All of these will determine costs to be incurred, which will affect rates in the short run and in the long run. At the very least, the information that is common to these applications should be consistent. It should also be reliable. Many of the issues are related to expectations about future cost. Even though forecasting future rates is not a common procedure, it would be useful for ratepayers to have some idea of what lies ahead. In fact, if ratepayers are aware of likely future increases, they may be more motivated to look for energy-saving opportunities on their own.

Q WHAT IS YOUR RECOMMENDATION?

A ENSC has stated that it does not analyze or verify the avoided cost estimates provided by NSPI (Response to Avon IR-8(a)). That leaves it to the Board and intervenors to do that analysis. In fact, even if ENSC did its own analysis, in the end it is the ratepayers who will bear the cost and should have more insight into the development of the avoided cost numbers. NSPI should be directed to provide much more information about the forecasts, the assumptions that went into them, and the potential for variability.

Marginal DSM Measures

Issues

Q WHAT ARE THE ISSUES REGARDING THE SAVINGS FROM DSM?

A One is that some DSM measures are uneconomic or are only marginal. The other is that calculated energy savings would be lower if the "dual baseline" effect is considered.

Uneconomic DSM

Q WHAT DO YOU MEAN BY "UNECONOMIC" DSM MEASURES?

A These are DSM measures that have TRC ratios below 1.0 or only slightly higher than 1.0. A TRC below 1.0 means that a measure is not itself cost-effective. A TRC only slightly above 1.0 (say, up to 1.3) would not be cost-effective if avoided costs are lower than assumed and/or the dual baseline measurement gives a lower amount of energy saving.

ENSC has argued that some of these measures are an integral part of a package and without them the overall program may not be as successful. That may be true in some cases. ENSC should demonstrate the need to include them. Plus, the Board and ratepayers should be aware of the cost they impose.

Q PLEASE GIVE SOME EXAMPLES.

A The most obvious program is the "Solar Hot Water Heater, replacing electric water heater" measure. It has a TRC ratio of 0.5 with the avoided costs as applied for. This program on its own has a negative "benefit" of almost $1 million per year. The low income renovation retrofit measures have a negative "benefit" of almost $600 thousand per year.

Table 9

Measures with Negative Net Benefits

Program	Measure	TRC Costs (000)	TRC Net Benefit ($000)	TRC Ratio
Residential–existing houses	Solar Hot Water Heater, replacing electric water heater (Table 2.1)	$1,633	-$893	0.5
Residential–Low Income	Retrofit Envelope Measures, Levels 1 to 6 (Table 2.1)	$2,323	-$586	0.7

Q WHAT IS THE IMPACT OF LOWER AVOIDED COSTS ON THE TRC BENEFIT/COST RATIOS FOR THE PROPOSED DSM PROGRAMS?

A Lower avoided costs lead to a reduction the TRC benefit/cost ratios. Reducing the energy-related avoided costs for only the years 2012 to 2016 to the values utilized in the recent LRR proceeding reduces the overall TRC benefit/cost ratio from 1.6 to 1.4 for 2013 and from 1.7 to 1.5 for 2014.

Reducing the energy-related avoided costs for only the years 2012 to 2021 to the average avoided fuel plus O&M cost for the NSPI owned thermal units reduces the overall TRC benefit/cost ratio for the total DSM program from 1.6 to 1.2 for 2013 and from 1.7 to 1.3 for 2014.

Q WHAT IS THE IMPACT OF LOWER AVOIDED COSTS ON THE TRC BENEFIT/COST RATIOS OF SPECIFIC DSM MEASURES?

A Reducing the energy-related avoided costs for only the years 2012 to 2021 reduces the TRC benefit/cost ratio for the program “Power Bar with Timer” from 0.9 to 0.7 and reduces the TRC ratio for Refrigerator Recycling and Freezer Recycling from 1.6 and 1.2, respectively, to 1.1 and 1.0. These three programs amount to roughly two-thirds of the Residential Efficient Products program.

Table 10

TRC Benefit/Cost Ratio
with Change in Avoided Costs

Program	Measure	TRC Costs ($000)	TRC Ratio As Filed	TRC Ratio Revised
Residential – Efficient Products	Power Bar With Timer	$275 (Table 1)	0.9	0.7
Residential – Efficient Products	Refrigerator Recycling	2,055 (Table 1)	1.6	1.1
Residential – Efficient Products	Freezer Recycling	$732 (Table 1)	1.2	1.0

The change in avoided costs also reduces the overall TRC benefit/cost ratio of the Residential Existing Home and Residential Low Income programs to less than 1.0. These programs have total costs in excess of $12 million.

Q ARE YOU AWARE THAT IN THE PREVIOUS DSM CASE THE BOARD ACCEPTED ENSC’S PROPOSAL TO APPLY THE TRC TEST AT THE PROGRAM LEVEL, NOT AT THE MEASURED LEVEL?

A Yes. That can be appropriate for measures that are necessarily part of a package. However, measures that are separable should be considered individually. If the amounts involved are small, it probably does not make much difference. However, spending $1.6 million on solar hot water heating, with a TRC of 0.5, does not seem like a good use of ratepayers' money.

Dual Baseline Effect

Q WHAT IS THE DUAL BASELINE EFFECT?

A Current "single baseline" calculations assume that the total energy savings from replacing equipment is the annual saving times the life of the new equipment. Dual baseline calculations recognize that some existing equipment will be replaced before the effective useful life of the replacement. The annual saving after replacement will likely be lower because the replacement equipment will be more efficient anyway. This also applies to items where the life of the more efficient product is much longer than the product being replaced. For example, ENSC uses a 10-year life for a compact fluorescent light (CFL), as compared to one year for an incandescent bulb. By adding up 10 years of savings, ENSC implicitly assumes that absent the incentive, the user will replace the incandescent bulb with another incandescent bulb nine times.

Q CAN THE DUAL BASELINE APPROACH BE IMPLEMENTED AT THIS TIME?

A Not precisely, but it is still worth considering the directional effect and estimating the magnitude.

Allocation of DSM Costs

Allocation of Program Costs

Q DO YOU SUPPORT THE ALLOCATION OF PROGRAM COSTS USED BY ENSC?

A Yes. 75% of these costs are directly assigned to the classes receiving the program dollars; the other 25% is allocated among all classes (except load retention customers) on the same basis as generation investment. This 75/25 split was an agreement among all the parties. Our analysis at the time shows that this was a reasonable method of allocating the costs in that no class is made worse off by DSM. Last Fall, after conferring with stakeholders, Elenchus Research Associates recommended continuation of this method. We agree.

Allocation of Enabling Strategies Costs

Q HOW HAS ENSC PROPOSED TO ALLOCATE THE COST OF ENABLING STRATEGIES?

A Heretofore, these costs have been allocated on the basis of the number of customers. Elenchus has recommended that they be allocated in a fashion similar to program costs. We agree with this, too. We also recommend that these costs be subject to true-up and that ENSC provide documentation of the effectiveness of such activities.

Q DOES THAT CONCLUDE YOUR EVIDENCE AT THIS TIME?

A Yes, it does.

EFFICIENCY NOVA SCOTIA CORPORATION

NSPI Generation Unit Loading and Heat Rate

		Generation (MWh)			Avg. Heat Rate		
		2012 GRA	GRA Fuel		2012 GRA	GRA Fuel	
Line	**Unit**	**Filing**	**Update**	**Change**	**Filing**	**Update**	**Change**
		(1)	(2)	(3)	(4)	(5)	(6)
1	Tufts Cove 1	[redacted]					
2	Tufts Cove 2						
3	Tufts Cove 3						
4	Pt Aconi						
5	Lingan 1						
6	Lingan 2						
7	Lingan 3						
8	Lingan 4						
9	Trenton 5						
10	Trenton 6						
11	Pt Tupper						
12	Tufts Cove 6						
13	Total	10,161,400	9,824,300				

Schedule 2

ENERGY NOVA SCOTIA CORPORATION

Generation - Without DSM (GWh)

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280 2022	CC150 2026	CC150 2027	CC280 2031	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
2012	[redacted]																	
2013																		
2014																		
2015																		
2016																		
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2029																		
2030																		
2031																		
2032																		

Source: Avon IR-31 CONFIDENTIAL Attachment 4, Page 1

Generation Without DSM

Schedule 3

ENERGY NOVA SCOTIA CORPORATION

Generation Capacity Factor - Without DSM

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280 2022	CC150 2026	CC150 2027	CC280 2031
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Cap'y	[redacted]																
2012	[redacted]																
2013	[redacted]																
2014	[redacted]																
2015	[redacted]																
2016	[redacted]																
2017	[redacted]																
2018	[redacted]																
2019	[redacted]																
2020	[redacted]																
2021	[redacted]																
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2023	[redacted]																
2024	[redacted]																
2025	[redacted]																
2026	[redacted]																
2027	[redacted]																
2028	[redacted]																
2029	[redacted]																
2030	[redacted]																
2031	[redacted]																
2032	[redacted]																

Schedule 4

ENERGY NOVA SCOTIA CORPORATION

Generation Fuel Cost - Without DSM ($000)

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280 2022	CC150 2026	CC150 2027	CC280 2031	Total	GWh	$/MWh
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2012	[redacted]																			
2013																				
2014																				
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2030																				
2031																				
2032																				

Source: Avon IR-31 CONFIDENTIAL Attachment 4, Page 2

Schedule 5

ENERGY NOVA SCOTIA CORPORATION

Generation O&M - Without DSM ($000)

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280 2022	CC150 2026	CC150 2027	CC280 2031	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
2012	[redacted]																	
2013																		
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2031																		
2032																		

Source: Avon IR-31 CONFIDENTIAL Attachment 4, Page 3

Schedule 6

ENERGY NOVA SCOTIA CORPORATION

Generation Fuel Cost - Without DSM ($/MWh)

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280 2022	CC150 2026	CC150 2027	CC280 2031
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
2012	[redacted]																
2013																	
2014																	
2015																	
2016																	
2017																	
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2030																	
2031																	
2032																	

NA - Means that generation is zero

Schedule 7

ENERGY NOVA SCOTIA CORPORATION

Generation - With DSM (GWh)

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280	CC150	CC150	CC280	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Cap'y	81	93	147	171	153	153	158	153	149	157	152	147	222	280				
2012	[redacted]																	
2013																		
2014																		
2015																		
2016																		
2017																		
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2031																		
2032																		

Source: Avon IR-31 CONFIDENTIAL Attachment 3, Page 1

Generation with DSM

Schedule 8

ENERGY NOVA SCOTIA CORPORATION

Generation Capacity Factor - With DSM

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Cap'y	81	93	147	171	153	153	158	153	149	157	152	147	222	280
2012	[redacted]													
2013	[redacted]													
2014	[redacted]													
2015	[redacted]													
2016	[redacted]													
2017	[redacted]													
2018	[redacted]													
2019	[redacted]													
2020	[redacted]													
2021	[redacted]													
2022	[redacted]													
2023	[redacted]													
2024	[redacted]													
2025	[redacted]													
2026	[redacted]													
2027	[redacted]													
2028	[redacted]													
2029	[redacted]													
2030	[redacted]													
2031	[redacted]													
2032	[redacted]													

ENERGY NOVA SCOTIA CORPORATION

Generation Fuel Cost - With DSM ($000)

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280	CC150	CC150	CC280	Total	GWh	$/MWh
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2012	[redacted]																			
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2032																				

Source: Avon IR-31 CONFIDENTIAL Attachment 3, Page 2

ENERGY NOVA SCOTIA CORPORATION

Generation O&M - With DSM ($000)

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280	CC150	CC150	CC280	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
2012	[redacted]																	
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2030																		
2031																		
2032																		

Source: Avon IR-31 CONFIDENTIAL Attachment 3, Page 3

Generation O&M Costs With DSM

Schedule 11

ENERGY NOVA SCOTIA CORPORATION

Generation Fuel Cost - With DSM ($/MWh)

Year	TC 1 (1)	TC 2 (2)	TC 3 (3)	Pt Aconi (4)	Ling 1 (5)	Ling 2 (6)	Ling 3 (7)	Ling 4 (8)	Tren 5 (9)	Tren 6 (10)	Tupper (11)	TC 6 (12)	TCs (13)	CC 280 (14)
2012	[redacted]													
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2030														
2031														
2032														

Gen Fuel Cost per MWh With DSM

Schedule 12

ENERGY NOVA SCOTIA CORPORATION

Changes in Generation From DSM Plan

Year	TC 1	TC 2	TC 3	Pt Aconi	Ling 1	Ling 2	Ling 3	Ling 4	Tren 5	Tren 6	Tupper	TC 6	CTs	CC 280 2022	CC150 2026	CC150 2027	CC280 2031	Total	DSM Profile	Diff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
2012	[redacted]																			
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Change in Generation With DSM