

Multeese Consulting Incorporated

**IN THE MATTER OF THE PUBLIC UTILITIES ACT, R.S.N.S 1989, c380, AS
AMENDED**

And

**IN THE MATTER OF AN APPLICATION BY EFFICIENCY NOVA SCOTIA
CORPORATION FOR APPROVAL OF ITS ELECTRICITY DEMAND SIDE
MANAGEMENT PLAN FOR 2012**

DIRECT EVIDENCE OF MEL WHALEN, P.ENG.

April 8, 2011

1 **MR. WHALEN, WOULD YOU PLEASE INTRODUCE YOURSELF?**

2
3 My name is Melvin E. Whalen. I am President of Multeese Consulting Incorporated. I am
4 a Professional Engineer, registered in the Province of Nova Scotia. I graduated from
5 Nova Scotia Technical College in 1970 with a Bachelor of Engineering (Electrical), and
6 from University New Brunswick in 1972 with a Master of Engineering in power systems.

7
8 Prior to establishing Multeese Consulting, I was employed by Nova Scotia Power, the
9 National Energy Board, and Bowater Power Company. Broadly speaking, my
10 responsibilities for each of these employers were of a planning nature, focused on topics
11 such as load research and forecasting, integrated resource planning, economic and
12 financial analysis, operational issues, cost of service studies and rate design. During the
13 last ten years of my employment with Nova Scotia Power, I was NSPI's principal witness
14 on cost of service and rate design issues.

15
16 I have presented testimony before this Board on behalf of Board counsel in General Rate
17 Applications by Halifax Regional Water Commission and Heritage Gas. I have also
18 provided consulting services to Board counsel in matters related to Nova Scotia Power in
19 the areas of Integrated Resource Planning (IRP), Demand Side Management (DSM), Fuel
20 Adjustment Mechanism (FAM), General Rate Applications, the Annual Capital
21 Expenditure Plan and the development of Top Up & Spill Tariffs.

22
23 **WHAT IS YOUR ROLE IN THIS HEARING?**

24
25 I was engaged by Board counsel to provide a review of Efficiency Nova Scotia
26 Corporation's (ENSC's) 2012 DSM proposal.

27
28 **ARE THERE OTHERS WHO ARE PARTICIPATING IN THIS REVIEW ON**
29 **BEHALF OF BOARD COUNSEL?**

1 Yes. Mr. Tim Woolf, Vice President, Synapse Energy Economics Inc. is providing
2 testimony on the pace at which ENSC is implementing the energy efficiency programs
3 over time.
4

5 **WHAT ARE YOUR CONCLUSIONS?**
6

7 My conclusions are as follows:

- 8 a) With the exception of one new program and the addition of new enabling
9 strategies, the DSM programs proposed for 2012 are expanded continuations of
10 programs previously approved by the Board for 2008, 2009, 2010 and 2011. The
11 additions and expansions of programs reflect ENSC's experience to date as well
12 as ENSC's consultation with experts. They should be approved.
- 13 b) Notwithstanding a), the energy savings proposed to come from ENSC's programs
14 in 2012 are lower than the program savings in 2011. The 2012 Plan should be
15 adjusted to address this before it is approved.
- 16 c) The savings from large industrials and from the introduction of codes and
17 standards are appropriately estimated. Their inclusion in the 2012 Plan is
18 consistent with the IRP and should be approved.
- 19 d) The avoided costs associated with DSM in this Application are the same avoided
20 costs that were used by NSPI to assess the 2011 DSM programs, and they are
21 being applied in the same manner. As discussed in my testimony in that
22 proceeding, this is an appropriate, but conservative approach.
- 23 e) ENSC's proposal to apply the TRC at the program, rather than measure, level and
24 the inclusion of the PAC as an additional program assessment tool are consistent
25 with practice in many other jurisdictions and should be approved.
- 26 f) ENSC's proposal to engage stakeholders in discussion of possible alternative
27 regulatory models is sound and should proceed, subject to confirmation that the
28 Board can accept a performance based model.
- 29 g) The 2008, 2009 and 2010 DSM program processes and impacts have been
30 evaluated and verified by independent experts. Recommendations from those
31 reviews have been, or are being, implemented to improve program effectiveness.

- 1 h) ENSC has taken steps to ensure that costs of electric DSM programs are
2 segregated from the costs of non-electric DSM programs and that common costs
3 are appropriately shared. A methodology will be submitted to the Board for
4 approval later in 2011, so no action is required at this time.
- 5 i) ENSC's proposal to consult stakeholders in 2011 on the development of an
6 effective stakeholder process, including a review of the PDWG, is appropriate.

7
8 The basis for each of these conclusions is addressed in the remainder of my evidence.
9

10 **PLEASE DISCUSS YOUR CONCLUSIONS WITH RESPECT TO THE**
11 **PACKAGE OF DSM PROGRAMS PROPOSED FOR 2012.**
12

13 In its Decision of July 27, 2010, the Board approved the following programs for 2011¹:

- 14 • Residential Efficient Products
15 • EnerGuide for Existing Homes
16 • Low Income Program
17 • EnerGuide for New Homes
18 • Small Business Direct Install Lighting Program
19 • Commercial & Industrial Custom Program
20 • Commercial & Industrial Prescriptive Rebate Program
21 • Education and Outreach Program
22 • Development and Research program.
23

24 The DSM package of programs proposed by ENSC for 2012 appears to be very similar to
25 these programs, except for four changes:

- 26 a) The Low Income Program has been subsumed into other programs.
27 b) A new Home Energy Report program has been added.
28 c) The Education and Outreach program and the Development and Research
29 program have been classified as "Enabling Strategies" (rather than "Multi Sector")
30 and a new "Other Enabling Strategies" has been added.

¹ Appendix B of Board Decision dated July 27, 2010.

1 d) The names of some programs have changed slightly.

2
3 The DSM package proposed by the Corporation for 2012 contains the following
4 programs:

- 5 • Efficient Products
- 6 • Existing Houses
- 7 • New Houses
- 8 • Home Energy Report
- 9 • Prescriptive Rebate
- 10 • Custom
- 11 • Small Business Direct Install
- 12 • Education and Outreach Program
- 13 • Development and Research program.
- 14 • Other Enabling Strategies

15
16 In addition to the changes that are apparent from the comparison above, a number of the
17 programs also include new components to make them more effective². These include
18 components for renters, financing options, fuel substitution options and the use of key
19 account managers and sector specialists to enhance program delivery to commercial,
20 industrial and institutional customers. These reflect practices of leading DSM
21 practitioners across North America, advice and assistance from Navigant Consulting Inc.
22 (Navigant) and Dunskey Energy Consulting (Dunskey), and input from stakeholders in
23 Nova Scotia.

24
25 All of these changes are appropriate, reflecting the experience and best practices of others
26 in the successful delivery of DSM programs.

27
28 The inclusion of the Low Income program within other programs warrants elaboration.
29 As explained in ENSC (Mulleese) IR-17, this is being done to recognize that the suite of
30 programs being offered to low income households is expanding and including those

² ENSC Evidence, page 5, lines 1 – 14.

households within the programs, rather than breaking out portions of the programs and identifying them as “low income”, provides for improved marketing and delivery. It should be noted, however, that ENSC will continue to track and report the low income component of these programs.

DO YOU HAVE ANY CONCERNS WITH THE PROPOSED PACKAGE?

Yes. The package, as proposed, is expected to deliver lower energy and demand savings than those approved by the Board for 2011, as shown in the following Table 1.

Table 1 – Comparison of DSM Program Results, 2008-09 to 2012³				
	2008-09	2010	2011	2012
Expenditures (\$M)	11.8	22.7	41.9	43.7
Energy Savings (Gwh)	85.8	82.5	158.5	124.1
Demand Savings (MW)	14.9	15.9	30.9	23.2
Kwh Saved Per \$ Invested	7.27	3.63	3.78	2.84

As shown in Table 1, from 2008/09 to 2011, expenditures, energy savings and demand savings were increasing significantly each year. The decreases in 2012 savings seem to be a somewhat regressive step. ENSC’s investment is increasing only 4.3% relative to 2011, despite an expectation that each dollar invested will yield 25% fewer Kwh saved.

WHY IS ENSC TARGETING LOWER SAVINGS FROM ITS 2012 PROGRAMS AND PROPOSING TO HOLD 2012 SPENDING CLOSE TO 2011 LEVELS?

³ Results prior to 2011 are verified results. The 2011 plan is as approved by the UARB, July 27, 2010.

1 The lower savings result from at least three considerations:

- 2 a) The cumulative DSM savings in the IRP are assumed to be the appropriate guide
- 3 to the level of savings to target.
- 4 b) The IRP DSM targets include energy and demand savings from programs such as
- 5 those proposed by ENSC, savings from third parties such as large industrial
- 6 customers, and savings from legislated codes and standards.
- 7 c) The lower spending levels minimize increased charges to ratepayers⁴.

8
9 In the 2009 IRP, the cumulative DSM savings to the end of 2012 were 500 Gwh and 101
10 MW and the cumulative DSM expenditures were \$137 million. As can be derived from
11 Table 1, by the end of 2011, savings from DSM programs will have accumulated to 326.8
12 Gwh and 61.7 MW, and spending will have accumulated to \$76.4 million. This means
13 that to meet all IRP targets, the 2012 plan should have savings of 173.2 Gwh and 39.3
14 MW, with expenditures of \$60.6 million.

15
16 For 2012, ENSC has identified savings from large industrial customers of 80 Gwh and 12
17 MW, and savings from legislated codes of 10 Gwh and 2.7 MW. This means that to meet
18 the IRP cumulative target, ENSC programs need to achieve only 83.2 Gwh⁵ and 24.6
19 MW⁶ in 2012. These lower savings requirements allow ENSC to reduce its savings
20 targets, and associated expenditures.

21
22 ENSC's proposed plan for 2012 will result in cumulative energy savings of 541 Gwh⁷.
23 This is above the IRP target of 500 Gwh for 2012. It will provide a cumulative demand
24 saving of 99.6MW, which is slightly below the cumulative IRP target.

25
26 **HAS ENSC INVESTIGATED DSM PLANS FOR 2012 THAT ADDRESS THE**
27 **ENERGY SAVINGS DROP IN 2012 RELATIVE TO 2011?**
28

⁴ ENSC (Multeese) IR-4(c).

⁵ 173.2 Gwh - 80Gwh - 10 Gwh.

⁶ 39.2MW - 12MW - 2.7MW.

⁷ Cumulative to 2011 from Table 1, plus ENSC plan excluding overachievements in 2008-09, since these are already accounted for in Table 1.

Yes. Two alternate plans are provided in ENSC (Multeese) IR-4(f); one that matches the energy savings in the 2011 plan, and one that provides 10% more energy savings than the 2011 plan⁸. The salient features of these plans are summarized in Tables 2, 3, 4 and 5. Table 2 compares the investments in each plan. Tables 3 and 4 compare the energy and demand savings from the ENSC programs only⁹. Table 5 compares the Kwh of energy saved per dollar invested.

Table 2 – Comparison of Alternate DSM Plans Investment Levels (\$M)			
	ENSC Proposed Plan	Plan Matching 2011 Energy Savings	Plan Providing 10% More Energy Saving Than 2011
Enabling Strategies	5.0	5.0	5.0
Residential	18.9	22.5	24.7
C & I	19.7	25.9	28.3
Total	43.7	53.4	58.0

Table 3 – Comparison of Alternate DSM Plans Energy Savings (Gwh)			
	ENSC Proposed Plan	Plan Matching 2011 Energy Savings	Plan Providing 10% More Energy Saving Than 2011
Enabling Strategies	N/A	N/A	N/A
Residential	50.1	60.8	67.1
C & I	74.1	97.8	107.6
Total	124.2	158.6	174.7

⁸ Prior to the inclusion of savings from large industrials, ENSC had prepared a similar preliminary plan, as provided in ENSC (EAC) IR-22. It included energy savings of approximately 175 Gwh at an investment of \$56.1 million.

⁹ As presented in the IR response, all plans also show the carryover from 2008/09, the savings from large industrial DSM and the savings from Codes. The magnitudes of these savings are the same in all plans. They are not shown here.

Table 4 – Comparison of Alternate DSM Plans Demand Savings (MW)			
	ENSC Proposed Plan	Plan Matching 2011 Energy Savings	Plan Providing 10% More Energy Saving Than 2011
Enabling Strategies	N/A	N/A	N/A
Residential	11.3	13.7	15.2
C & I	11.9	15.7	17.2
Total	23.2	29.4	32.4

Table 5 – Comparison of Alternate DSM Plans Kwh Saved Per \$			
	ENSC Proposed Plan	Plan Matching 2011 Energy Savings	Plan Providing 10% More Energy Saving Than 2011
Enabling Strategies	N/A	N/A	N/A
Residential	2.65	2.70	2.72
C & I	3.76	3.78	3.80
Total	2.84	2.97	3.01

Three other points should be noted:

- a) These tables do not show comparisons on a program level. Such a comparison was done, however. It shows that in moving from the ENSC proposed plan to the alternative plans, investment levels and savings are increased across all programs except the New Houses program.
- b) The average costs of all three plans on a \$/Mwh basis are within about six percent of each other, with the lowest average cost being the plan that provides 10% more savings than the 2011 plan.
- c) All three plans have TRC's of approximately 2.0 and PAC's of approximately 3.0.

WHAT ARE YOUR RECOMMENDATIONS FOR THE 2012 PACKAGE?

1 I would recommend that ENSC adjust its plan to provide energy savings from its
2 programs that are at least equal to the 2011 plan. Such an approach sustains the
3 momentum of the 2011 plan and makes the achievement of the 2013 savings targets more
4 achievable. If ENSC were to achieve 158.5 Gwh of energy savings from its programs
5 (i.e., the same as 2011), the step required to get to 2013 from 2012 will be about 230
6 Gwh¹⁰. This drops to about 214 Gwh if ENSC were to go for a 2012 target that is 10%
7 greater than 2011. The 230 Gwh is comparable to ENSC's 2012 proposal¹¹, and should
8 be achievable if, as anticipated, some portion of this increment can be supplied by third
9 parties or from codes and standards (above and beyond what is included in 2012)¹².

10
11 **DO YOU HAVE ANY COMMENTS ON THE ENERGY SAVINGS FROM**
12 **LARGE INDUSTRIALS AND CODES?**

13
14 Yes. The savings from the industrials shown in the 2012 plan are based on a preliminary
15 review conducted for ENSC by Energy Performance Services (EPS/Canada) Inc. That
16 review is provided in ENSC (Multeese) IR-8. Table 2 of that review estimates savings of
17 124.5 Gwh, but EPS notes that "to obtain a greater level of validation of these and future
18 projects, ENSC and/or evaluation and verification consultants will need to obtain more
19 comprehensive data from NPPH and apply a more formalized Measurement and
20 Verification (M&V) process to be established with the ELI class." Based on these
21 findings, the savings shown in the 2012 plan are conservatively estimated at 80 Gwh.
22 ENSC plans to pursue the more formal M&V process in 2011 and any adjustments to the
23 80 Gwh will occur in the 2013 plan. I agree with this approach.

24
25 With respect to energy savings from Codes, ENSC's estimate of 10 Gwh is based on the
26 implementation of two Codes, the Residential New Construction Code, which has been in
27 place since January, 2010, and the Federal Standard for General-Service Lamps which
28 becomes effective in January, 2012. The effects of these, plus the effects of other

¹⁰ IRP target for 2013 is 805 Gwh. Deducting cumulative 2008-11 savings from Table 1 and 158.5 Gwh (ENSC) and 90 Gwh (Industrials + Codes) for 2012 leaves a balance of 230 Gwh.

¹¹ 233.6 Gwh as per Figure 5.1 of ENSC's Evidence.

¹² The ELI and Code incremental contributions in 2013 could be 45Gwh and 25 Gwh respectively based on ENSC (Multeese) IR-8 and ENSC (Multeese) IR-6.

1 anticipated Codes, were assessed by Dunskey as provided in ENSC (Multeese) IR-6. As
2 shown in that assessment, Code changes are expected to provide significant savings over
3 time. For 2012, the estimated cumulative savings are 21.8 Gwh. Recognizing
4 uncertainties, particularly with respect to the Federal standard which begins in 2012,
5 ENSC has conservatively chosen to show only 10 Gwh in its 2012 plan. I support this
6 approach.

7
8 **ENSC IS PROPOSING CHANGES TO ITS ASSESSMENT OF DSM**
9 **OPPORTUNITIES. DO YOU HAVE ANY COMMENTS ON THOSE?**

10
11 Yes, I do. For a number of years, DSM in Nova Scotia has been assessed economically
12 using the TRC Test. The most recent review of this approach occurred in 2009, where the
13 question related to the application of the test, rather than to the test itself. In its August 4,
14 2009 Decision, the Board found that “any activity in the program, which, by itself, has a
15 TRC ratio less than one should only be undertaken if its elimination jeopardizes the
16 whole program”¹³. For 2012, ENSC is requesting approval to modify this approach and
17 apply the TRC test at a program rather than an individual measure level. It has also
18 introduced an additional assessment known as the Program Administrator Cost test
19 (PAC).

20
21 The difference between the TRC and the PAC is that the TRC considers the benefits of a
22 DSM measure or program in relation to its total cost, regardless of who pays that cost,
23 whereas the PAC considers the benefits of the DSM program or measure in relation to its
24 cost to the DSM administrator. This difference can be seen in the formulae that describe
25 them:

- 26
27 • $TRC = \frac{\text{Present Worth of costs avoided by the DSM measure (or program)}}{\text{total cost of the DSM measure (or program), including both ENSC's cost and the participants' costs.}}$
28
29
30

¹³ NSUARB-NSPI-P-884(2), Paragraph 36.

- 1 • PAC = Present Worth of costs avoided by the DSM measure (or program)
2 divided by only ENSC's cost.

3

4 In each of these tests, the numerator is the avoided costs of the DSM. For 2012, ENSC
5 has used the same avoided costs as in 2011 and has applied them in the same manner¹⁴,
6 which, as noted in my testimony provided in relation to that Hearing¹⁵, is a conservative
7 approach.

8

9 The evaluation of DSM has been multi-faceted since DSM began to be considered as an
10 alternative to supply side options some thirty years ago and it continues to evolve. As
11 noted by Dunskey in Appendix C, the seminal reference with respect to the question is the
12 California Standard Practice Manual of the mid-eighties. That Manual identified several
13 tests that assessed DSM from different perspectives. These included the Participant Test,
14 the Utility Cost Test (which has been renamed the Program Administrator Cost Test), the
15 Rate Impact Measure Test, the Total Resource Cost Test and the Societal Cost Test.
16 Currently the most common test being used in North America appears to be some form of
17 the Total Resource Cost (TRC) Test as documented in ENSC (Mulleese) IR-26, with the
18 Program Administrator Cost (PAC) Test becoming more prominent because of emerging
19 concerns related to the TRC.

20

21 I support ENSC's proposal to apply the TRC at the program level beginning in 2012.

22 There are several reasons why I believe this is appropriate:

- 23 a) None of these tests provides a complete answer and the application of any of them
24 requires some judgment.
- 25 b) ENSC's proposal to apply the TRC at the program level rather than at the measure
26 level is consistent with experience across North America, as documented in
27 ENSC (NPB) IR-3(a).
- 28 c) As noted earlier, ENSC's application of avoided costs in the TRC is somewhat
29 conservative, resulting in conservative TRC estimates.

¹⁴ ENSC (Mulleese) IR-5.

¹⁵ NSUARB-NSPI-P-884(3)

- 1 d) ENSC and its predecessor, NSPI, have accumulated significantly more experience
2 in the delivery of DSM and have a much better understanding of the factors that
3 can influence customers to participate in DSM programs.
- 4 e) New research is emerging on the shortcomings of the TRC and the potential for
5 unintended outcomes¹⁶.
- 6 f) The move to applying the TRC at the program level is a small step compared to
7 Dunskey's recommendation that the TRC be applied at the plan level and is
8 consistent with the possibility of moving to a performance based approach to
9 DSM, as recommended by Dr. Wheeler.

10

11 With respect to the PAC, the provision of those results in the 2012 plan is helpful. It
12 provides a view of the attractiveness of the program from the point of view of the electric
13 customers who are funding it, allowing this view to be balanced against the broader
14 society view represented by the TRC results.

15

16 **PLEASE DISCUSS THE PERFORMANCE BASED MODEL YOU REFERRED**
17 **TO ABOVE.**

18

19 As noted by ENSC in Section 10 of its Evidence, DSM programs in some jurisdictions
20 are delivered by an agency under a multi-year arrangement which includes incentives to
21 ensure results. Such an arrangement for Nova Scotia was also envisioned in the Wheeler
22 report. ENSC's proposal at this stage is simply to engage the UARB and stakeholders in
23 2011 to assess the possibility of adopting such a model. I have no objection to such a
24 review, provided that such a regulatory model is permissible by the Board.

25

26 **WHAT ARE YOUR THOUGHTS ON THE EVALUATION AND VERIFICATION**
27 **REPORTS OF 2010 DSM PROGRAMS?**

28

29 The Evaluation and Verification (E&V) reports appear to be working as they should. The
30 reports for 2010 are the third such reports completed by NMR Group and Gil Peach &

¹⁶ See, for example, the paper referenced by Dunskey and provided in ENSC (Mulleese) IR-27.

1 Associates respectively. Each assesses the effects of NSPI's DSM programs in terms of
2 energy and demand savings and provides independent substantiation of the results
3 estimated by NSPI. In addition, each report reviews the processes used to implement the
4 DSM programs and contains recommendations and suggestions for improvements.

5
6 For 2010, NMR calculated DSM savings to be 84.97 Gwh and 16.38 MW. The
7 verification consultant, Gil Peach and Associates, agreed with NMR's results for all
8 programs except the Efficient Products - Direct Install C & I program. In that program a
9 minor adjustment was made, such that the total DSM savings for 2010 were reduced to
10 82.45 Gwh and 15.85 MW.

11
12 Many of the recommendations from prior E&V reports have been, or are being,
13 implemented. One example¹⁷ is the modification of the free rider methodology. The
14 2008-09 verification report called for a collaborative process, to be convened by the
15 Program Administrator, to review possible approaches to the free ridership question and
16 recommend which should be adopted in Nova Scotia. It was recommended that this be in
17 place in time to be used in the evaluation of 2010 DSM programs. On May 19, 2010 a
18 one day session addressed this question with experts from across North America. As a
19 result of this, NMR used a different method to estimate free riders in 2010, but additional
20 modifications are being contemplated for 2011 based on results in the field¹⁸.

21
22 **ENSC IS ANTICIPATING RESPONSIBILITY FOR NON-ELECTRIC DSM**
23 **PROGRAMS IN THE NEAR FUTURE. DO YOU HAVE ANY CONCERNS WITH**
24 **RESPECT TO THE INTEGRATION OF THOSE PROGRAMS WITHIN ENSC?**

25
26 No. From a regulatory perspective, ensuring that costs are properly segregated and
27 assigned is a major consideration, but methods of doing this are well established. Further,
28 as identified in ENSC (Multeese) IR-15, ENSC is already taking steps to address this

¹⁷ Other examples are included in ENSC (NPB) IR-8.

¹⁸ ENSC (Multeese) IR-12.

1 issue, and anticipates submitting a proposal to the Board for review and approval later
2 this year.

3
4 **WHAT ARE YOUR VIEWS ON THE FUTURE ROLE OF THE PROGRAM**
5 **DEVELOPMENT WORKING GROUP?**

6
7 I agree with the view expressed by ENSC at page 2 of its evidence that the PDWG should
8 continue for at least one more year to assist ENSC as it currently does, and that the
9 ongoing role of the PDWG beyond 2011 be included as part of ENSC's broader
10 stakeholder review process scheduled for 2011. The PDWG was initially formed as a
11 result of the 2008/09 DSM Settlement Agreement and was expected to exist only until the
12 transition to the new administrator was in place. That is now the case and it is appropriate
13 that stakeholders, together with ENSC, review whether it is still required.

14
15 **DOES THIS CONCLUDE YOUR EVIDENCE?**

16
17 Yes, it does.