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Request IR-1:

ENSC utilizes DSM Screening Tests to assist in determining what fuel appliances will be included in ENSC DSM programs. Please provide the:

- a) Results of the Total Recovery Cost (TRC) screening test for Energy Star® oil-fired appliances as compared to TRC results for natural gas, propane, pellet and wood furnace/boilers.**
- b) Results of the Program Administrator Cost (PAC) screening test for Energy Star® oil-fired appliances as compared to PAC results for natural gas, propane, pellet and wood furnaces/boilers.**
- c) If TRC and PAC screening tests were not performed for oil appliances, please explain why not?**

Response IR-1:

- a) ENSC did not perform TRC screening tests on oil-fired appliances.
- b) ENSC did not perform PAC screening tests on oil-fired appliances.
- c) ENSC's rationale to not include oil or natural gas heating systems in its Green Heating Systems approach is unrelated to TRC or PAC screening.

ENSC's Green Heating Systems approach defines eligible systems as those whose heat production is derived either exclusively or primarily from natural, renewable resources. Consistent with this approach, in cases where electricity is required to produce a minority share of the heat, ENSC further applied an analytic screen to ensure that the amount of electricity used would not inadvertently lead, under various assumptions related to the

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electricity supply mix that would be offset, to a net increase in such CO₂e (carbon dioxide equivalent) emissions.¹

ENSC examined the feasibility of a scenario in which it would promote the highest-performing fossil fuel-based heating systems available, i.e. condensing gas and oil appliances. In its consultations with industry, ENSC found that little to no “ultra-low sulphur”, 15-50 PPM (parts per million), heating oil is presently being sold in Nova Scotia for home heating. This was a factor in ENSC’s rationale, since condensing units are at risk of corrosion if supplied by standard heating oil (approx. 500-1000 PPM of sulphur).

A factor for existing residential is that most electrically-heated homes in Nova Scotia use baseboard systems and, as such, do not have the necessary ductwork that would make oil heating systems a realistic option.

¹ Notably for this reason, ENSC is proposing to develop or adapt specific performance requirements for air-source heat pumps, as indicated in Appendix E to the Evidence, page 4. A similar concern around air quality issues explains ENSC’s intent to require that incited biomass units obtain CSA-B415.1-10 or US EPA 40CFR Part 60 AAA certification.

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Request IR-2:

Dramatic improvements have been made in the areas of fuel oil storage, equipment efficiency and fuel properties. Based on the Dunskey Energy Consulting report dated December 16th, 2010 and filed as *Appendix D, Residential Fuel Substitution Pilot Program* as part of proposed ENSC 2012 DSM Plan, heating oil was eliminated based on pricing, environmental and home insurance concerns. Reasons outlined within the Scope of the 2010 report, continue to form the basis for the exclusion of oil appliances within the 2013-2015 ENSC DSM filing.

1 Heating oil was excluded as a target fuel, primarily because of its significant negative environmental and economic impacts for Nova Scotia relative to other fuel substitution options, as well as concerns around price volatility. Heating oil is also problematic for residential heating because of increasing issues with home insurance policies due to potential soil contamination from fuel leaks (Page 5, Scope of Pilot, Residential Fuel Substitution Pilot Program, Dunskey Energy Consulting, December 16th, 2010)

a) Please explain how ENSC, according to the ACT under which they are governed, has the authority to exclude oil appliances within its Fuel Substitution Program, effectively eliminating consumer choice, based on today's fuel costs.

b) Please explain how ENSC, according to the ACT under which they are governed, has the authority to exclude oil appliances within its Fuel Substitution Program, effectively eliminating consumer choice, based on GHG emissions levels.

c) Please explain how ENSC, according to the ACT under which they are governed, has the authority to exclude oil appliances within its Fuel Substitution Program, effectively eliminating consumer choice, based on home insurance costs.

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d) Please explain why heating oil is the only petroleum-based heating fuel/gas not included under the Fuel Substitution Program.

Response IR-2:

a) The *Efficiency Nova Scotia Corporation Act*, S.N.S. 2009, c. 3, as amended, (“the ENSC Act”), states clearly in section 2 that its purpose is to (a) establish an administrator to manage electricity demand-side management programs in the Province, (b) establish a fund to be used to defray the costs of electricity demand-side management programs, (c) provide for regulatory oversight of the administrator, the fund, and programs, and (d) provide the administrator with authority to engage in energy efficiency and conservation programs other than electricity DSM programs.

Flowing from this broad purpose, section 8 of the ENSC Act stipulates that the objects of ENSC as the independent DSM Administrator are to (a) design and administer electricity DSM programs with a view to restraining future electricity demand and use in the Province, and (b) engage in energy efficiency and conservation programs other than electricity DSM programs.

There is no stipulation within the ENSC Act, or any other legislation or regulation, as to any specific type of measure or program that must be included within the electricity DSM (or other energy efficiency) programs to be developed and implemented by ENSC.

Review and approval of every electricity DSM Plan, and the various programs to be implemented by ENSC, must be obtained from the Utility and Review Board (“UARB”) as regulator, pursuant to section 35 of the ENSC Act. As part of this public review process, the UARB must also review and be satisfied with the allocation of costs between electricity DSM and other energy efficiency programs, pursuant to section 36 of the Act. General supervision of ENSC as the independent DSM Administrator is mandated to the UARB pursuant to section 37 of the ENSC Act, through which the UARB may make all

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necessary examinations and enquiries and obtain from ENSC all information necessary for the UARB to fulfill its duties. The UARB controls the scope and procedure of the public review process pursuant to the ENSC Act and its own enabling legislation and regulations, and all interested stakeholders and members of the public have the opportunity to participate in the review and hearing process for each DSM Plan.

As such, the ENSC Act provides extremely broad authority to ENSC as the independent DSM Administrator to design and implement electricity DSM and other energy efficiency programs. The detailed content and eligibility of such programs are subject to the specific and general oversight and approval of the UARB. The ENSC Act itself does not prescribe, or prohibit, either a Fuel Substitution Program as a particular DSM program, or the particular fuels or appliances that may qualify for inclusion within that (or any other) DSM program.

b) Please refer to part a.

c) Please refer to part a.

d) Heating oil was not included in the Fuel Substitution pilot for the reasons referred to in the preamble to this question. These include concerns related to environmental impact, price volatility, and home insurance. In addition, ENSC took into consideration the net economic value to Nova Scotia, which imports its heating fuel, while all other fuels in the pilot could be produced locally. ENSC's decision was not based on any single factor, but on the combination of concerns.

In developing the Green Heating Systems initiative, ENSC examined the issue of greenhouse gas emissions in more detail, finding that the marginal impact of replacing electricity with 85% AFUE¹ oil furnaces remained negative (net increase in emissions). Please refer to COHA IR-4.

¹ Annual Fuel Utilization Factor.

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1 ENSC also explored the option of promoting condensing oil furnaces that can achieve
2 AFUE of 90% or higher, but found that the sulfur content of heating fuel sold in Nova
3 Scotia could lead to corrosion in these units. Please refer to COHA IR-1c.

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Request IR-3:

ENSC is forecasting energy savings attributed to the province adopting new energy efficiency codes and standards (p.22, Evidence, ENSC 2013-2015 DSM Filing). ENSC supports and builds DSM programs around the new Nova Scotia residential building code, adopted in 2010. The code requires all new residential houses to either meet prescriptive requirements (intended to achieve an EnerGuide rating of 80) or demonstrate energy efficiency performance through an EnerGuide rating of 80. (p.30, Appendix A, ENSC 2013-2015 DSM Filing)to form the basis for the exclusion of oil appliances within the 2013-2015 ENSC DSM filing.

- a) Please advise if ENSC DSM 2013-2015 Plan will be adapting its program design and eligibility criteria based on EnerGuide80 performance-based rating system.
- b) If EnerGuide80 is the performance-based rating system used by ENSC, is the performance-path to EnerGuide80 compliance based on NRCan's HOT2000 method and software?
- c) If HOT2000 software is the performance-path to EnerGuide80, are you aware the HOT2000 method skews builders/owners decisions (since credits are awarded based on certain design directions within the software) which drives them to install electric heat in order to achieve the highest EnerGuide rating, and subsequently, a larger rebate?
- d) If DSM is ENSC's main goal, why are new home builders/owners being rewarded for installing electric heat?

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1 Response IR-3:

2
3 a) ENSC does adapt its program design based on the Provincial Building Code
4 requirements, including meeting or exceeding the EnerGuide 80 performance-based
5 rating system.

6
7 b) HOT2000 is the software used in determining the performance-based rating to meet the
8 Provincial Building Code requirements.

9
10 c) ENSC is aware of various anomalies in the HOT2000 software.

11
12 d) At this time HOT2000 is the best available tool for estimating the energy efficiency of
13 new homes. The HOT2000 program weighs most heavily on the building envelope which
14 is where ENSC believes the greatest amount of energy savings are to be found.

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Request IR-4:

ENSC has included a Green Heating System component to their Existing Residential Programs & Services (p.11, Appendix A, ENSC 2013-2015 DSM Plan). We applaud the inevitable move toward renewables, however we question the effectiveness of this program within the context of electricity demand-side management as these incentives will drive more homes to heat with electricity than already exist in Nova Scotia today.

Please provide the following residential electric savings (kWhs) comparisons:

- a) How many kWhs are saved by replacing electric baseboard heating with a ductless air source heat pump?
- b) How many kWhs are saved by replacing electric baseboard heating with a ducted air source heat pump?
- c) How many kWhs are saved by replacing electric baseboard heating with an Energy Star® oil-fired appliance? With an Energy Star® oil-fired appliance with electrically commutated motor?
- d) How many kWhs are saved by off-setting electric baseboard heating with a ductless air source heat pump?
- e) How many kWhs are saved by off-setting electric baseboard heating with a ducted air source heat pump?
- f) How many kWhs are saved by off-setting electric baseboard heating with an Energy Star® oil-fired appliance? With an oil-fired appliance with electrically commutated motor?

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Response IR-4:

a) The table below provides the effects associated with replacing (R) or off-setting (O) electric heating with other options. The values for ground source heat pumps, pellet furnaces, and oil furnaces are, for the existing residential market, largely theoretical, as homes heated with electric baseboard are unlikely candidates for switching to systems that require comprehensive ducting.

	New System	Replace (R) / Offset (O)	Electricity (kWh/yr)	Fossil Fuels (fuel/yr)	GHGs* (kg CO₂e/yr)
EXISTING RESIDENTIAL	Wood Stove	O	(9,301)	0	0 / (2.05)
	Pellet Stove	O	(9,301)	0	0 / (1.89)
	Ductless HP – base	O	(6,557)	0	0 / (1.44)
	Ductless HP - premium	O	(6,969)	0	0 / (1.54)
	Air Source HP - base	Na	na	na	na
	Air Source HP - premium	Na	na	na	na
	Ground Source HP	R	(19,838)	0	0 / (4.37)
	Pellet Furnace	R	(25,050)	0	0 / (5.52)
	Oil Furnace**	R	(25,050)	2,472 litres	6.89 / 1.37
NEW RESIDENTIAL	Wood Stove	O	(9,301)	0	0 / (5.67)
	Pellet Stove	O	(9,301)	0	0 / (5.24)
	Ductless HP - base	O	(6,137)	0	0 / (3.74)
	Ductless HP - premium	O	(6,522)	0	0 / (3.98)
	Air Source HP - base	O	(8,453)	0	0 / (5.15)
	Air Source HP - premium	O	(9,136)	0	0 / (5.57)
	Ground Source HP	R	(12,378)	0	0 / (7.54)
	Pellet Furnace	R	(15,383)	0	0 / (9.20)
	Oil Furnace**	R	(15,383)	1,519 litres	4.24 / 0.85

* The values represent the net CO₂e impact using two different assumptions regarding the marginal source of power generation to be offset. The first value, always zero except in the Oil Furnace case (which generates a net CO₂e increase), assumes that NSPI's marginal resource is 100% renewable energy. The second scenario, always negative (CO₂e reduction) except in the Oil Furnace case (which also generates a net CO₂e increase), assumes that NSPI's marginal resource is comprised of 40% renewable energy and 60% natural gas combined cycle gas turbine. NSPI's "marginal resource" is the resource that is assumed to be added in the long run as the result of load growth,

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or avoided as the result of a DSM-related decrease in kWhs consumed, and should be consistent with the assumptions that underlie NSPI's avoided costs. The scenarios modeled are meant as reasonable boundaries for the likely marginal power resources that would underlie NSPI's long-run avoided costs today.

** Energy StarTM furnace with an electronically commutated motor.

b) Please refer to part a.

c) Please refer to part a. The table provides an Energy Star Oil Furnace with an electronically commutated motor. ENSC did not model less efficient options.

d) Please refer to part a.

e) Please refer to part a.

f) Please refer to part c.