Synapse
Energy Economics, Inc.

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Nova Scotia Demand Side Management Advisory Group
c/o Holly Brown
EfficiencyOne
230 Brownlow Avenue, Suite 300
Dartmouth, NS B3B 0G5

Via email

RE: Comments on EfficiencyOne's January 21, 2019 Locational DSM Pilot – DSMAG Update

Synapse Energy Economics, Inc. (Synapse) respectfully submits the following comments in regard to EfficiencyOne's (E1) *2018 Locational DSM Update* dated June 29, 2018 and *Locational DSM Pilot – DSMAG Update* dated January 21, 2019.

INTRODUCTION

In June 2018, E1 and Nova Scotia Power (NS Power) submitted a *2018 Locational DSM Update*. In the update, they identified the area served by the Klondike substation (Kentville and its surrounding area) as a region that may be suited to implement and test a locational demand-side management (DSM) pilot. The Klondike substation was selected because: (a) there is the potential for a 6–8 MVA load increase in the next few years which could require the rebuild of a transmission line and the replacement of the substation transformer, and (b) the substation is bounded on all sides by circuits which would make the impact of a locational DSM pilot on the region's demand more easily identifiable.

In January 2019, E1 submitted an update on the locational DSM pilot for review by the DSM Advisory Group (DSMAG). In this update, E1 indicated its intent to submit a draft pilot proposal and solicit comments from the DSMAG in April 2019. Synapse has comments and questions related to both the June 2018 and the January 2019 updates. Our comments are summarized as follows:

1. E1 and NS Power have not sufficiently justified their selection of Klondike as the best area to implement a locational DSM pilot; but
2. If E1 and NS Power pursue the Klondike locational DSM pilot, the draft pilot proposal should provide more detailed information on the pilot design.
3. E1 and NS Power's pilot study could pursue testing additional demand response measures such as residential hot water heaters with direct load controls and various commercial demand response measures.

The remainder of these comments expands on these three points.

KLONDIKE MAY NOT BE THE BEST OPPORTUNITY TO PURSUE

Synapse has several concerns regarding E1 and NS Power's selection of Klondike as the area best suited to implement a locational DSM pilot.

First, the potential timeframe of 1 to 2 years is a very short period in which to address the expected local distribution congestion and to avoid a potential substation upgrade. Beginning the pilot implementation in Q3 2019 and completing the implementation in Q4 2020 allows only 18 months to fully develop the DSM efforts. It may be difficult for E1 to ramp up DSM measures sufficiently to succeed in avoiding the upgrade. As a point of comparison, the Joint Utilities in New York submitted *Supplemental Information on the Non-Wires Alternatives Identification and Sourcing Process and Notification Practices* in May 2017 in which each joint utility listed a 36- to 60-month timeframe to sufficiently avoid or defer large upgrade projects through non-wires alternatives.[1]

Second, the need at Klondike is too soon to make use of AMI data. While not necessary for undertaking the pilot, AMI data would likely facilitate and reduce the cost of evaluation. By providing site-specific data, AMI data would provide greater insights into the effectiveness of programs and measures promoted by locational DSM.

Finally, the presence of AMI might change the ways that the locational DSM would be measured and evaluated, meaning that whatever protocols and methodologies that arise from a pilot targeted at Klondike would likely need to be revisited and revised.

ADDITIONAL INFORMATION SHOULD BE PROVIDED TO JUSTIFY THE PILOT AT KLONDIKE

More information is needed to determine if this pilot is the best site for a pilot study and will serve as a replicable model for future locational DSM efforts. For example:

1. Is the goal of the pilot to completely avoid distribution system investments? Is there value in deferring these investments if they cannot be avoided entirely? How would success be measured?
2. What is the breakdown of the expected costs of the upgrade? Can the upgrade be scaled down or implemented in increments if locational DSM is unable to provide load reduction sufficient to keep load below 26 MVA?
3. What is driving load growth (e.g. end uses, sectors)? What are the anticipated load characteristics of the new agricultural customer? More documentation and details on the expected need would be helpful for understanding whether targeted DSM is likely to be successful.
4. What are the selection criteria, and how do other identified system needs compare to Klondike in these criteria? Are there any other substations that serve a contained area? Were potential avoided distribution investment costs considered for the pilot selection? Were the estimated potential timeframes considered for the pilot selection? What is the remaining expected useful life of this substation? Can there be multiple pilot sites based on the criteria?

[1] Con Edison defined a large project as one taking place on a major circuit or substation. Klondike would classify as a large project under this definition.

If E1 and NS Power continue to develop the locational DSM pilot for this region despite our concerns about the selection of Klondike, the draft pilot proposal should include more details than were provided in the January 2019 update.

In the *2018 Locational DSM Update*, E1 and NS Power note that the design of the pilot program is expected to include the following:

- "A list of peak reduction measures, each with estimates of:
    - Substation-coincident demand and energy reduction impacts;
    - Measure lives;
    - Customer and utility (i.e. incentive/administrative) costs, specifying if there are incentives or other costs in addition to those which EfficiencyOne would otherwise offer for the same measure;
    - Eligibility criteria for each measure;
    - Expected quantity of each measure delivered through the pilot;
- Total planned substation-coincident peak demand and energy reduction impacts;
- Marketing and outreach activities and costs;
- Program delivery approach (use of existing EfficiencyOne energy auditors, in-store rebates, etc.);
- Evaluation plan and costs; and
- Total pilot cost."[2]

We encourage E1 and NS Power to provide as detailed information as possible for each of these items in the next update to the locational DSM pilot. In particular, we would like to see details on how E1 proposes to target only customers in this geographic region, and how E1 would reduce market confusion from providing incentives to just this subset of customers.

In addition to the items E1 and NS Power listed in the 2018 Update and responses to the questions we raised above, the draft pilot proposal should include the following:

- Under a range of scenarios (e.g. partial investment deferral, full deferral, and full avoidance):

[2] *2018 Locational DSM Update*, Pages 10 and 11 of 21.

- Projected incremental DSM costs by program and by measure (specifically for the Electric Thermal Storage (ETS) units, for which we believe that E1 has not previously provided incentives);
- Projected energy and capacity savings by program and by measure;
- Projected benefits of avoided distribution system investments; and
- Expected benefits of other projected avoided costs (e.g., avoided energy and capacity).

Finally, the *2018 Locational DSM Update* stated three goals for the locational DSM pilot project:

- "Better ascertain the relationship between the required investment and the achieved demand impact of the measures, program components, and the pilot project as a whole;
- Better ascertain the time required to obtain certain levels of demand reduction with the geographic area served by the substation; and
- Allow an opportunity to monitor how demand reductions persist and affect the net load growth on the substation into the future."[3]

We encourage E1 and NS Power to provide specific metrics related to these goals in the pilot proposal. For example: the demand reduction from each measure should be tracked over time on a monthly basis. This will assist with the second and third goals, in that these data will provide insights into (a) how long it takes to ramp up certain measures to a level in which they are impactful, and (b) how long the impacts of different measures persist.

DESIGN OF THE LOCATIONAL DSM PILOT

The load shape on 2017 peak days in the Klondike area shows early morning peak hours from 7 AM to 10 AM for all the peak days, except for two peak days that exhibited a relatively flat sustained load from 8 or 9 AM through 6 or 7 PM. Based on this, it appears that the most effective measures will be those that are (a) capable of reducing customer demand for at least two to three morning hours, and (b) able to shift load from daytime hours to nighttime hours. The measures included in slides 9 and 10 of the *Locational DSM Pilot – DSMAG Update* – such as home energy assessments, ETS units, and small business energy solutions – are well-positioned to reduce customer demand at all hours. We encourage E1 and NS Power to pursue these measures and to provide additional detail for each measure in the draft pilot proposal.

Below we raise several considerations for the proposed design and recommend additional measures to be included in the pilot project.

[3] *2018 Locational DSM Update*, Page 10 of 21.

Considerations for Proposed Design

It is important to consider external factors that may impact the load shape of the area in the next few years. For example, increased level of distributed generation (DG), especially solar photovoltaic (PV), systems would modify the shape of peak hours. For example, while most of the peak hours at Klondike occur in early morning hours, high loads persisted throughout the day for two peak days in 2017. If solar PV penetration increased, it would reduce net load during the day time. In this case, most future peak hours would occur in the early morning, creating a favorable environment for many demand response measures. Similarly, increased levels of electric vehicle (EV) charging could change load shape in ways that could impact the efficacy of the selected measures. Because the timeframe for avoiding distribution system investments in this region is so short, it is unlikely that DG and EV will have substantial effects on the load shape prior to the pilot project, but these impacts should still be considered and planned for.

Recommended Additional Measures

E1's proposal includes only one demand response measure (i.e., electric thermal storage). Given that this is a pilot study, it is important to test a variety of other demand response measures. While there may be others, the most notable omissions from the January 2019 pilot update are (a) hot water heaters with load control switches and (b) a large customer demand response program.

Hot water load control measures have been one of the most popular demand response measures in North America for a few decades. Hot water heaters with a storage tank can heat water to a higher temperature level well in advance of water use to store heat prior to the morning peak hour. This will eliminate or reduce the need for the heater to use any electricity during the peak hour. Conventional hot water heaters as well as heat pump hot water heaters can be used for this approach. This type of DR measure is likely to be particularly helpful for the Kentville area, given that the local peak time is in the early morning when demand for hot water is particularly high.

Business customer demand response measures also hold promise for the Kentville area, because about 50 percent of load comes from this customer segment. E1 and NSPI together can implement a load curtailment program for large customers where customers receive and respond to curtailment notifications to reduce loads from a utility or a third party. This program is suitable for large customers with interval meters. Enabling technologies that make their participation more effective include having an energy management system, a back-up power system, or a back-up space heating system. Commercial demand response programs can also take a direct load control approach for smaller commercial customers where a utility send load control signals to thermostats to control the temperature setting.