2019 Achievable Potential Study
Feedback on the Draft Project Plan Scope of Work
September 13, 2018

On August 17, 2018, the Independent Electricity System Operators (IESO) and the Ontario Energy Board (OEB) (collectively the Project Team) posted a draft Project Plan for the 2019 Achievable Potential Study and requested feedback from stakeholders by August 29th, 2018. The draft Project Plan was prepared by Navigant, who is the project consultant and was selected through a competitive procurement process. Navigant presented an overview of the draft Project Plan at the August 9, 2018 Advisory Group meeting and the August 20, 2018 public webinar.

The Project Team received written feedback from the following stakeholders (listed in alphabetical order, hyperlinks to posted feedback provided):

- Enbridge
- Environmental Commissioner of Ontario
- Enerlife Consulting
- London Hydro
- Niagara-on-the-Lake Hydro
- Thunder Bay Hydro
- Union Gas
- Waterloo North Hydro

A summary of feedback received and the Project Team and Navigant's responses is included below. Given the volume of comments received, the Project Team has consolidated duplicative feedback and condensed comments wherever possible to manage the length and usefulness of this document.

The Project Team appreciates the feedback received and has incorporated comments where appropriate into the revised Project Plan, which is posted on the 2019 APS engagement webpage.

Comment/Question	Project Team Response
Task 1: Project Plan / General Comments	
The project timeline is unclear, provide a project schedule.	The most up to date project schedule will be shared with the Advisory Group at the next meeting.
Clarify which inputs and assumptions (e.g., measure characteristics, incentive levels, awareness, willingness to pay) will vary between on IESO zones and/or natural gas utility regions. Note that measure profiles, installation costs, etc. may differ greatly based on geography and the commercial operation of a business in the Greater Toronto Area (GTA) is different from that in rural Ontario.	Navigant is currently reviewing the geographic resolution of available data to develop a modeling approach that best aligns with data sources. Some inputs will likely vary by IESO zone / utility region, some by climate zone and some inputs will be held constant for the entire province. Navigant will work with the Project Team to refine this modeling approach for discussion with the Advisory Group at a future meeting.
Stakeholders have described many "black boxes" that have limited the usefulness and legitimacy of past conservation potential modeling exercises in Ontario. All major inputs, assumptions, and adjustments that result in the final APS conclusions (including the calibration work mentioned throughout the project plan), should be transparent and made available to the public, where possible and practical.	The Project Team and Navigant are working to develop communications and project management tools to effectively communicate the major inputs, methodologies and decision points that will drive achievable potential results. The Advisory Group will be consulted on key decision points as the project progresses.
How did the last AP study compare with reality and were there were measurable differences between forecasted and actual results?	A comparison of aggregate savings to-date under the current framework and the previous achievable potential studies was presented as part of the Conservation First Framework Mid-term Review. The conclusion was that residential and business savings at the mid-point of the framework exceeded the IESO 2016 APS estimate.. A similar analysis has not be produced for natural gas, however, one of the 2019 APS deliverables is to compare achievable potential results (calibrated using actual program participation) to previous studies.
Concerns that base year data and forecasts are based on IESO rather than LDC data. Recommendations to ensure that results can be disaggregated by utility service territories and for the Project Team to get LDC input on any future LDC-level analyses.	To manage the project scope, inputs and outputs will be developed for IESO zone and natural gas utility regions. A separate, optional, task has been added to the contract to allow for further disaggregation of data to support future policy and/or program development if required. Should the Project Team undertake to disaggregate data and analyses by LDC service territories, additional consultation with LDCs will be sought.

Comment/Question	Project Team Response
Task 2: Base Year (2017) Disaggregation	
Involve Advisory Group members in segment and end-use mapping. Ensure segments and end-uses also align with LDC classifications.	Segments and end uses will be defined in consultation with stakeholders as noted in the Task 2 Table of Activities. Recommended segment and end-use classifications and their mapping to existing IESO, Union Gas and Enbridge classifications will be presented at the Sep 18th Advisory Group meeting.
The residential sector should be further broken out to include: • Retirement homes • Condos and student housing • Low-income MURBs • Bulk vs suite metered MURBs (consider nuances of gas utility classification of MURB consumption) • Customers not connected to the natural gas grid Does sufficient data exist to characterize low-income residential building energy use separately from other residential buildings?	Generally, additional segments are only useful if there is robust data to characterise the segment and they contribute a meaningful percentage of the total sector load. Regarding the suggested additions: • Retirement homes would be captured under the long-term care segment (commercial sector), and sufficient data is not available for this project to further separate them from this segment. • Condos and student housing will be captured under multi-unit residential buildings, and sufficient data is not available for this project to further separate them from this segment. • Low-income MURBs have been added as a separate segment. • Access to natural gas will be considered as part of the fuel share assumptions across all segments and sectors • Navigant is working with the natural gas utilities to identify all MURB consumption so it can be captured within the Residential MURB segment; differences in program participation between suite vs. bulk metered customers can be discussed as part of the achievable potential modeling. Regarding low-income buildings, Navigant is proposing to assume end-use intensities are consistent across building types regardless of income (i.e., low-income MURBs and non-low-income MURBs would have the same energy use) consistent with the previous APS assumptions. Differences in program participation for the segments would be considered as part of the achievable potential modeling.

Comment/Question	Project Team Response
The commercial sector should be further broken out to include • Large volume commercial and industrial customers • Fast food • Large restaurants • Elementary schools • High schools • Strip malls	Generally, additional segments are only useful if there is robust data to characterise the segment and they contribute a meaningful percentage of the total sector load. Regarding the suggested additions: • Under Navigant's current proposed approach, large volume customers would be included within their respective commercial and industrial segments (e.g., hospital, university, chemical manufacturing, etc.). Navigant is currently working with the Project Team to understand if/how transmission-connected electricity customers and large volume natural gas utility customers should be broken out for this study. • Fast food and large restaurants will be considered within the restaurants segment, as their end use breakdown is expected to be similar to a typical restaurant. The 2016 APS showed that all restaurants composed about 5% of the total commercial consumption (electric and gas). • Elementary school and high schools will be considered within the schools segment, as their end use breakdown is expected to be similar to a typical school. The 2016 APS showed that all schools composed about 5% of the commercial electric consumption, and 8% of the commercial gas consumption. • The main types of stores found in strip malls would be captured under their respective commercial segments (e.g., non-food retail, food retail, restaurants, etc.); sufficient data is not available for this project to create a separate strip mall segment.
The industrial sector should be further broken out to include: • Light industrial/manufacturing.	Light industrial and manufacturing businesses will be considered within the most relevant recommended segment, e.g., light manufacturing related to plastics and rubber will be considered under the "Plastic and Rubber Manufacturing" segment. Navigant does not have data sufficient to split existing segments by the criterion recommended.

Comment/Question	Project Team Response
End-uses should be further broken out. Break out: • Residential major appliances – this grouping captures end-uses that are too dissimilar. • Residential plug loads – this end-use is growing very quickly and should be broken out further. • Commercial lighting – this is a significant portion of commercial consumption and different lighting types have different profiles and savings potential. • Also break out/clarify allocation of server rooms, booster pumps and ventilation (for MURBs), electric vehicles, smart devices, computers, modems etc.	Generally, including additional end-uses is only meaningful if there is robust data to characterise the end-uses within each segment and the unique end-uses contribute a meaningful percentage of the total segment load. Regarding the suggested additions: • Navigant is proposing to break out cooking from other residential appliances. • Agree that plug loads are growing. Navigant's view is that the composite end-uses have sufficiently similar load profiles and intensities to be grouped together. • Navigant's view is that interior commercial lighting end-uses have sufficiently similar load profiles and intensities to be grouped together, and that exterior lighting is sufficiently small as a proportion to of sector consumption to include within this category. • Server rooms are included in the "Computer Equipment" end-use. • Booster pumps are not included in the existing measure list. Should a measure targeting this equipment be included as one of the 20 new measures, Navigant could consider separating out this end-use. • The existing measure list does not include any EV-related conservation measures. These could be included as one of the 20 new measures, in which case Navigant may discuss including an EV end-use. • "Smart" consumer electronics are efficient technologies that replace existing technologies that fall under the "Other Plug Load" end-use. • A "Computer Equipment" end-use exists in the commercial sector. • Modems represent a very small proportion of load in any sector, and are not included in the existing measure list.
If Union Gas and Enbridge are to merge, what is the value of separating out natural gas consumption data by their respective service territories and is there still value in presenting the data regionally?	While the Union Gas and Enbridge merger is being implemented, Navigant will continue to work with the current natural gas utility billing and forecasting teams to collect data as it has been developed by the former companies. Breaking out data by IESO zone and natural gas utility region following Navigant's proposed methodology (to be discussed at the Sep 18th Advisory Group meeting) helps map the electricity data to natural gas data, allowing more effective characterization of fuel switching measures and consideration of interactive effects between measures (major drivers of the integrated study).

Comment/Question	Project Team Response
How will non-residential segments be broken out without NAICS or SIC codes?	Segmentation of electricity consumption is developed as part of the IESO's end-use forecasting. The breakdown of natural gas segments will be developed using a combination of consumption and end-use data sources (e.g. NRCan's CEUD, StatCan Survey of Commercial and Institutional Energy Use, StatCan Table 25, etc.).
There is a reference to using MPAC data for some analyses, which was found to be unreliable on the past APS.	MPAC data will not be used for this study.
Is there any way to take into account the effect large industrial customers have on a low density area (e.g., IESO Zone 10)?	Base year data is disaggregated into sectors and so differences in the composition of customers between zones will be captured.
Are directly connected customers being taken into account?	Transmission-connected electricity customers will be included in the study.
Task 3: Reference Forecasts	
How are the impacts of policy and electrification being assessed?	Two alternate forecasts will be developed as part of Task 3 that may be used to test the impacts of high electrification or other future economic or policy scenarios. Additionally, three achievable potential scenarios will be considered as part of Task 7.
Will natural conservation (i.e. future decisions by homeowners or businesses to implement an energy conservation project without the influence of an energy conservation program) be included in the reference case? If the market share for Technology A is at 15% in 2018 and the Study assumes it can be at 80% by 2030, will the 80% include influences other than the utilities' programs?	Natural conservation is captured in the reference cases developed by the IESO and natural gas utilities Forecasted market shares/ saturations of efficient technologies will consider the impact of natural conservation, codes and standards and future conservation programs but only the program impacts will be captured in achievable potential savings estimates.
Need to ensure that reference forecasts do not implicitly include the effects of some future conservation programs through regression analyses or other extrapolations from historic consumption.	Navigant is currently working with the Project Team and natural gas utilities to understand the drivers of electricity and natural gas forecasts and will propose adjustments if required to ensure all future conservation program potential is captured in the achievable potential results.
Forecasts should be updated with the most current data available (fuel use data in Fuels Technical Report and past Ontario Planning Outlook are out of date). Allow enough time for stakeholders to review the underlying forecast assumptions.	Navigant will rely on the provincial electricity end-use forecast developed by the IESO (will be consistent with next OPO and Long-Term Energy Plan cycle) and the natural gas demand forecasts developed by the natural gas utilities to develop the reference case.

Comment/Question	Project Team Response
Task 4: Measure Characterization	
How are district energy, behind-the-meter generation and combined heat and power going to be treated? How will wood heated homes be captured in the study?	The scope of this study is limited to electricity and natural gas conservation and energy efficiency measures.
Some existing conservation measure assumptions used on past APS studies do not reflect experiences on the ground. Ensure measure inputs align with LDC and gas utility data and review with Advisory Group.	Navigant will review all measure assumptions for existing measures and develop assumptions for new measures based on the best available data. Navigant will work with the Project Team to facilitate engagement and input from the Advisory Group.
The Advisory Group should review and discuss the proposed custom measure characterization to ensure effective interactive effects between competing measures are appropriately considered. Re-commissioning measures require comprehensive review.	Savings, estimated costs and all other measure inputs will be developed as part of the measure characterization task. Competition groups and interactive effects will be considered as part of the achievable potential task. Navigant will work with the Project Team to facilitate engagement and input from the Advisory Group.
What is meant by the fuel switching example (page 17) that says an electric storage water heater would not compete with a high-efficiency natural gas storage water heater, for savings potential? In a simple example, wouldn't a homeowner have 3 options: install a base gas water heater, install a high-efficiency gas water heater, or install an electric water heater? Each would have a different gas savings assumption.	In the past, Navigant has modeled fuel switching measures in a separate version of the DSMSim model from other measures for a number of reasons (e.g., when a different cost-effectiveness test from other measures was used). With this approach, Navigant's ability to include both fuel-switching and non-fuel switching measures in the same competition group is technically limited. Considerations for fuel switching modelling and treatment in competition groups can be discussed further with the Project Team and stakeholders when the potential tasks are initiated. In the interim, this example has been removed from the Project Plan.
What is the method to determine measure cost effectiveness over the study period? A measure that may not be cost effective today could be cost effective at year 10 or 15.	Measure cost-effectiveness is calculated for each year of the study for each measure using forecasted annual avoided costs and projected annual changes in measure costs.
How will emissions reductions be quantified for electricity measures (where emissions reduction potential differs greatly depending on the time of day and time of year when electricity savings occur)?	IESO will provide forecasts of emissions associated with electricity consumption that are either broken out hourly or bucketed (e.g., by time-of-use period or other system developed in collaboration with the planning team).

Comment/Question	Project Team Response
How are behavioural measures validated to ensure alignment with LDC experience and how will persistence/rebound of behavioural measures be captured (Local Energy Efficiency Action Network has written extensively on this)? How will Navigant ensure behavioural measures (e.g., home energy reports, pre-pay, building benchmarking) do not double count savings from technologies installed as part of these programs?	Navigant will review relevant EM&V reports for verified actual program savings as well as the Local Energy Efficiency Action Network's research and any additional utility data that is available pertaining to behavioural or other measure impacts. Navigant will only characterize behavioural measures for which reliable data is available to differentiate behavioural impacts from impacts of efficiency upgrades.
Is Navigant proposing to characterize measures assuming average costs and savings for all customers? While some measures may not be cost effective based on these average assumptions, they may be cost effective for a subset of the population (e.g., home energy reports may produce higher savings at lower costs for high consuming households).	Measure costs-effectiveness is assessed on a segment-specific basis, so for example a measure that is not cost-effective for detached houses may be for multi-unit residences or vice versa. Generally program eligibility would be defined based on residence type, household income, business characteristics, etc. (i.e., factors that define segments) rather than baseline energy use. While some specific pilot projects may attempt to target sub-sets of customer segments, assuming average measure inputs for each segment represents the way in which programs are brought to market in majority of cases.
How will Navigant capture the potential from emerging technologies that cannot be identified today? Suggest developing a proxy "emerging technology" measure to account for such unknown potential. Not accounting for future new innovations could significant underestimate potential over the 20-year horizon of the study.	It is Navigant's practice on potential studies to only include new emerging technologies for which reasonably robust estimates of savings exist. Navigant would be willing to discuss the value of an emerging measure adder with the Project Team and/or Advisory Group if requested.
What constitutes 'more rigour' for high impact measures?	Whereas for low or medium impact measures, Navigant may accept some measure inputs at face value, reviewing only the reasonableness of the measure description and/or amount of deemed savings estimated; for high impact measures, Navigant will review the source for each individual measure input assumption and confirm the most current, credible and relevant information is referenced.

Comment/Question	Project Team Response
Consider soliciting insight from industrial site experts, energy managers, industrial reviews, industrial energy assessments, professional experience, literature review, equipment inventories, and ongoing audit and market assessments to improve industrial sector data reliability.	Navigant has engaged Michael Kuriychuk, president and principal consultant for Pathchoic Energy as a sub-consultant on the project. Michael is an expert in industrial energy management systems and site commissioning whose expertise will be leveraged to review key measure savings and assumptions inputs on the project.
How would the highly unique and customized measures typical of the industrial sector be captured in the study? Does classifying measures as 'custom' imply assumptions about how the program is delivered?	Highly unique and customized measures in the industrial sector will be captured in the potential study model as custom measures. The savings for these measures will be calculated as reduction in end-use gas energy consumption, rather than using documented, prescriptive assumptions. This classification does not imply whether a measure should be delivered with a custom or prescriptive conservation program.
Would the consultant be able to use the opportunity accelerator results as a sanity check here? Obviously we recognise that the OA results would not have all the measures available but it would provide a reasonable benchmark to test against.	Navigant will take into consideration and discuss with the Project Team as part of the achievable potential task initiation.
The effectiveness of air source heat pumps is limited in colder climates, assumptions such as the penetration of heat pumps cannot be applied across all climate zones.	Measures will be characterised differently for the three weather zones in the province.
Include GreenON 2018 results (e.g., thermostat program) when calculating future conservation potential in the residential market.	Measure saturation is a key input to the measure characterisation. This value captures the existing market share of an efficient technology. Estimation of measure saturation values will account for historical program performance where data are available to do so.
Task 5: Technical Potential	
How are fuel switching measures considered in the technical potential estimation? If competition groups are ranked based on energy savings does this mean fuel switching measures will always be selected for inclusion? Will the fuel switching analysis take into consideration increased loads associated with the switched measures?	Treatment of fuel switching measures in competition groups can be further discussed when the potential tasks are initiated. In the past Navigant has modelled fuel switching separately and not included them in competition groups with other measures. Yes, the model will take into consideration increased loads associated with the switched measures.

Comment/Question	Project Team Response
Will measure stacking, interaction and persistence be considered for all measures (i.e., prescriptive, custom and behavioural)? How will re-participation rates be addressed and is it always assumed that the same efficient technology is reselected?	As appropriate, measure stacking, interaction and persistence will be considered for all measures, either as part of measure characterization, and/or in the calculation of measure cost-effectiveness. Re-participation at the end of a measure's useful life assumes the same efficient technology is reselected.
Section 7.3 references sales forecasts, where are these going to come from?	This section is referring to the reference electricity and natural gas demand forecasts provided by the IESO and the NG utilities.
How are quality checks (activity 5.11) going to be defined before the model is run? What kind of quality checks are going to be performed for technical and economic potential?	In addition to Navigant's general QA/QC process for the study, the team has built in checks to the modeling tasks – e.g., if measure costs or savings coming out of the model are unexpectedly high or low, the measures will be flagged for review.
How will the study take into account the time required for utilities to bring programs to market?	Technical potential assumes all measures are implemented in Year 0. Navigant will take time required for program roll-out into consideration and discuss with the Project Team as part of the achievable potential task initiation.
Task 6: Economic Potential	
How will non-energy benefits be considered? Recent research conducted for the IESO suggests that the current 15% non-energy benefits adder (included since 2014) is an appropriate valuation for non-energy benefits, excluding carbon reduction.	Non-energy benefits will be incorporated in the avoided cost tables. The current non-energy benefit adder of 15% will remain in place for this study, unless OEB/IESO are directed otherwise.
The economic potential is based on TRC and PAC tests. Customers don't evaluate projects based on TRC or PAC but rather business metrics based on costs and benefits i.e. payback and ROI and non-energy benefits such as improved lighting and working environment.	Consumer acceptance and willingness to adopt technologies considering different paybacks, capital costs, etc. from the consumer perspective is addresses through the achievable potential modeling. Economic potential deliberately excludes consumer purchasing considerations to evaluate the measure from a system and/or program administrator perspective.
Are the same economic potential assumptions applied across all regions or for example, could different incentives be assumed for different regions?	Typically, the economic test is consistently applied across all geographic regions. A different economic test may be applied for specific segments (e.g., low-income residential).
What cost-effectiveness test would be used to screen fuel switching measures?	The cost-effectiveness test for fuel switching measures is yet to be determined.
Will avoided costs of natural gas and electricity savings being included in cost effectiveness calculations for measures that save both?	Yes.

Comment/Question	Project Team Response
Task 7: Achievable Potential	
How are "2017 actual performance results" going to be used for model calibration?	Actual performance results are used to help calibrate near term achievable potential in the model for specific measures, end-uses, segments, and sectors under incentive scenarios that align with current incentive levels.
How will the Delphi panel be selected? How will we avoid group think?	Additional details regarding the composition of the Delphi panel and the process of that consultation will be discussed at a future Advisory Group meeting.
Why is the Delphi panel used to produce inputs for only retroift measures?	The Delphi panel will be used to inform inputs for all measure types, not just retrofit measures. This language has been updated in the Project Plan.
A range of scenarios may be more appropriate than 3-specific scenarios. "incentive strategies" to define budget constrained scenarios are unclear – how will these scenarios compare to current program budgets and targets/results?	Navigant recommends that the three scenarios be selected to define a reasonable range of outcomes. The scenarios will be defined in collaboration with the Project Team and discussed with stakeholders as part of the initiation of this task. The Project Team has included an option in the contract to licence the DSMSim model to run additional scenarios following the conclusion of this study.
For retrofit (specifically early replacement) measures what assumptions are made around the remaining useful life of the baseline technology?	Navigant typically assumes that the dual baseline retrofit measures are installed at 2/3 of the baseline measure's existing useful life. The value of the 1/3 of useful life remaining is included in the assumed costs for these measures.
How will factors such as market education, training, trade ally relationship development be considered in achievable potential modeling? Can the point of market intervention (e.g., upstream vs. downstream) be adjusted in the model?	Factors such as education, training and relationship development would be captured in the awareness parameters of the bass diffusion modeling, which represent a composite of the market effects that could influence diffusion. DSMSim is agnostic as to the point of market intervention and does not distinguish between upstream or downstream incentives.
Will achievable potential represent gross or net savings? Will net-to-gross factors be applied?	Achievable potential values are all "net" because all natural conservation is accounted for in the reference forecast (no net-to-gross ratios will be applied beyond this). Gross achievable potential results are out of scope for this study
Payback acceptance and other achievable potential assumptions should be reviewed by the Advisory Group.	Navigant will work with the Project Team to engage the Advisory Group on achievable potential input assumptions.
Can LDCs review preliminary results of the AP study?	Draft results for each task will be shared with the stakeholders for comments. The team can also consider opportunities to share interim results once the potential modeling is underway.

Comment/Question	Project Team Response
Task 8: Whole Building Benchmarking	
What data does Navigant need from utilities to support this work? Clarify data needs and calibrate to electricity and gas data.	Navigant is in the process of working with the Project Team to understand what data are available to support this analysis, and will soon be submitting a formal data request. It is expected that the key input variable for this work will be the annual electricity and natural gas consumption figures tracked for "Broader Public Sector" buildings by the provincial government.
The description of the Whole Building Benchmarking pilot should assume that all buildings within a segment (e.g., schools) are brought up to a defined level of whole building energy performance, and compare results to the potential derived from a bottom-up, measures-based methodology (see chapter 4 of the ECO's 2015/2016 energy conservation report).	Navigant's approach for the WBB task is an extension of empirical "top-down" load forecasting techniques applied to projecting potential on the basis of actual historical achievement. The approach described in the comment has merit and may be worth further exploring, but appears to deliver an estimate of potential more akin to technical (or economic) rather than achievable potential: it sets a level of achievement (like measure savings) and assumes that this is achievable by the entire population.
Is this pilot using data from electricity conservation programming data only to assess the historical uptake of energy efficiency measures?	The pilot will use both electricity and natural gas programming data, if available. Navigant will work with the Project Team to issue a data request for this study at the earliest opportunity.
How will baseline efficiency and net to gross adjustments be incorporated into this analysis?	There will be no net-to-gross adjustments since the reference forecast accounts for naturally-occurring efficiency changes.
How will you know if this pilot has been successful?	Piloting of this approach will be considered successful if the approach yields reliable savings estimates.
Task 10: Sensitivity Analysis	
Provide Excel format for task outputs (as well as for other potential tasks).	Excel deliverables will be provided.
The sensitivity analysis should capture the impacts of carbon pricing and changes in the cost of energy	Avoided cost is a variable that will be included in the sensitivity analysis. Sensitivity analysis also may address carbon pricing and changes in the cost of energy.