2019 ACHIEVABLE POTENTIAL STUDY
PUBLIC WEBINAR #4

February 15, 2019

ONTARIO ENERGY BOARD

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Agenda

Topic	Lead
Welcome & Introductions	Nik Schruder (IESO)
Recap of Project Objectives & Governance	Valerie Bennett (OEB)
APS Project Updates	Navigant
Thank You	Nik Schruder (IESO)
Q&A	All

Webinar Objectives

- Present draft results of the base year disaggregation and reference forecast tasks.
- Seek feedback on achievable potential scenarios.

Achievable Potential Study Recap

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APS Recap – Ministerial Directives

- The Independent Electricity System Operator (IESO) and the Ontario Energy Board (OEB),("Project Team") are currently conducting an integrated electricity and natural gas conservation achievable potential study (APS) to be completed by June 2019.
- The Achievable Potential Study is a requirement of:
  - March 31, 2014 Direction to the former Ontario Power Authority (OPA) now IESO

    "**conduct an achievable potential study** for electricity efficiency in Ontario **every three-years**… to inform electricity efficiency planning and programs. The achievable potential study should, where appropriate, **be coordinated with the natural gas efficiency achievable potential study…**"
  - March 26, 2014 Direction to the OEB

    "an achievable potential study for natural gas efficiency in Ontario should be **conducted every three-years**… to inform natural gas efficiency planning and programs. The achievable potential study should, as far as is appropriate and reasonable… be **coordinated with the [former OPA now IESO]…**"

APS Recap – Study Objectives

- The main objective of the APS is to identify and quantify energy savings (electricity and natural gas) and GHG emission reductions and associated costs from energy efficiency and conservation for the period of 2018-2038.
- The APS will provide data and analysis to inform:

  - the development of future conservation policy and/or frameworks;
  - program design, implementation and evaluations;
  - long-term resource planning and system operations.

- Being the first integrated APS in Ontario, the study aims to capture the dynamic relationship between electricity and natural gas use in order to better support emerging whole home and business multi fuel measures and programs.

APS Recap – Study Governance

Group	Responsibility	Members
Project Team	• Provide day-to-day oversight and direction for the project including consultant procurement, project delivery and management and stakeholder engagement.	IESO, OEB
Third Party Consultant	• Develop study methodology and undertake study in accordance with industry best practices.	Navigant
Advisory Group	• Provide advice on development of the project as well as review of all project milestones.	**Members:** Local Distribution Companies, Natural Gas Utilities, Consumers, Consultants/Delivery Agents **Observers:** Ministry of Energy, Northern Development and Mines; Ministry of Environment, Conservation and Parks; Environmental Commissioners Office **Project team:** IESO, OEB
Expert Panel	• Review consultant materials and provide technical guidance ensuring work is conducted in accordance with industry best practices. • Where relevant to Advisory Group discussions, Expert Panel input will be shared and communicated in written form in addition to conference calls as required.	Chris Neme, Energy Futures Group Christine Gustafson, Harbourgreene Consulting Danielle Sass Byrnett, National Association of Regulatory Utility Commissioners Dave Shipley, Posterity Group

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INTEGRATED NATURAL GAS AND ELECTRICITY CONSERVATION ACHIEVABLE POTENTIAL STUDY (APS)

PUBLIC WEBINAR

2019-02-15

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AGENDA

1 PROJECT OVERVIEW

2 SCHEDULE AND STATUS UPDATES

3 TASK 02: BASE YEAR DISAGGREGATION

4 TASK 03: REFERENCE FORECAST

5 TASK 07: ACHIEVABLE POTENTIAL

6 ACHIEVABLE POTENTIAL STUDY OUTLOOK – NEXT STEPS

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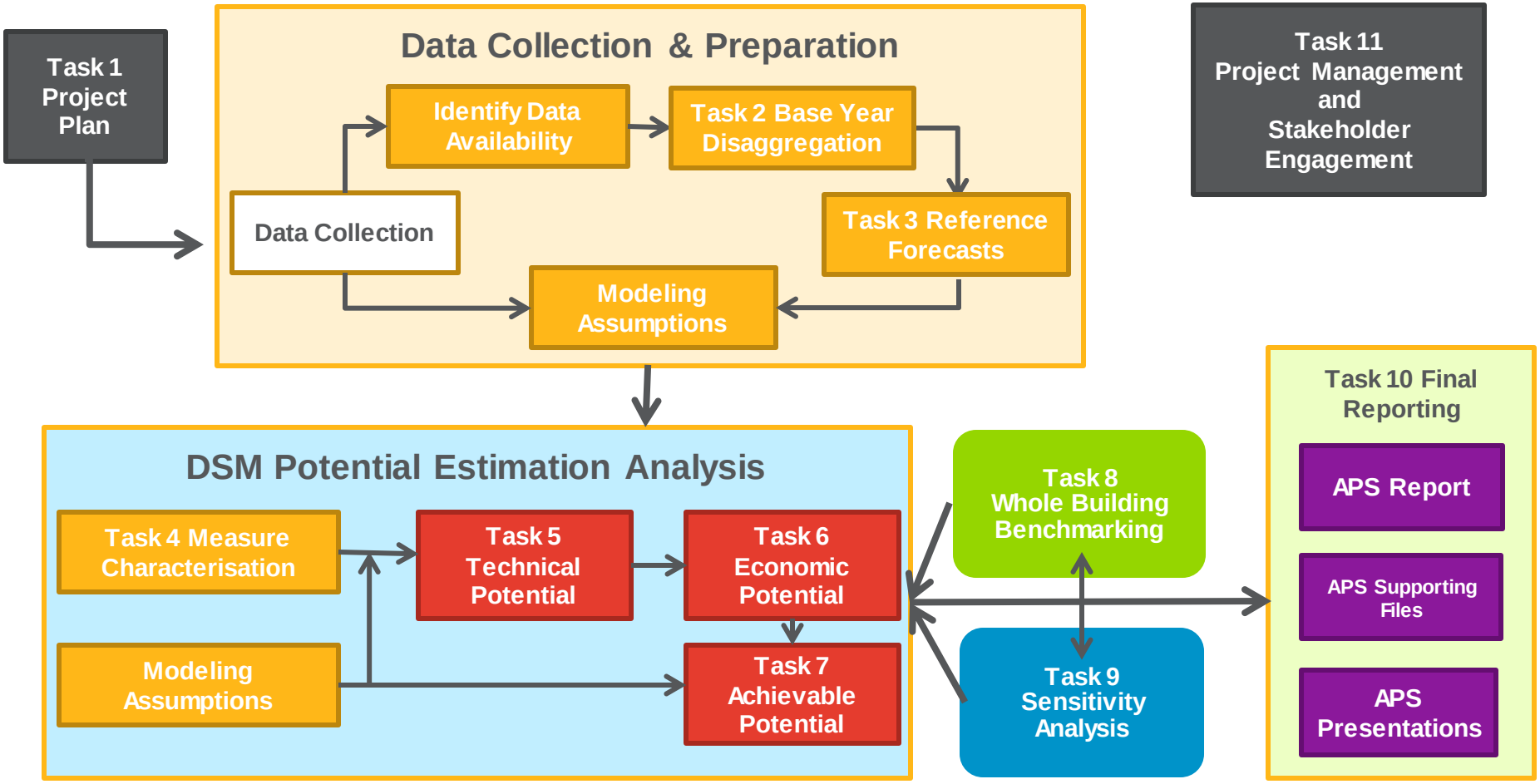
SCHEDULE & STATUS UPDATES

PROJECT OVERVIEW



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SCHEDULE & STATUS UPDATES

PROJECT TIMELINE

Task	% Complete	Start Date
01 – Project Plan	100%	2018-08-01
02 – Base Year Disaggregation	95%	2018-09-01
03 – Reference Forecast	90%	2018-09-01
04 – Measure Characterisation	90%	2018-09-01
05 – Technical Potential	15%	2018-10-26
06 – Economic Potential	5%	2018-11-20
07 – Achievable Potential	20%	2018-09-27
08 – Whole Building Analysis	25%	2018-09-10
09 – Sensitivity Analysis	10%	2019-01-21
10 – Final Report	10%	2018-11-15

TASK 02: BASE YEAR DISAGGREGATION

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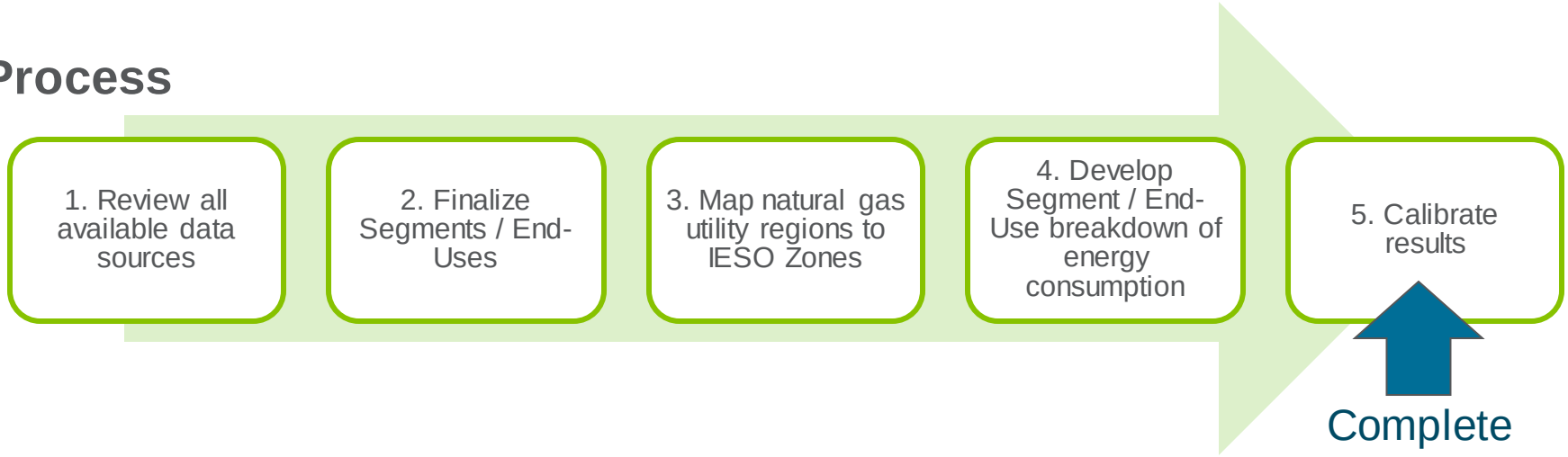
TASK 2: BASE YEAR DISAGGREGATION
OVERVIEW

Process



Purpose

- The **base year disaggregation** (BYD) delivers a detailed profile of electricity and natural gas consumption, by sector, segment, and end use.
- The goal of the BYD is to transform input NG and electricity base year consumption to achieve **a common level of granularity** that reflects the requirements of the study..

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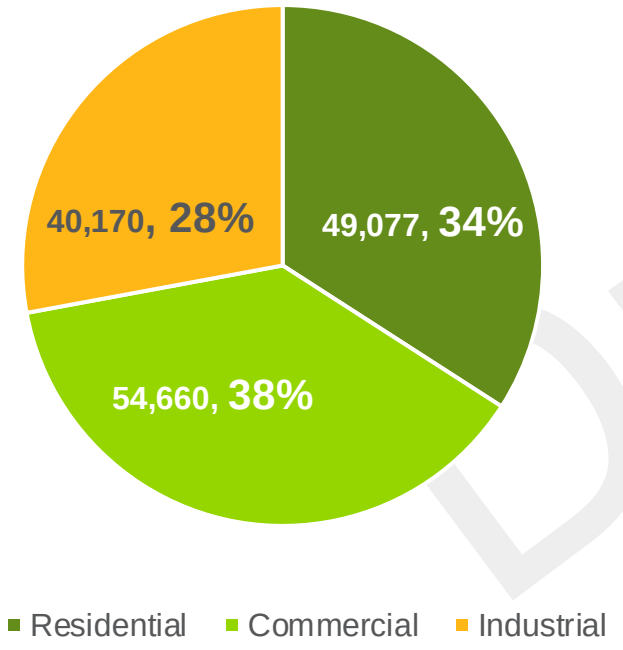
APS base year consumption and stock data was provided by the IESO, Enbridge Gas Distribution and Union Gas. Navigant disaggregated the data to match the requirements of the study.

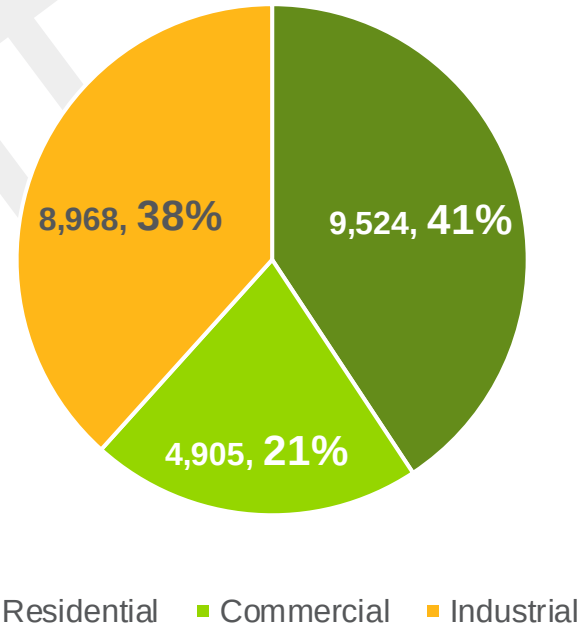
- IESO provided electricity consumption data by segment, end-use, and IESO zone.
  - For the 2019 APS, several IESO segments are further disaggregated to provide insight into customers with unique or growing electricity needs (e.g., low-income households, data centres, water/wastewater treatment facilities).
  - Navigant used best available data to allocate consumption to these APS segments.
- NG utilities provided natural gas consumption data by segment, natural gas regions and (with some exceptions) IESO zone.
  - Navigant used best available to data to allocate natural gas consumption to end-uses as well as to IESO zone where required.
- The output of the base year disaggregation is an estimate of base year consumption for both electricity and natural gas by: segment, end-use, IESO zone and natural gas region.

TASK 02 – BASE YEAR DISAGGREGATION
RESULTS: OVERVIEW OF SECTORAL CONSUMPTION

Electricity Consumption (GWh)



Natural Gas Consumption (million cubic meters)



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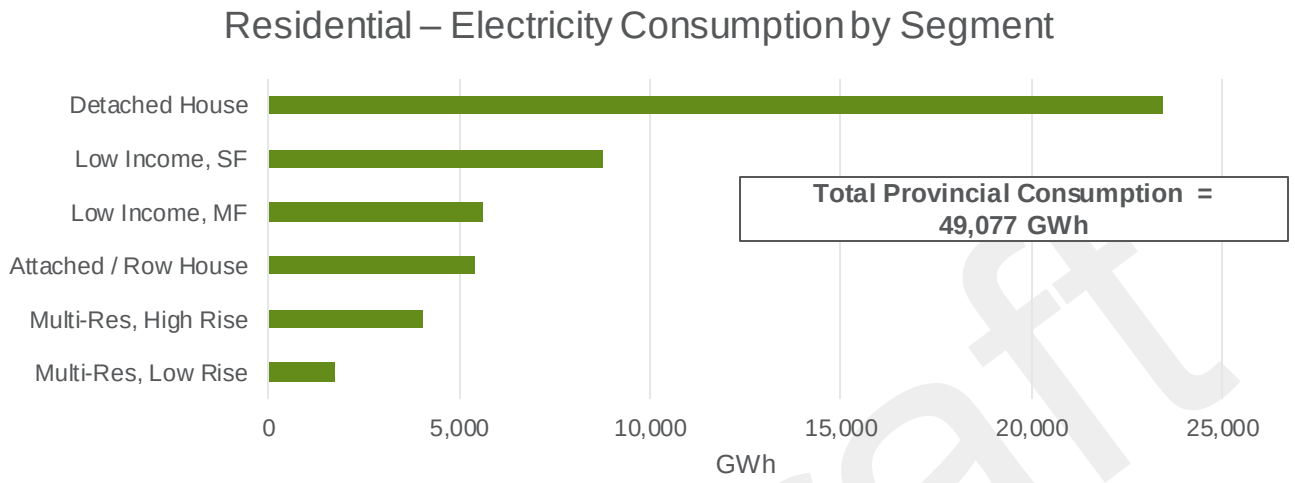
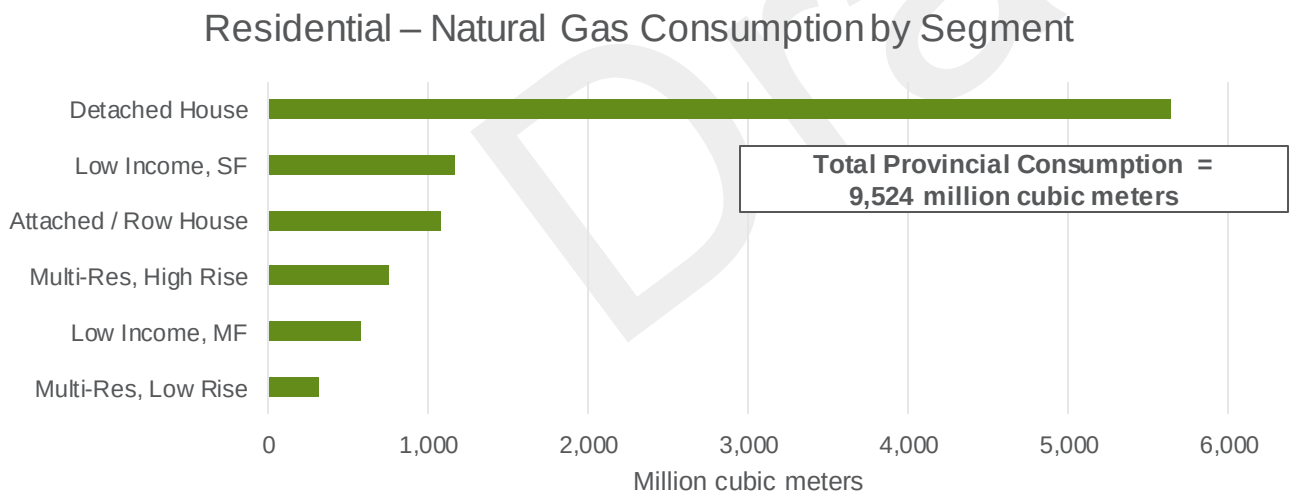
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: PROVINCIAL RESIDENTIAL CONSUMPTION BY SEGMENT





- **Low income** segments make up a smaller proportion of gas and electric consumption than non-low income.
- Low income households are **concentrated in zones where electric space heat is more common** (Northeast, Northwest, etc.) .

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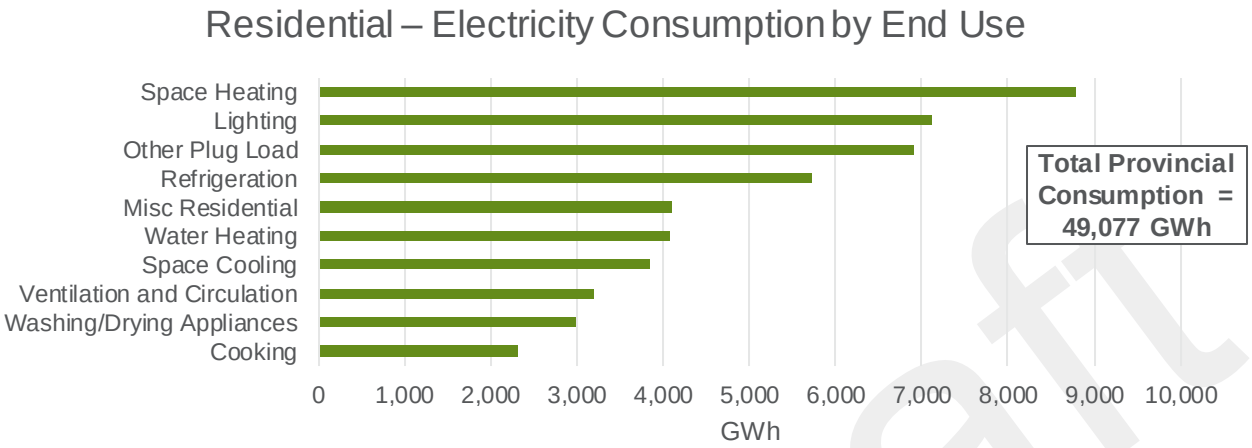
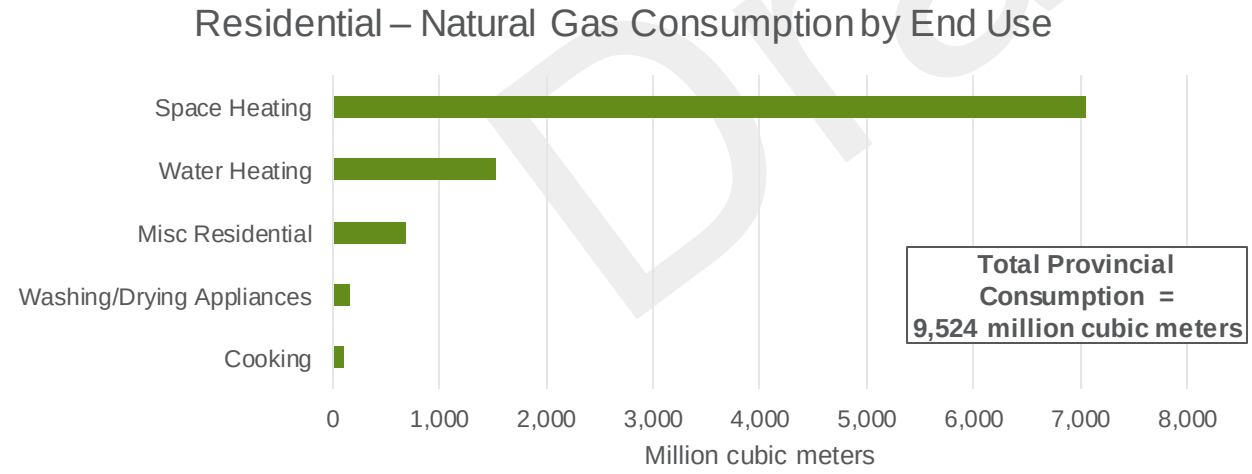
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: PROVINCIAL RESIDENTIAL CONSUMPTION BY END USE





- **Space Heating** is the highest consumption end-use for both fuels.
- Water heating as a fraction of space-heating is much higher for electricity than for gas. This reflects the fact that **it is not unusual for a home to use gas for space heat, but not for water heat**: 22% of non-low-income single family (SF) households (HH) use electric water heat, but only 9% of non-low income SF HH use electric space heat.

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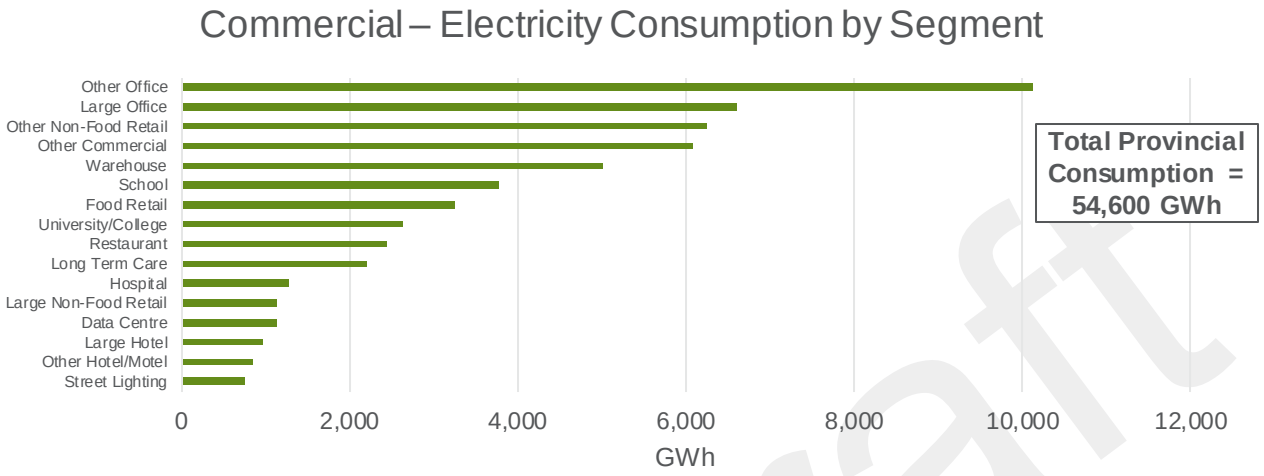
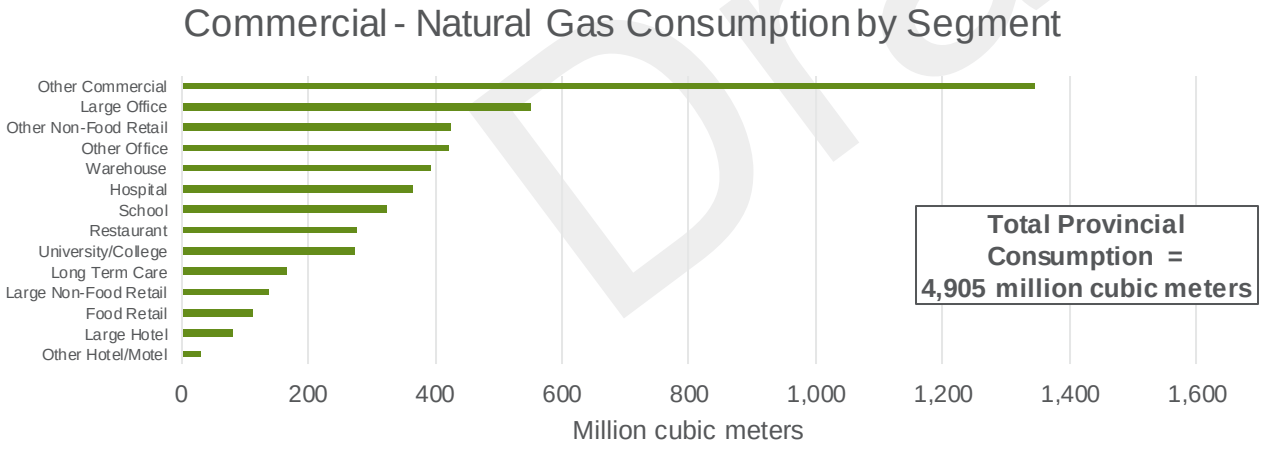
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: PROVINCIAL COMMERCIAL CONSUMPTION BY SEGMENT





- **Electricity consumption** is **highest** for Other Office, Large Office, Other Non-Food Retail, and Other Commercial segments..
- **Natural gas consumption** is **highest** for the Other Commercial, Large Office, Other Office, and Other Non-Food Retail.

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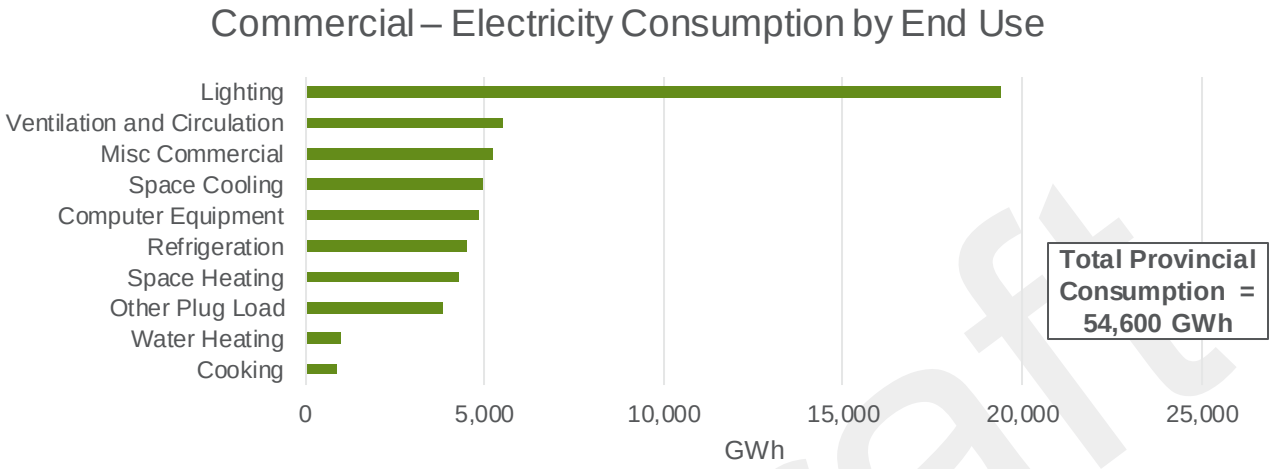
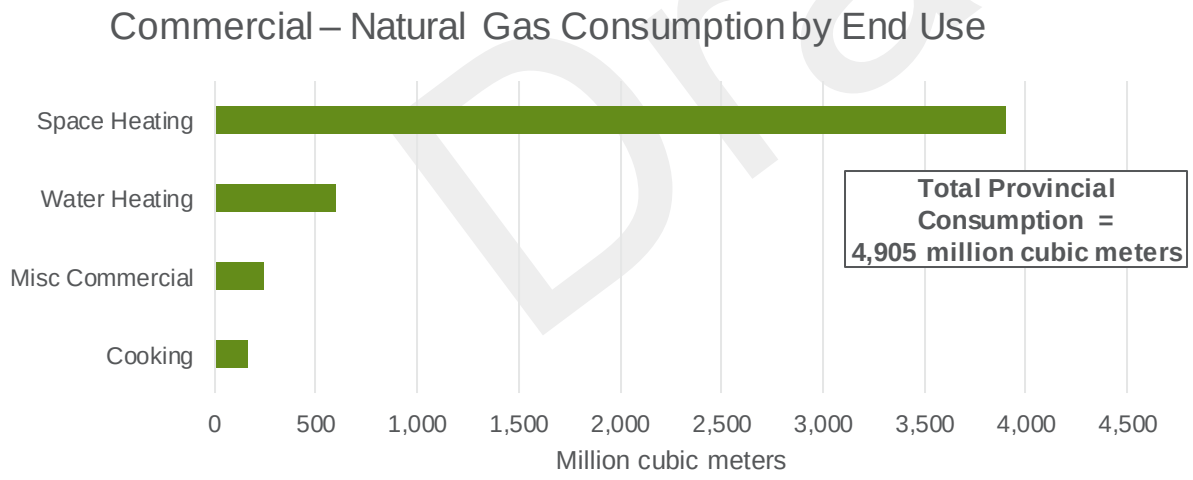
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: PROVINCIAL COMMERCIAL CONSUMPTION BY END USE





- **Electricity consumption** is primarily composed of **lighting**, due to large amounts of store room, warehouse, retail and office space that require extensive lighting, often throughout the day.

- **Natural gas consumption** is primarily composed of **space heating**, due to the high proportion of natural gas space heating equipment for commercial applications.

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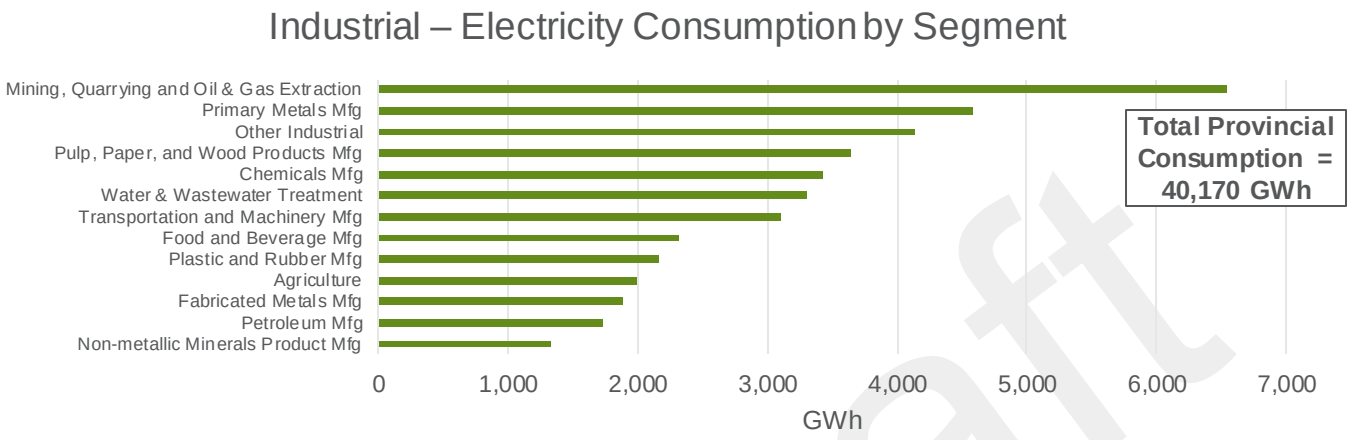
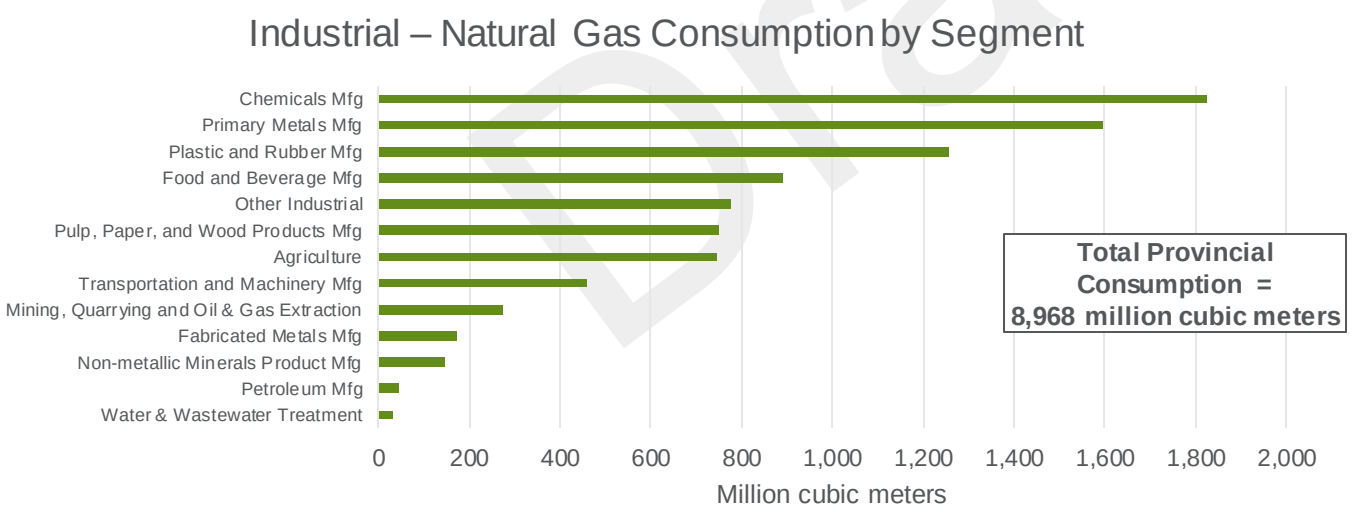
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: PROVINCIAL INDUSTRIAL CONSUMPTION BY END USE





- **Electricity consumption is** largely composed of the **Mining**, and **Primary Metals Manufacturing** segments.
- **Natural gas consumption** is largely composed of the **Chemicals Manufacturing** and **Primary Metals Manufacturing** segments.

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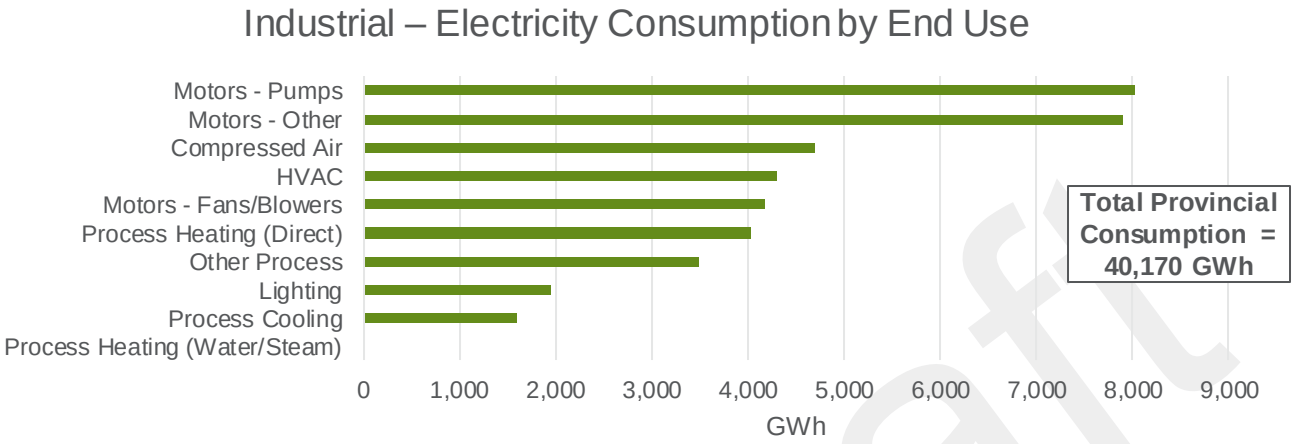
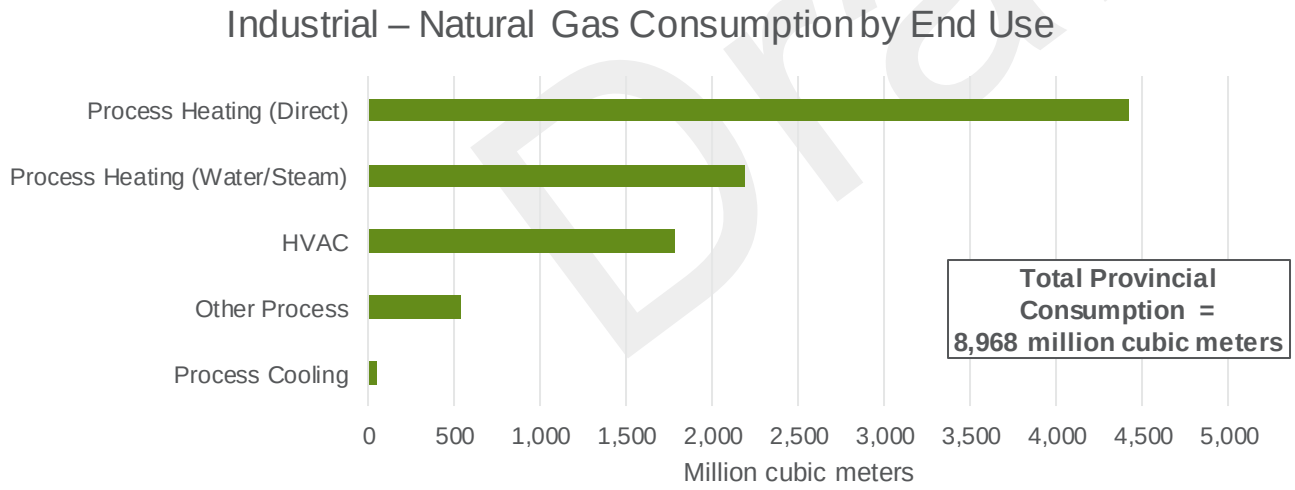
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: PROVINCIAL INDUSTRIAL CONSUMPTION BY END-USE





- **Motors** (pumps, fans and other) are used **extensively** in industrial processes and are almost entirely **powered by electricity**.
- **Gas** is used primarily for **process heating**.
- Both **gas** and **electricity** have **significant HVAC consumption**.

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TASK 03: REFERENCE FORECAST

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TASK 3: REFERENCE FORECAST
OVERVIEW

Process

Purpose of Task 3

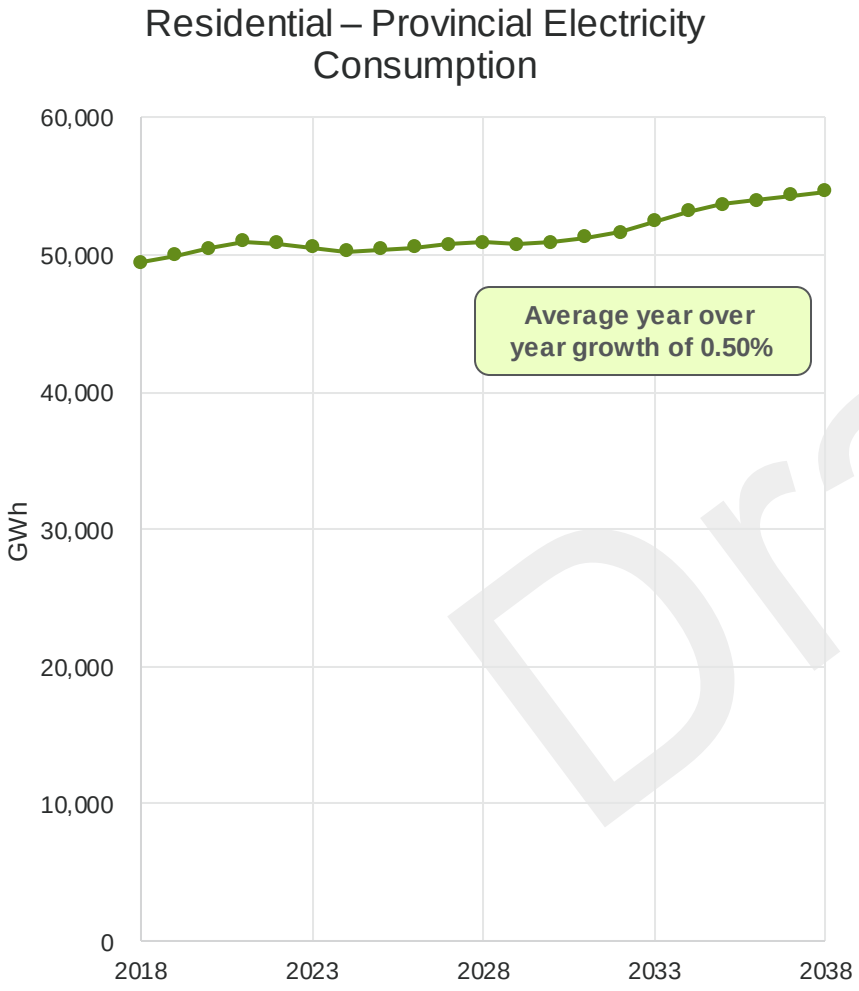
- The **Reference Forecast** is a 20-year forecast of electricity and natural gas consumption by: sector, segment, and end use.
- The reference forecast is based on the consumption forecasts provided by the NG utilities and IESO further disaggregated to the required level of granularity based on the methods and outputs of the Base Year Disaggregation (Task 2).
- The end use forecast is a key input to the DSMsim™ model that delivers projected achievable potential.

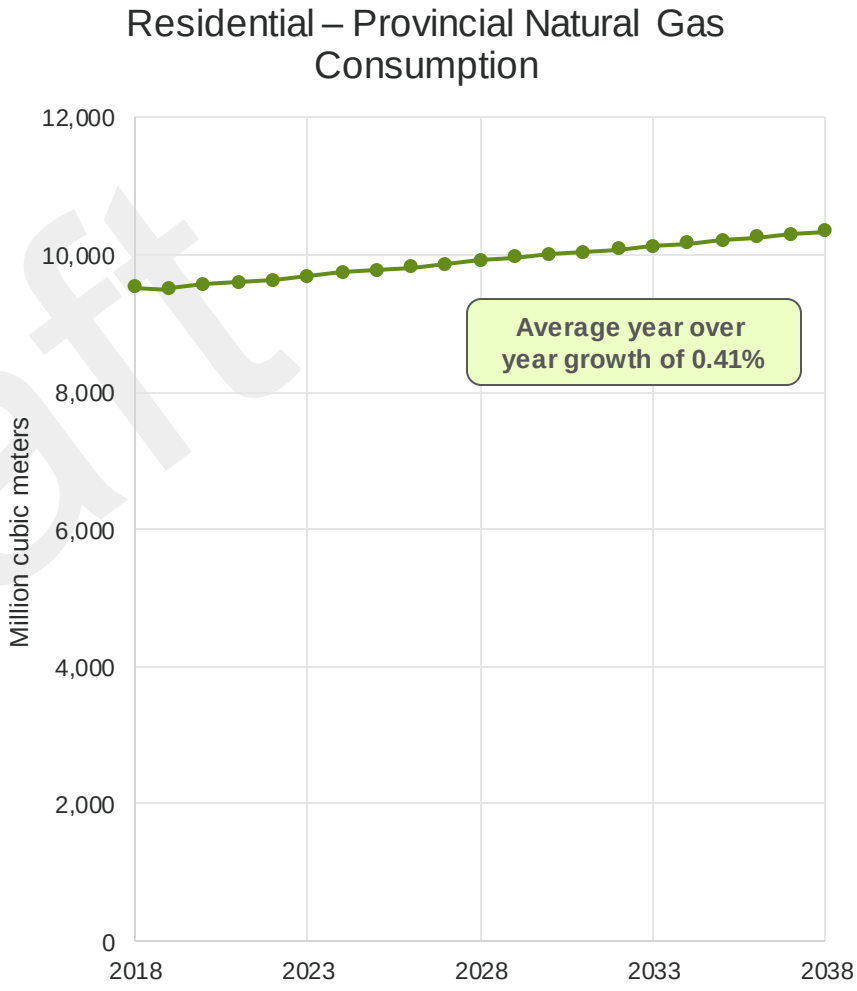
Forecast values provided by the IESO and NG utilities were allocated to the APS segments and end-uses based on the approaches and values developed as part of the Base Year Disaggregation.

- IESO provided electricity consumption data by segment, end-use, and IESO zone (same as for Base Year Disaggregation)
- NG utilities provided natural gas consumption data by sector only.
- Navigant applied the methods and values developed as part of the Base Year Disaggregation to deliver consumption by:
  - Segment
  - End-Use
  - IESO zone
- NG forecast input data is only at sector level, so projected values at segment and end-use level reflect values derived as part of Base Year Disaggregation, and the stock forecast (Residential and Commercial only).

RESIDENTIAL WORKBOOKS

CONSUMPTION BY PROVINCE





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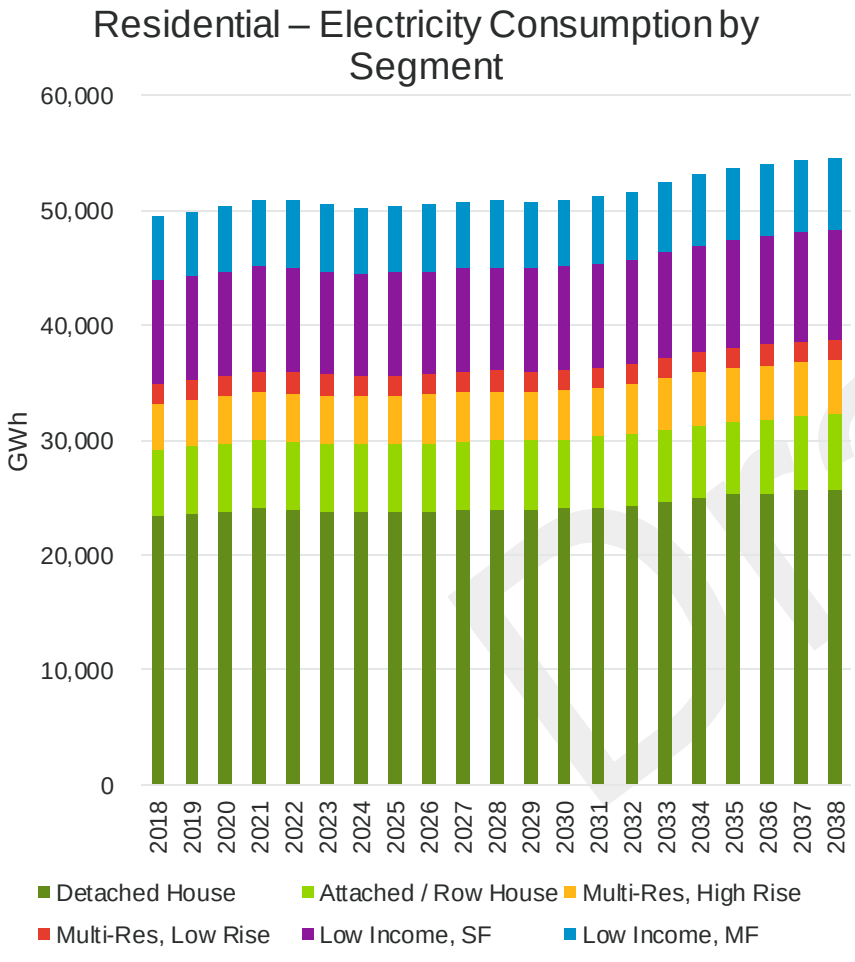
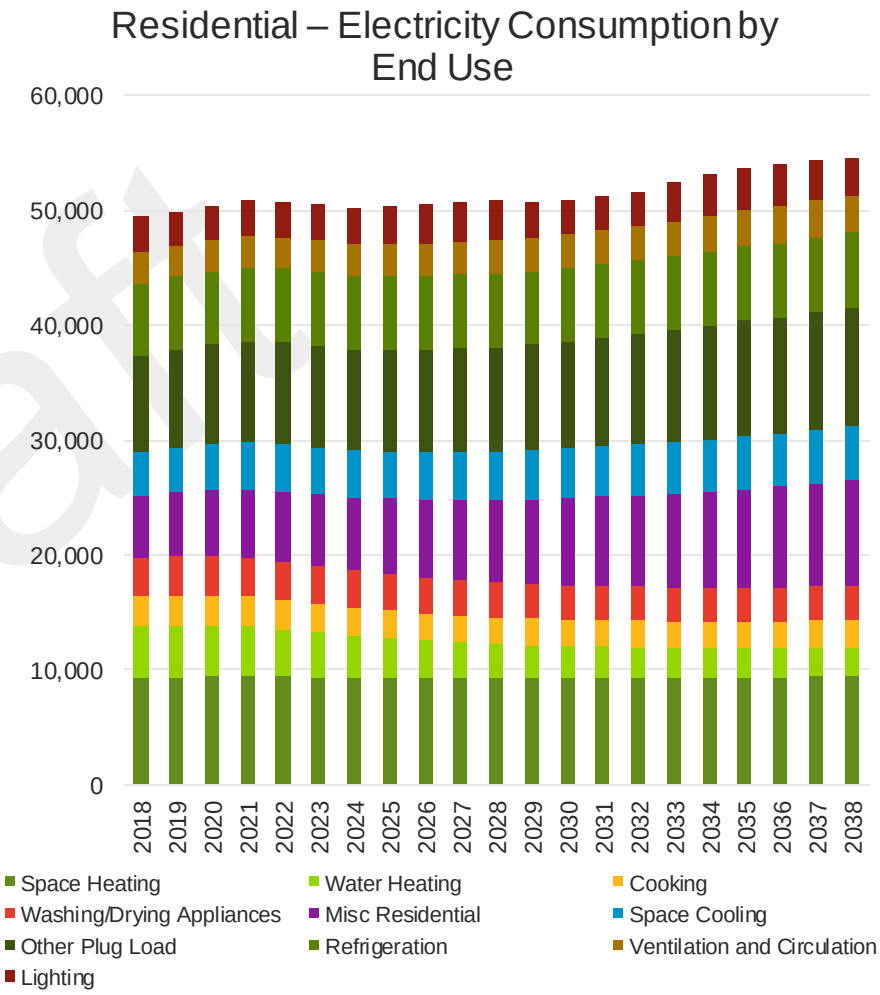
RESIDENTIAL WORKBOOKS

ELECTRICITY CONSUMPTION BY PROVINCE, SEGMENT AND END-USE





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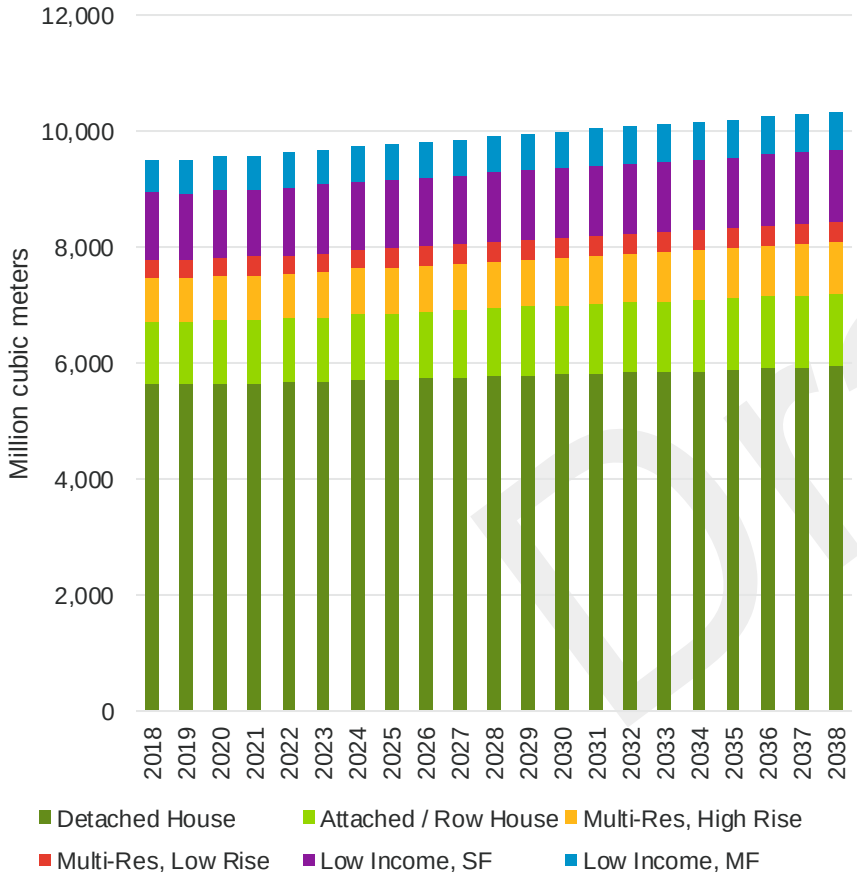
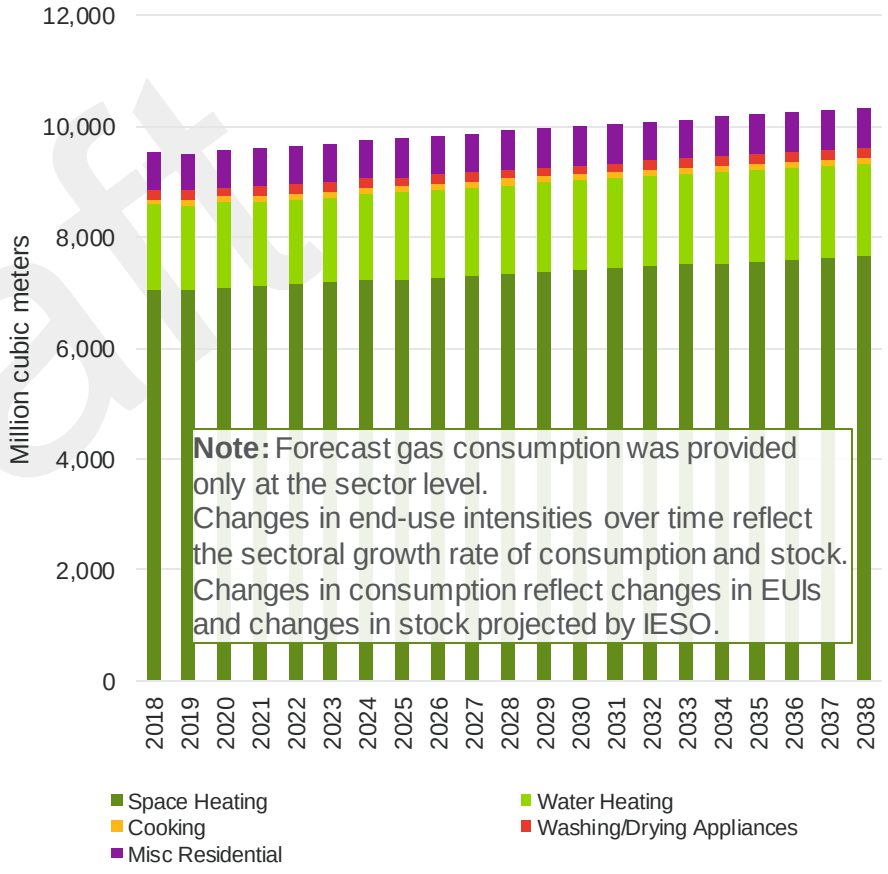
RESIDENTIAL WORKBOOKS

NATURAL GAS CONSUMPTION BY PROVINCE, SEGMENT AND END-USE

Residential – Natural Gas Consumption by Segment



Residential – Natural Gas Consumption by End Use



Note: Forecast gas consumption was provided only at the sector level.
Changes in end-use intensities over time reflect the sectoral growth rate of consumption and stock.
Changes in consumption reflect changes in EUIs and changes in stock projected by IESO.

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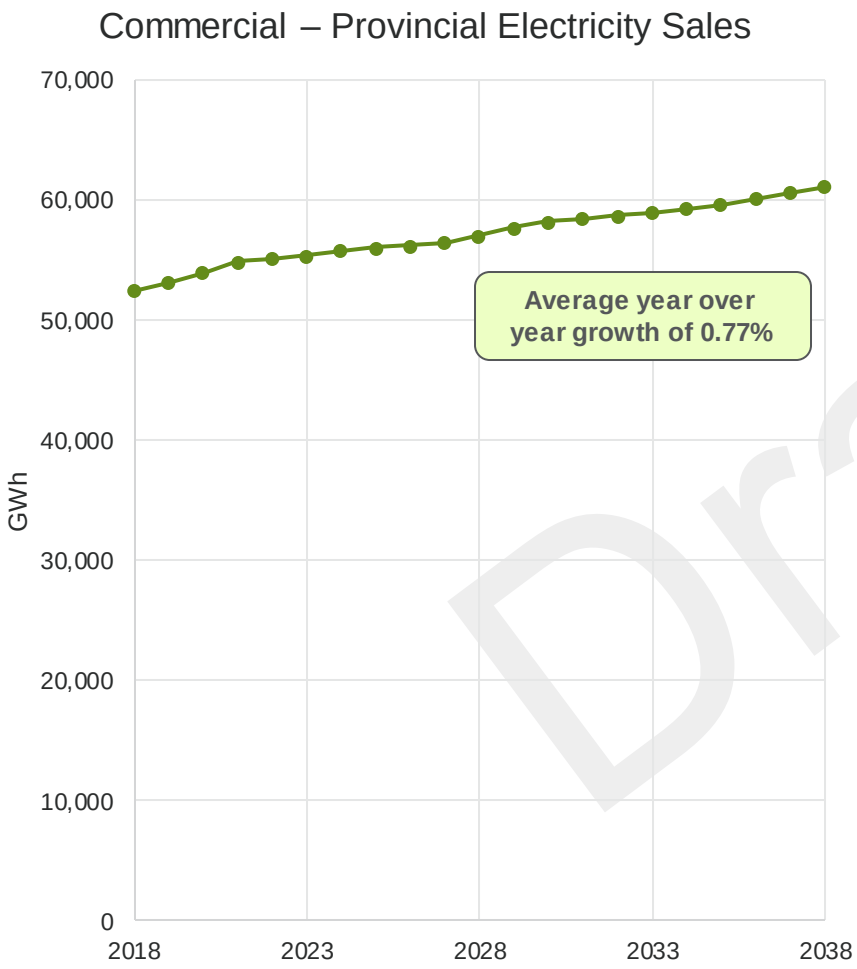
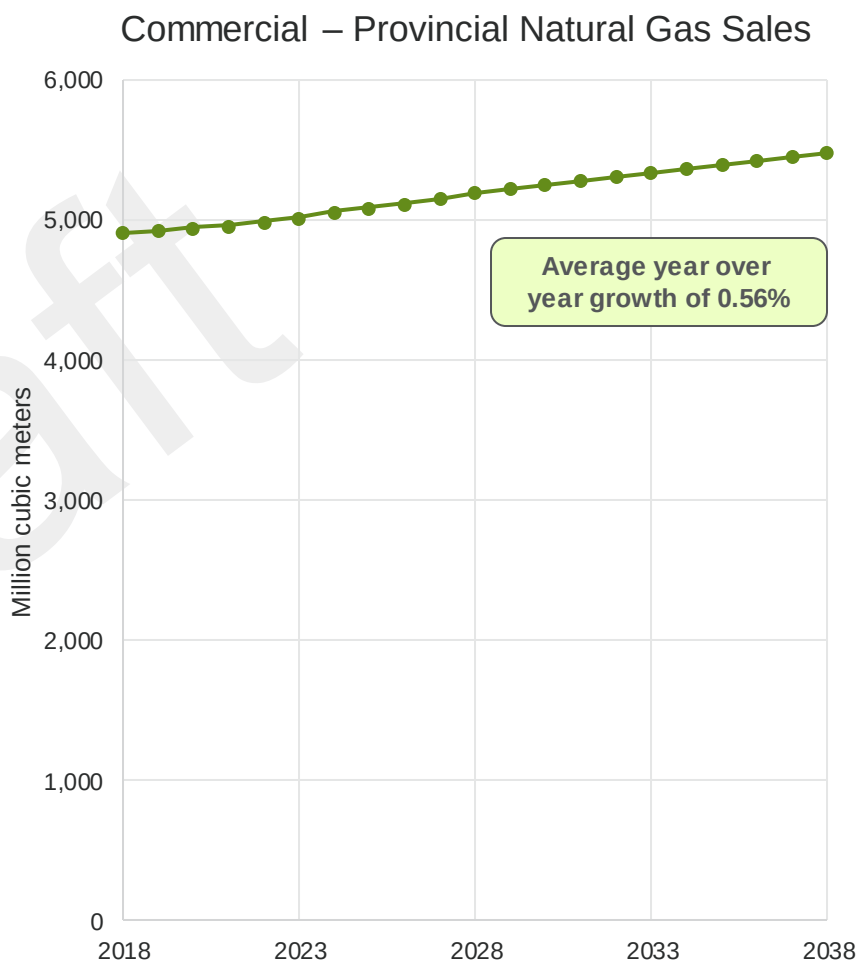
COMMERCIAL WORKBOOKS
CONSUMPTION BY PROVINCE





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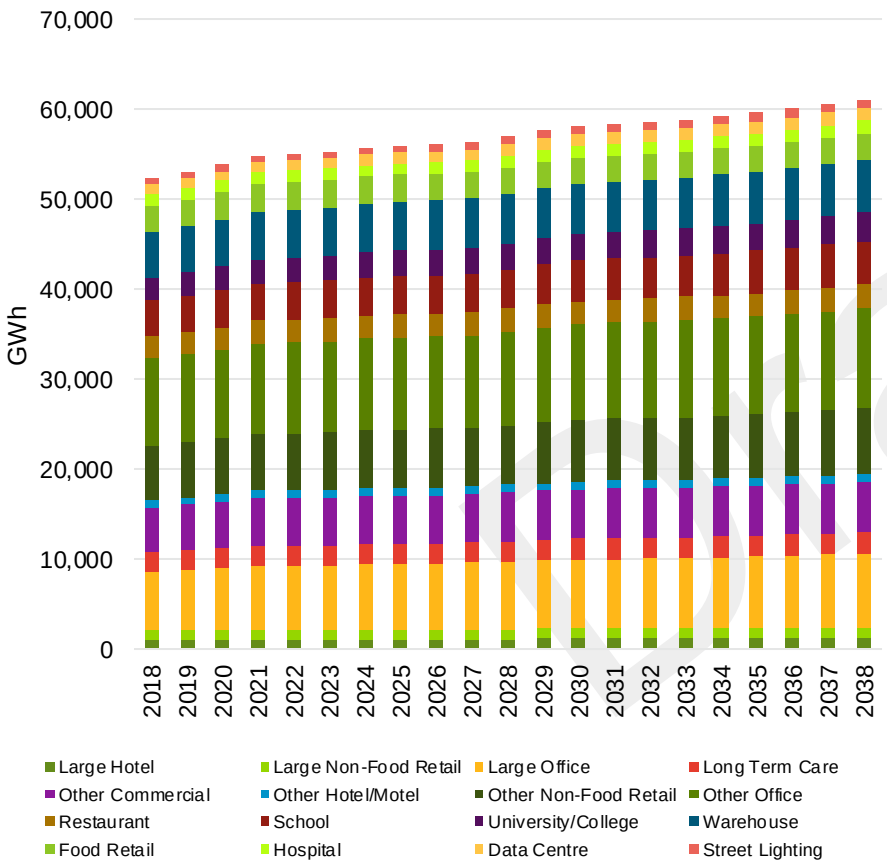
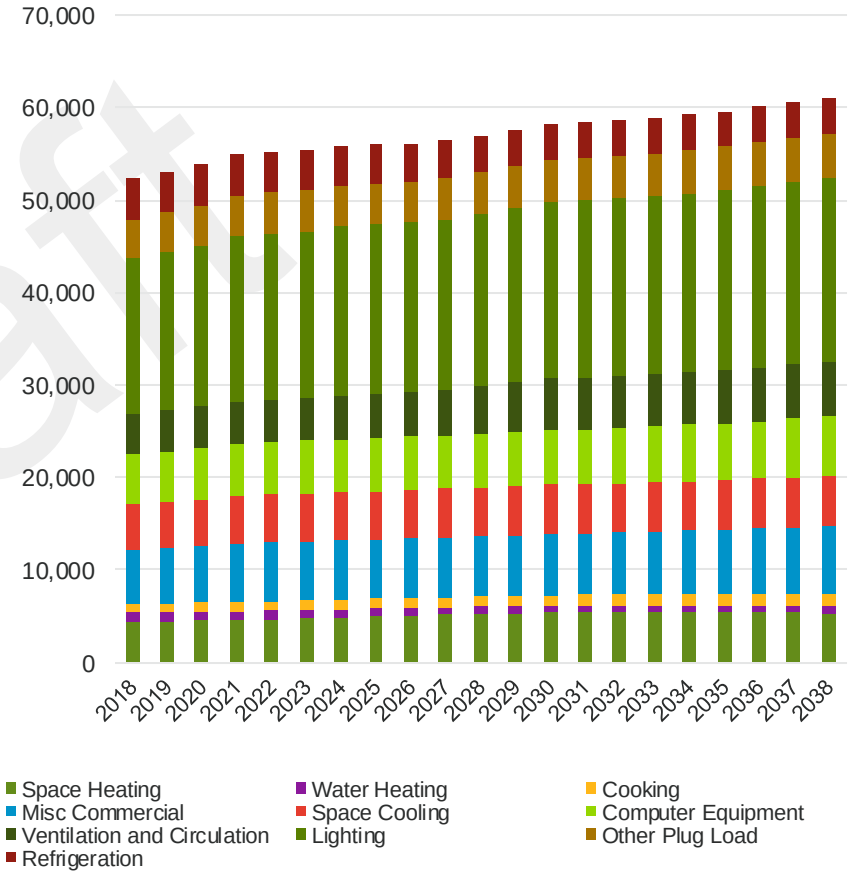
COMMERCIAL WORKBOOKS

ELECTRICITY CONSUMPTION BY PROVINCE, SEGMENT AND END-USE

Commercial - Electricity Consumption by Segment



Commercial – Electricity Consumption by End Use



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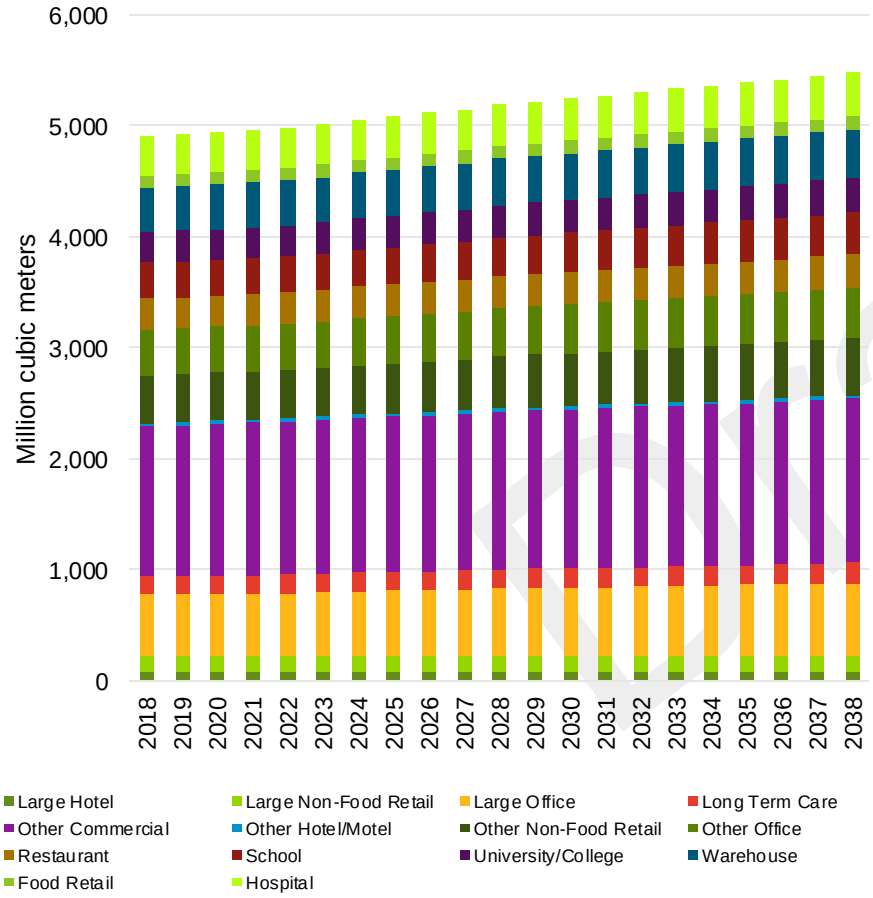
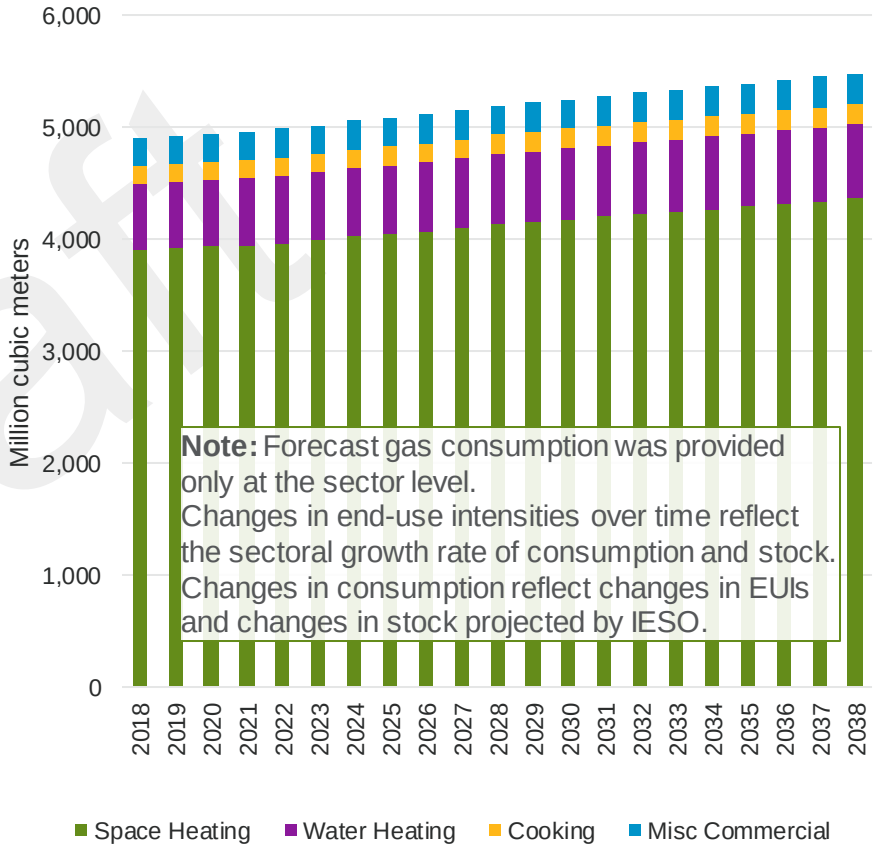
COMMERCIAL WORKBOOKS

NATURAL GAS CONSUMPTION BY PROVINCE, SEGMENT AND END-USE

Commercial - Natural Gas Consumption by Segment



Commercial – Natural Gas Consumption by End Use



Note: Forecast gas consumption was provided only at the sector level.
Changes in end-use intensities over time reflect the sectoral growth rate of consumption and stock.
Changes in consumption reflect changes in EUIs and changes in stock projected by IESO.

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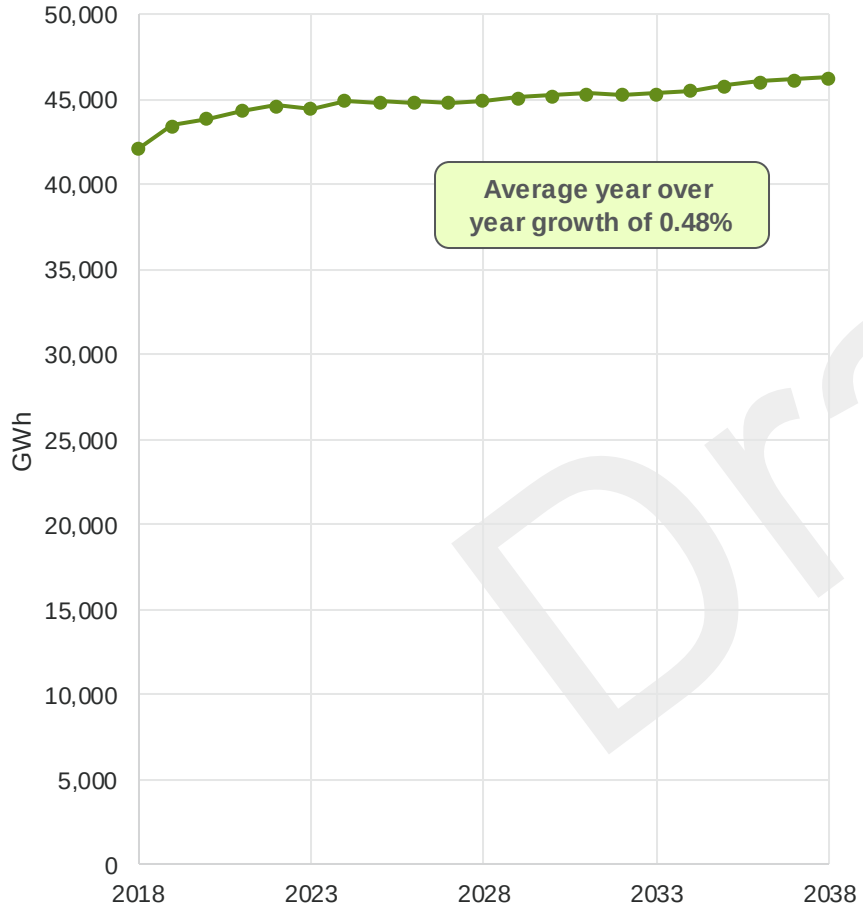
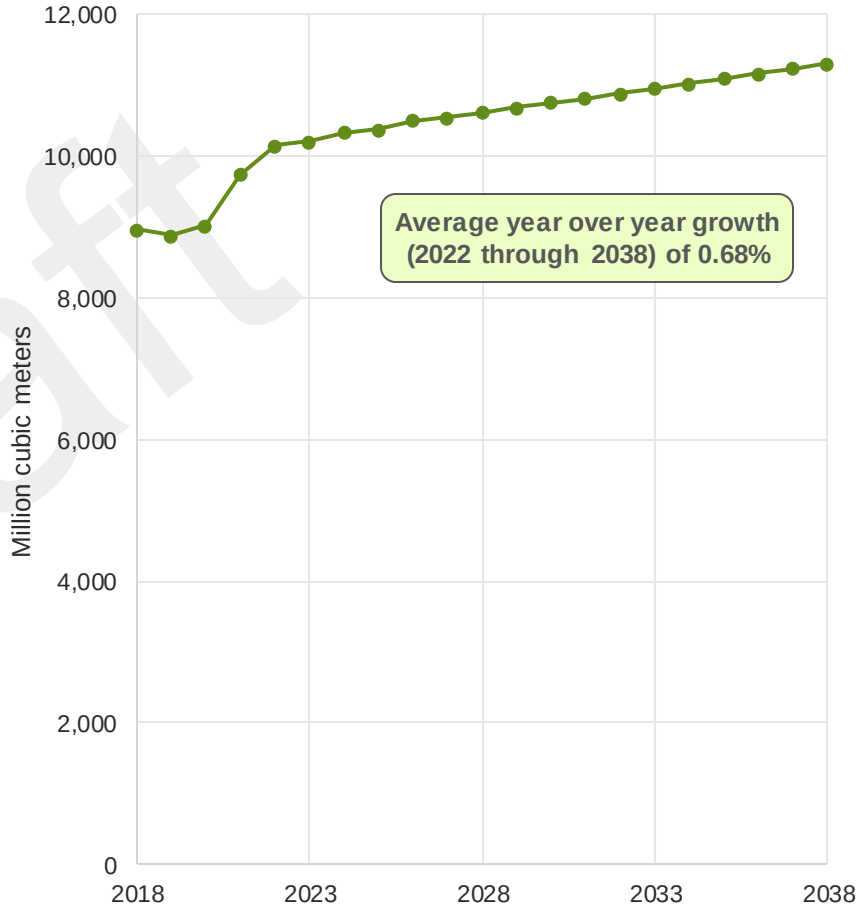
INDUSTRIAL WORKBOOKS
CONSUMPTION BY PROVINCE

Industrial – Provincial Electricity Sales



Industrial – Provincial Natural Gas Sales



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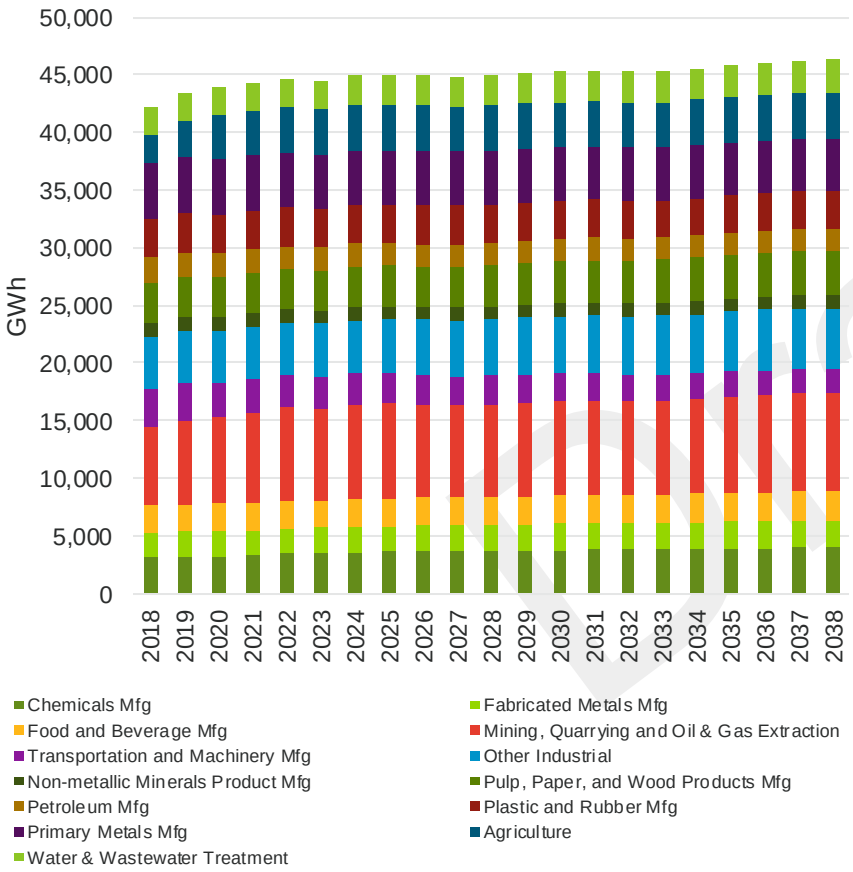
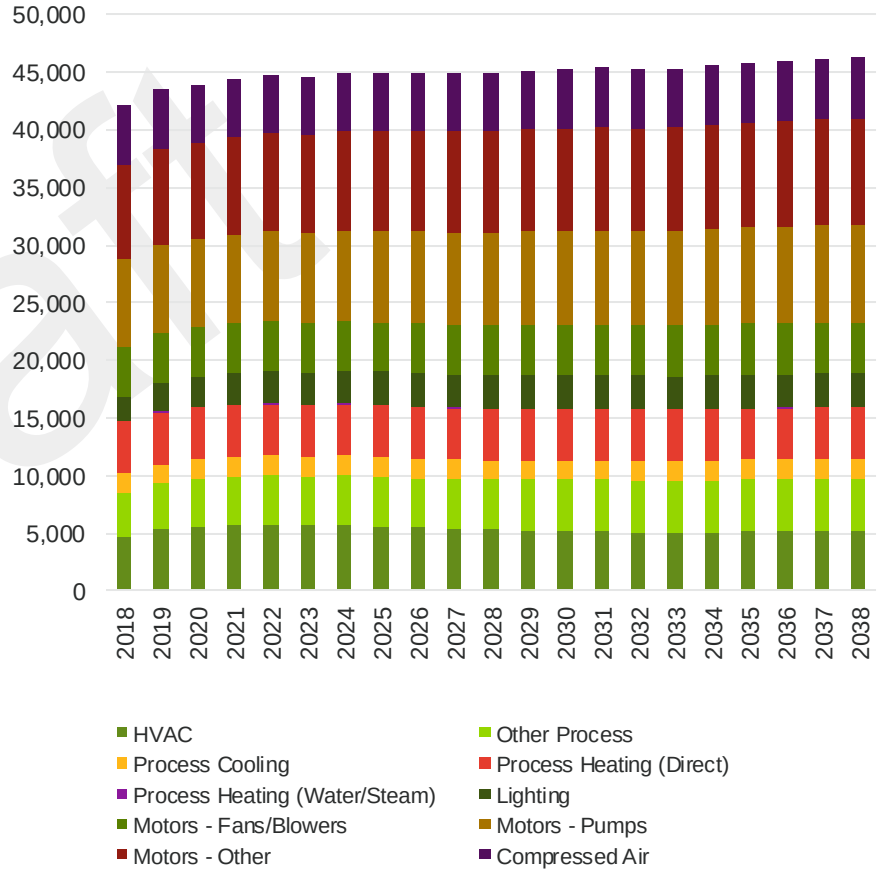
INDUSTRIAL WORKBOOKS

ELECTRICITY CONSUMPTION BY PROVINCE, SEGMENT AND END-USE

Industrial – Electricity Consumption by Segment



Industrial – Electricity Consumption by End Use



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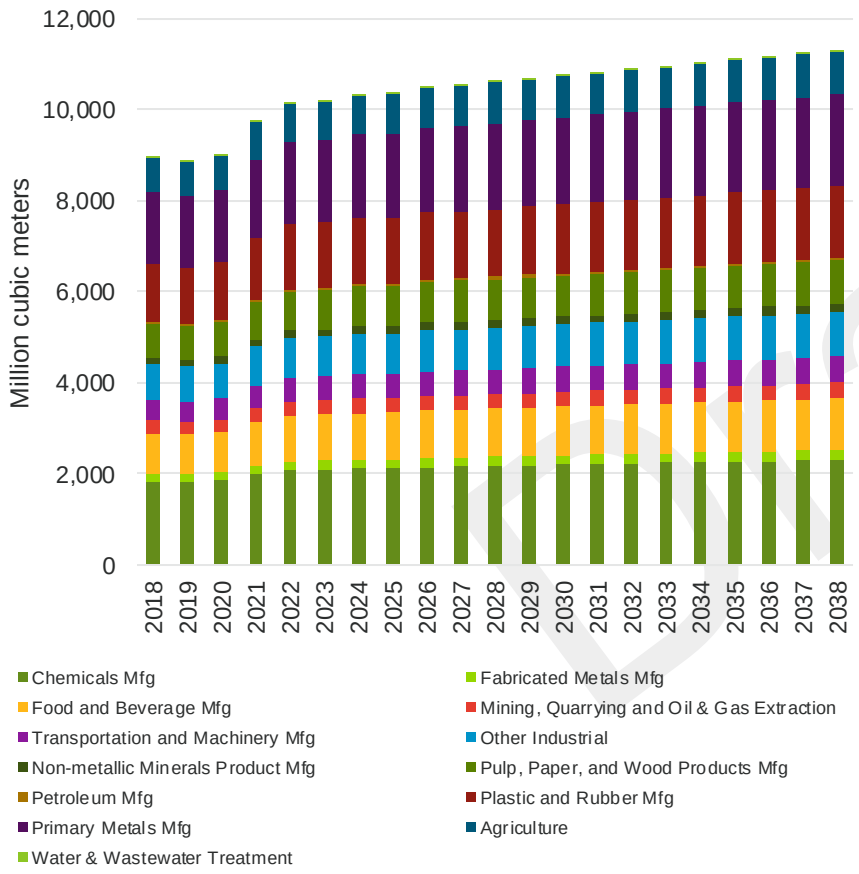
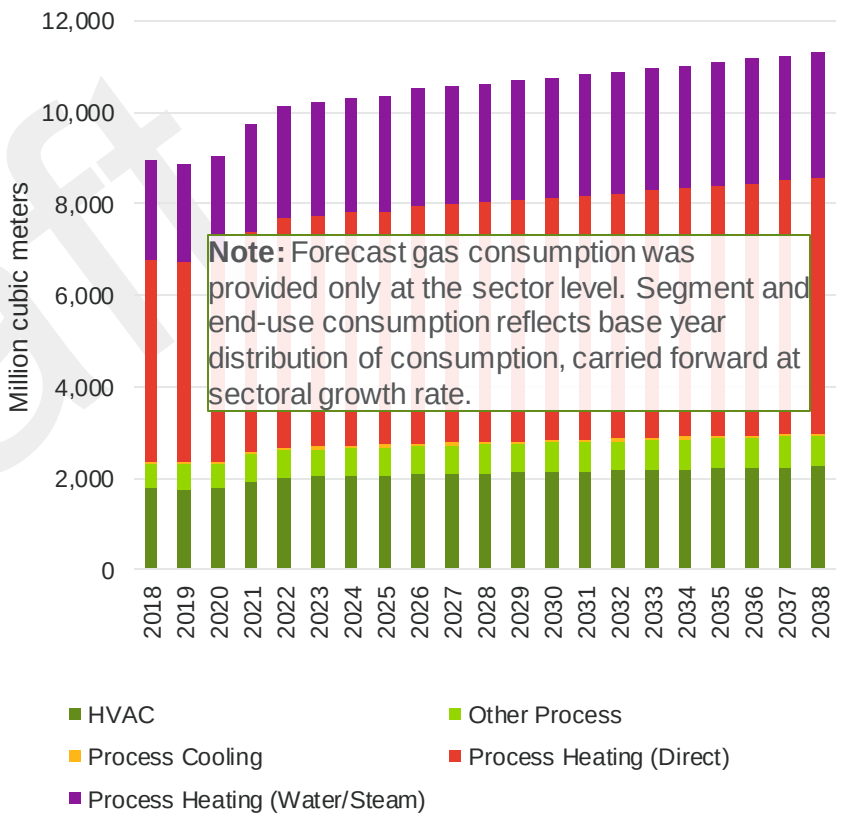
INDUSTRIAL WORKBOOKS

NATURAL GAS CONSUMPTION BY PROVINCE, SEGMENT AND END-USE

Industrial – Natural Gas Consumption by Segment



Industrial – Natural Gas Consumption by End Use



Note: Forecast gas consumption was provided only at the sector level. Segment and end-use consumption reflects base year distribution of consumption, carried forward at sectoral growth rate.

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TASK 07: ACHIEVABLE POTENTIAL

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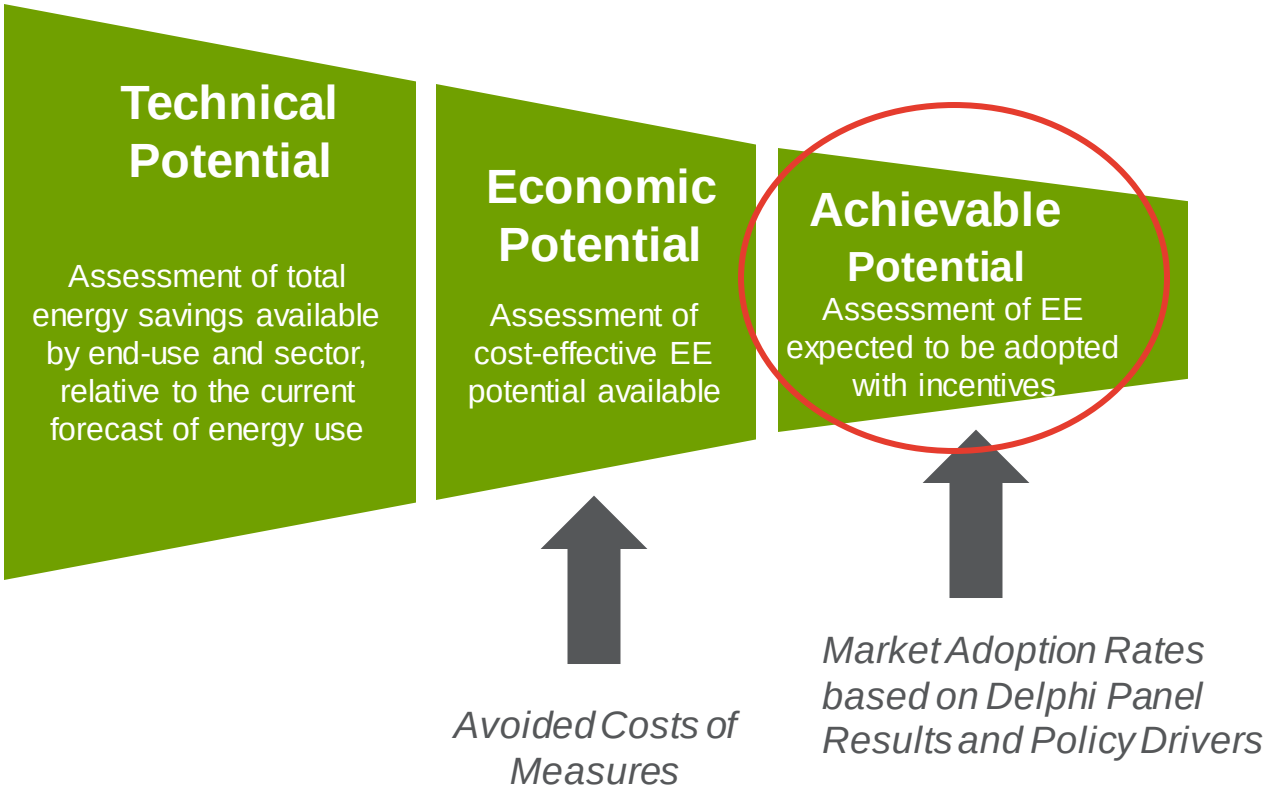
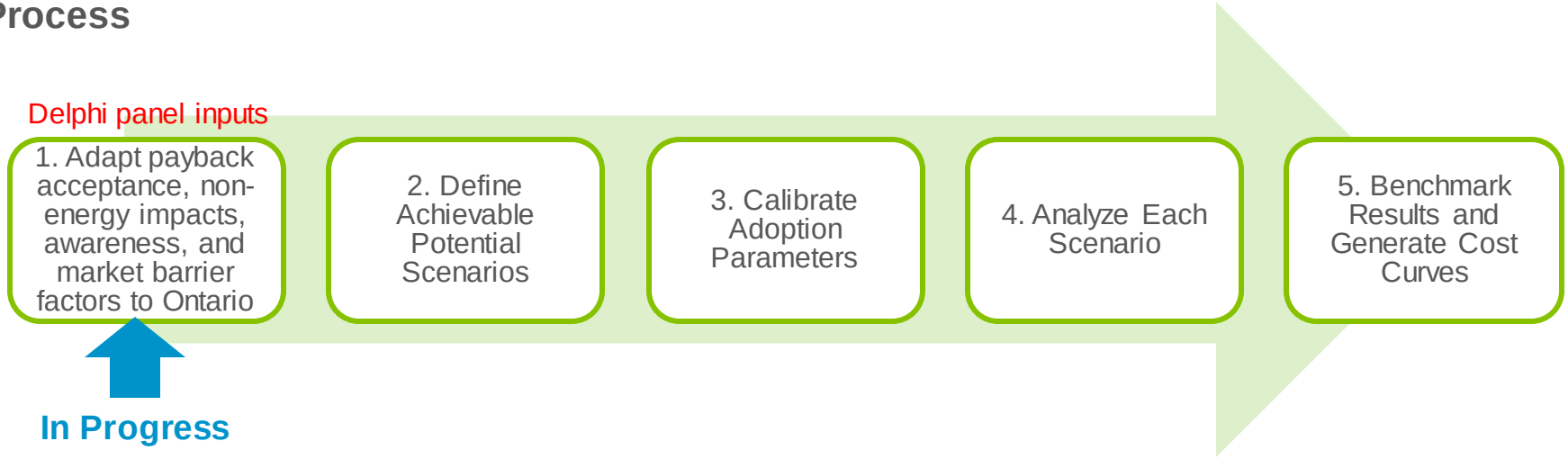
What is Achievable Potential? How does it compare to Economic Potential?



TASK 07: ACHIEVABLE POTENTIAL

OVERVIEW

Process



Purpose

- The **Achievable Potential** is the subset of the **Economic Potential** that reflects measure adoption given existing (and future) market conditions.
- As part of this study, Navigant is projecting **three different Achievable Potential scenarios**. The Project Team would like your input regarding how those are defined.
- Scenarios are defined based on the "levers" that are available through the model: things like incentive levels, as well as "softer" parameters like word-of-mouth spreads, and how much importance consumers put on various non-energy impacts.

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Discussion Question

1 **Which three Achievable Potential scenarios should be assessed?**

Three types of possible scenarios will be discussed:

Budget Targeted

How much potential for a given level of spend?

Potential Targeted

How much do we have to spend to get to a given potential?

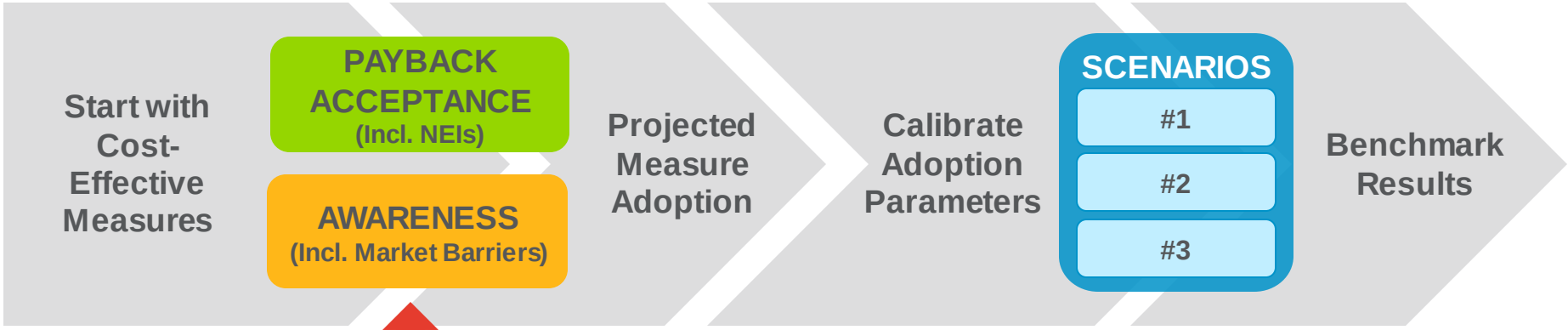
Other

Interesting "what if" scenarios

There are important considerations within each step of the Achievable Potential process.

*Inputs are informed by **Delphi Panel**.*

***Budget levels** and **program design choices** help shape the trajectory of the annual spending and savings forecasts.*



*Focuses on **incentivizing measures that pass selected TRC screen.***

DELPHI PANEL

*Results are calibrated to initially align with **historic program savings and expenditures**.*

*Results benchmarked against **past Ontario APS and other jurisdictions.***

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1 Which three Achievable Potential scenarios should be assessed?

Some Options:

Budget Targeted *How much potential for a given level of spend?*	1A	Set a maximum total spend for individual years
	1B	Set a maximum total spend for a group of years (e.g. 500M over 5yrs)
	1C	Set specific $/kWh variable costs and not capping the budget
Potential Targeted *How much do we have to spend to get to a given potential?*	2A	Determine maximum potential, by setting incentives equal to 100% of the incremental measure cost
	2B	2A, while also applying awareness parameters of "ideal" program
	2C	After 2A and/or 2B, set "% of max" target (e.g., what is the cost of achieving 50% of "max achievable"?)
Other *Interesting "what if" scenarios*	3A	Vary one of: measure level incentive/admin amounts, avoided costs, retail rates, or set GHG targets
	3B	Carbon-targeted: allow fuel switching and other measures to compete and incentivize electrification.
	3C	Apply multipliers to one of the other forecasted values (e.g., EUI, stock growth, projected sales)

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Next Steps

Task 7 – Achievable Potential Analysis

1. Complete analysis of Delphi panel survey data.
2. Prepare and finalize virtual discussion guide for Delphi panel
3. Select Achievable Potential scenarios.

Action Items and Next Steps

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Request for Project Plan Comments

- The APS Project Team is requesting feedback on the achievable potential scenarios discussed today.
- Please submit your comments using the comment template posted on the APS engagement webpage to engagement@ieso.ca by Friday March 1, 2019.

What three achievable potential scenarios should be modeled in the 2019 APS and why?

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Thank You

- Thank you for your engagement.
- For more information about the APS, including AG meeting materials and interim APS deliverables visit the APS engagement webpage.
- The next public webinar will be held in the spring of 2019 which will focus on reviewing the technical and economic potential task results.

Questions

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