2019 Achievable Potential Study Advisory Group Meeting #8

February 14, 2019

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Meeting Agenda

Time	Topic	Lead
10:00-10:10	Welcome & Introductions	Nik Schruder (IESO) & Pascale Duguay (OEB)
10:10-10:15	Review and confirmation of: • Mtg #7 minutes • Action items from Mtg #7	Valerie Bennett (OEB)
10:15-10:25	Project status update	Peter Steele-Mosey (Navigant)
10:25-11:15	Task 2: Base Year Disaggregation Results	Dixon Grant (Navigant)
11:15-11:45	Task 3: Reference Forecast Results	Farhad Daruwala (Navigant)
11:45-12:15	Task 7: Achievable Potential	Peter Steele-Mosey (Navigant) & Tyler Capps (Navigant)
12:15-12:45	Lunch	
12:45-1:45	Task 7: Achievable Potential Continued	Peter Steele-Mosey (Navigant) & Tyler Capps (Navigant)
1:45-2:15	Task 9: Sensitivity Analysis	Peter Steele-Mosey (Navigant) & Tyler Capps (Navigant)
2:15-2:25	Next steps and 30 day outlook	Peter Steele-Mosey (Navigant)
2:25-2:30	Wrap-up	Nik Schruder

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Meeting Objectives

- Provide project schedule and status updates
- Present draft base year disaggregation and draft reference forecast task results
- Present achievable potential methodology and discuss scenarios to be used for this study
- Present and discuss approach to sensitivity analysis

Action Items from December 13th Meeting

Action Items Identified	Status/Next Steps
Gas utilities to confirm whether the avoided costs they provided to Navigant include the federal carbon price.	Both Enbridge and Union Gas confirmed avoided costs do not include the cost of carbon.
Navigant to calculate cost effectiveness of individual measures and work with Project Team to select cost effectiveness threshold based on results.	Still under discussion with the Project Team. Cost effectiveness threshold will be shared once confirmed.
Project Team to provide an update on electricity avoided cost assumptions.	Still under discussion with the Project Team. Updated assumptions will be shared once confirmed.
Project Team to confirm the selected segment for whole building analysis.	Navigant is moving ahead with the hospital segment.

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INTEGRATED NATURAL GAS AND ELECTRICITY CONSERVATION ACHIEVABLE POTENTIAL STUDY

UPDATES FROM NAVIGANT

2019-02-14

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SCHEDULE & STATUS UPDATES

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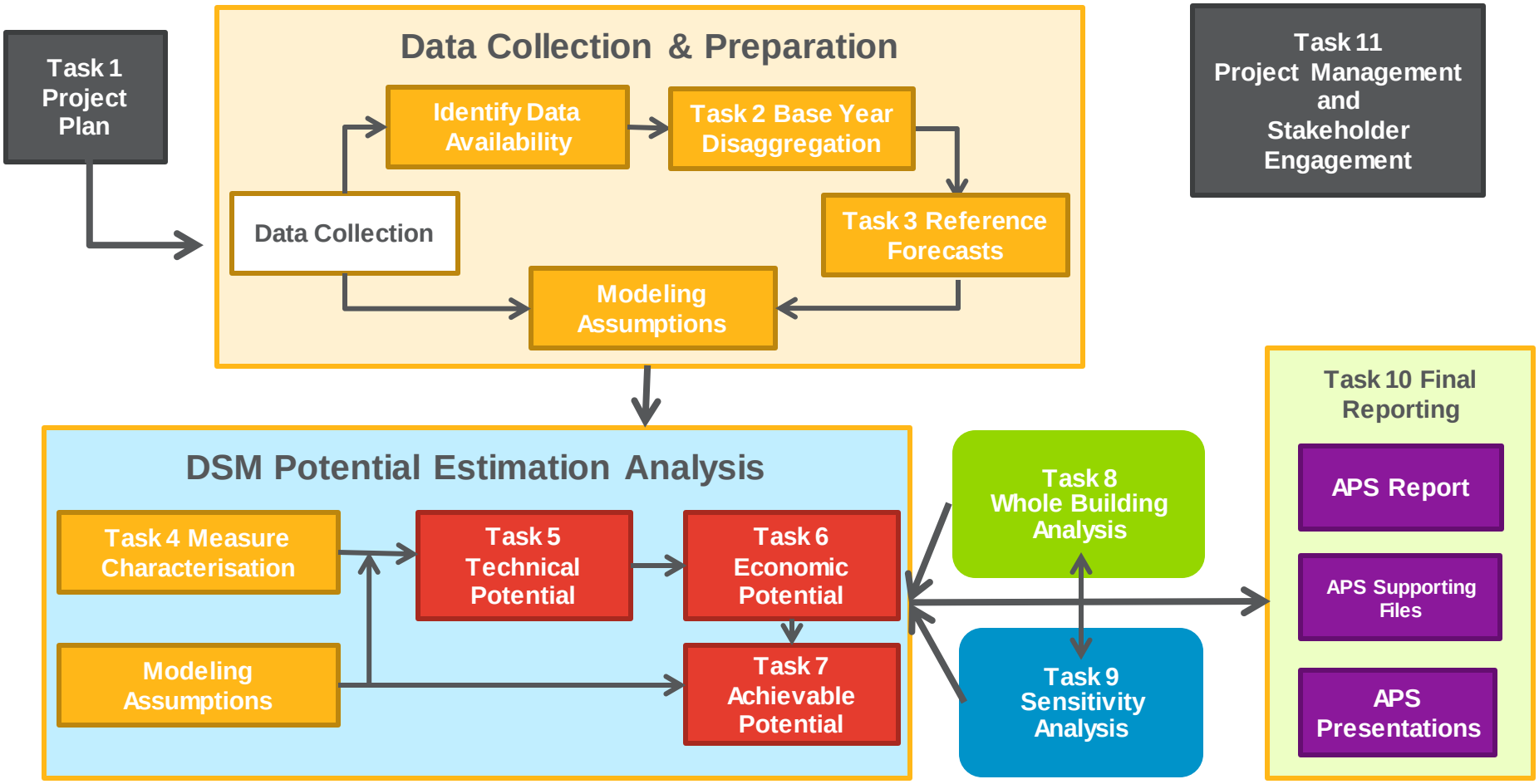
SCHEDULE & STATUS UPDATES

REVIEW PROJECT OVERVIEW



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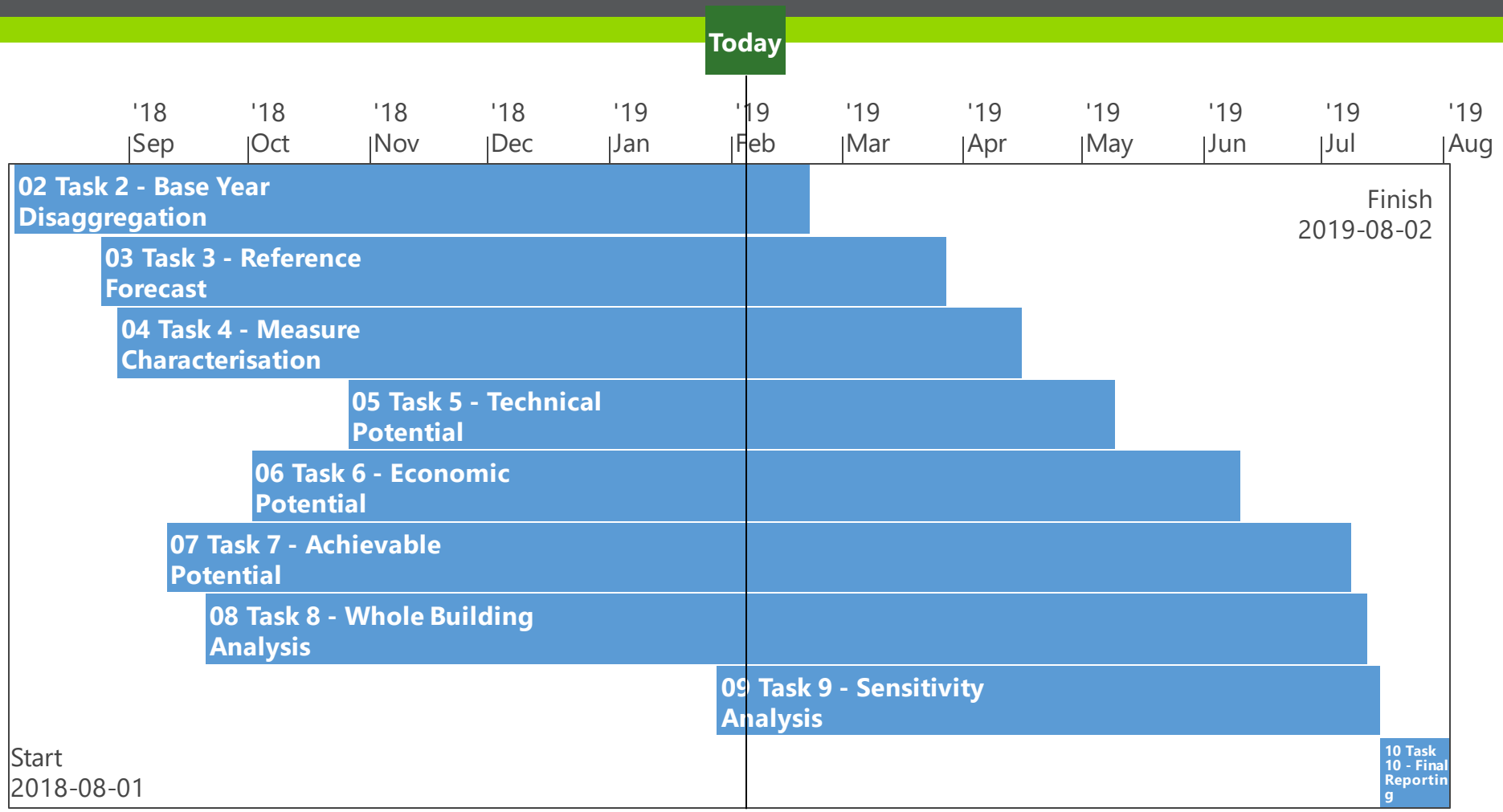
SCHEDULE & STATUS UPDATES

PROJECT TIMELINE



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SCHEDULE & STATUS UPDATES

PROJECT TIMELINE

Task	% Complete	Start Date	Prior End Date (2018-12-13 AG Meeting)	Current End Date Projection	Notes
01 – Project Plan	100%	2018-08-01	2018-09-13	2018-09-13	Completed
02 – Base Year Disaggregation	95%	2018-09-01	2018-12-06 (electricity) / 2018-11-30 (NG)	2019-01-22	Report chapter submitted
03 – Reference Forecast	90%	2018-09-01	2019-02-05	2019-02-05	NB: Report Chapter to be completed by end of Feb.
04 – Measure Characterisation	90%	2018-09-01	2019-02-01	2019-02-15*	Measure list expanded.
05 – Technical Potential	15%	2018-10-26	2019-02-28	2019-03-27	Additional review time provided to PT & lag due to T04
06 – Economic Potential	5%	2018-11-20	2019-04-01	2019-04-26	Lag from upstream activities
07 – Achievable Potential	20%	2018-09-27	2019-07-09	2019-06-17	Delphi approach adopted
08 – Whole Building Analysis	25%	2018-09-10	2019-06-20	2019-06-24	Scheduling updates (working group)
09 – Sensitivity Analysis	10%	2019-01-21	2019-07-22	2019-06-28	Due to upstream changes
10 – Final Report	10%	2018-11-15	2019-08-23	2019-08-02	Due to upstream changes

**NB measure characterisation QC and adjustment continues through potential estimation. End date captures first-round characterisation and review efforts.*

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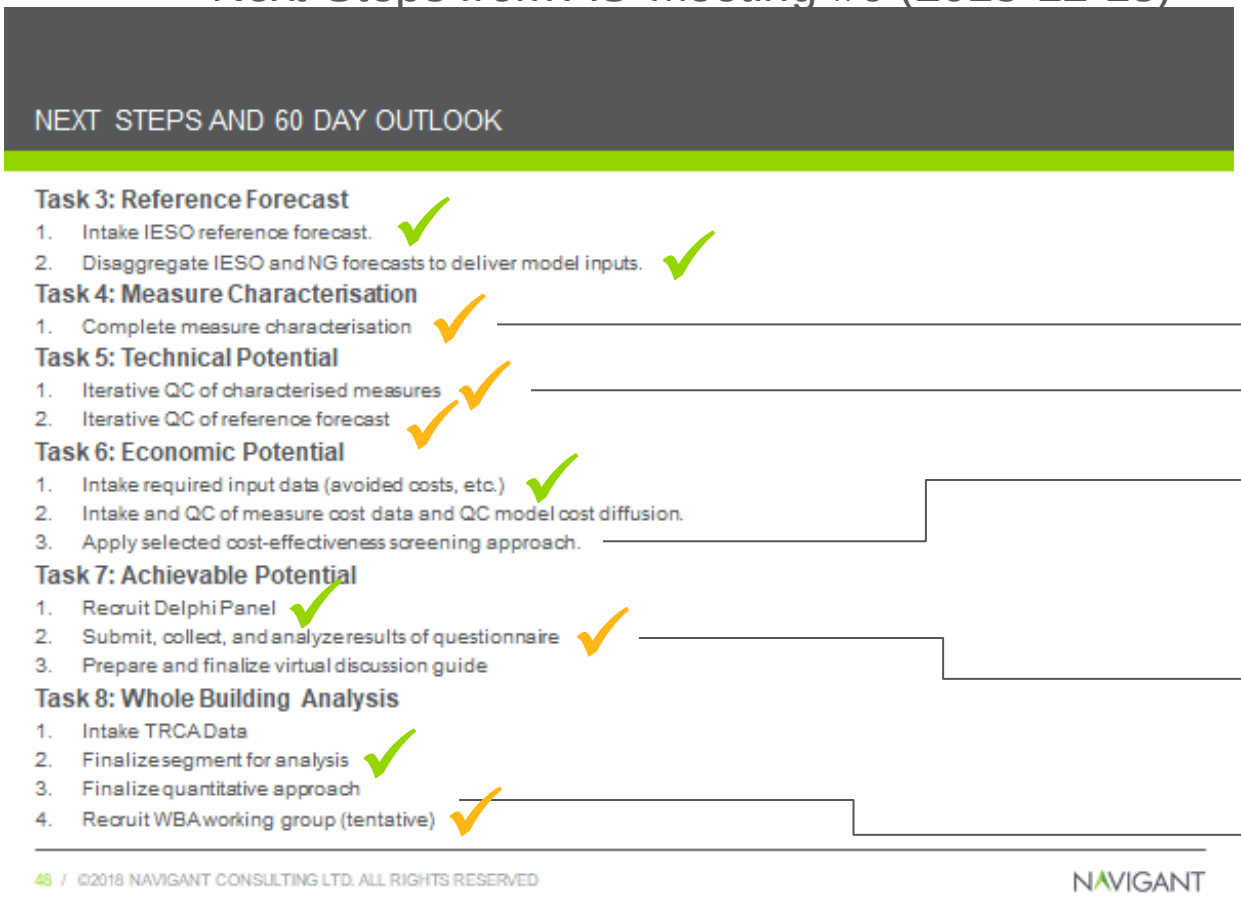
- **Task 2 (Base Year Disaggregation) Activities**
  - Summary presentation completed, and draft report chapter delivered.
- **Task 3 (Reference Forecast) Activities**
  - Summary presentation completed. Report chapter being drafted.
- **Task 4 (Measure Characterisation) Activities**
  - Initial measure characterisation complete. Final batch of measures currently under review by sub-committee.
  - Ongoing updates expected as part of QC process associated with Technical, Economic, and Achievable Potential.
- **Task 5 (Technical Potential) Activities**
  - Measure stacking logic in process of being implemented.
  - Ongoing intake and QC of measure characterisation data.

- **Task 6 (Economic Potential) Activities**
  - Draft electricity avoided costs provided by IESO.
  - Continued discussions with Project Team regarding cost-effectiveness screen TRC threshold.
- **Task 7 (Achievable Potential) Activities**
  - Delphi-style survey deployed and recovered. Analysis of responses in progress.
  - Begun discussions re: Achievable Potential scenarios.
- **Task 8 (Whole Building Analysis) Activities**
  - Segment finalized: Hospitals.
  - IESO and NG utility historical data intake in process.
  - Scope and required expertise for potential working group to be confirmed following in-depth review of program data (currently in process).
- **Task 9 (Sensitivity Analysis) Activities**
  - Potential sensitivity parameters identified.
  - Key decisions w.r.t. which parameters will be tested to be discussed today.

Next Steps from AG Meeting #6 (2018-12-13)



First round complete. Revisions to continue through development of potential estimates.

Iterative QC ongoing

Project Team and Navigant in discussions regarding cost-effectiveness screening

Analysis of Delphi-style survey and development of discussion guide in process

TRCA data unavailable for legal reasons. Quantitative approach to be finalized following review of existing program data.

TASK 02: BASE YEAR DISAGGREGATION

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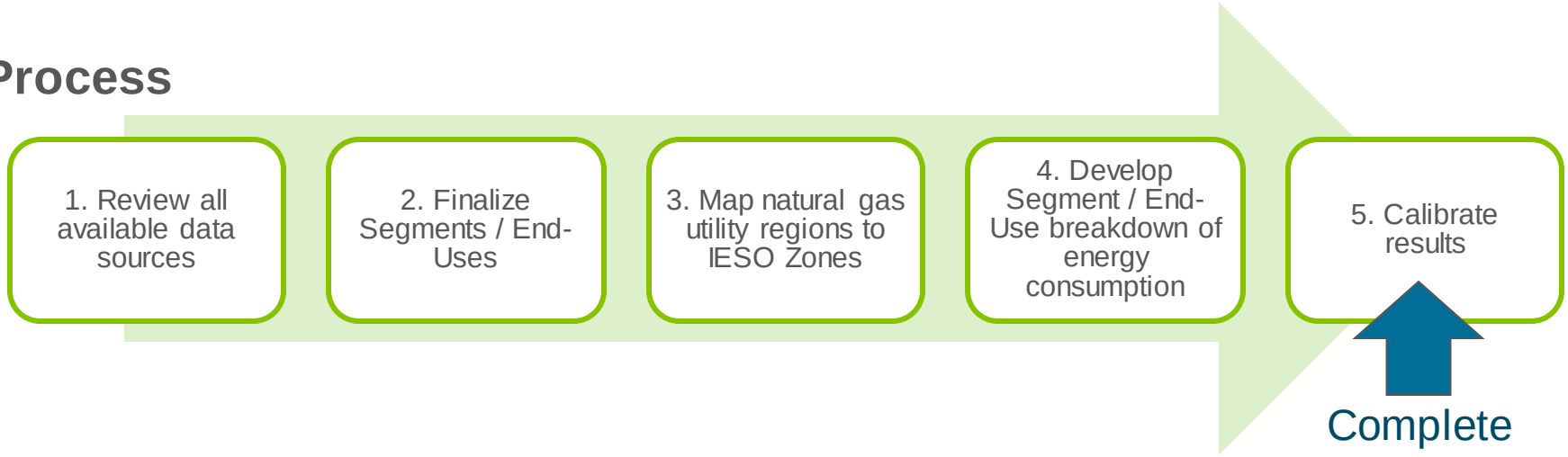
TASK 2: BASE YEAR DISAGGREGATION
OVERVIEW

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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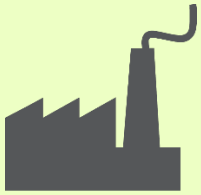
TASK 2: BASE YEAR DISAGGREGATION

BASE YEAR DATA RECEIVED

APS base year consumption and stock data was provided by the IESO, Enbridge Gas Distribution and Union Gas. In some cases the input granularity does not match the requirements of the study.

	Electricity	Natural Gas
Residential 	Consumption Data provided by segment, end-use, and IESO Zone	Consumption Data provided by segment, IESO Zone, and natural gas region
	Stock Households provided by segment, and IESO Zone	Stock Number of customers provided by segment, IESO Zone, and natural gas region.
Commercial 	Consumption Data provided by segment, end-use, and IESO Zone	Consumption Provided by segment, IESO Zone (~75% of consumption) and natural gas region
	Stock Floor space provided by segment and IESO Zone	Stock Number of customers provided by segment, IESO Zone, and natural gas region
Industrial 	Consumption Data provided by segment, end-use and IESO Zone	Consumption Data provided by segment, IESO Zone (Union only) and natural gas region
	Stock No stock provided	Stock No stock provided

*Note that Enbridge consumption was only provided by segment and sector

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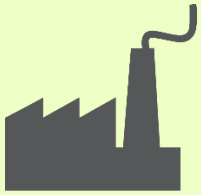
APS base year data are transformed to deliver granularity required by APS. Calibration ensures that aggregated values match those delivered to Navigant by IESO and utilities.

Key Transformations

	Electricity	Natural Gas
Residential 	Segment Allocation: • Low Income Single Family • Low Income, Multi-Family	Segment Allocation: • Low Income Single Family • Low Income, Multi-Family End-Use Allocation • Input data not split by end-use Fuel Share Estimation (Gas-Connected Stock)
Commercial 	Segment Allocation: • Data Centres	Geographic Allocation • ~75% BYD data provided mapped to IESO zones. Remainder allocated by Navigant. End-Use Allocation • Input data not split by end-use Fuel Share Estimation (Gas-Connected Stock)
Industrial 	Segment Allocation: • Agriculture • Water/Wastewater Treatment Plants End-Use Allocation: • Input data for new segments not split by end-use	Geographic Allocation • EGD BYD data mapped to IESO zones by Navigant. End-Use Allocation • Input data not split by end-use

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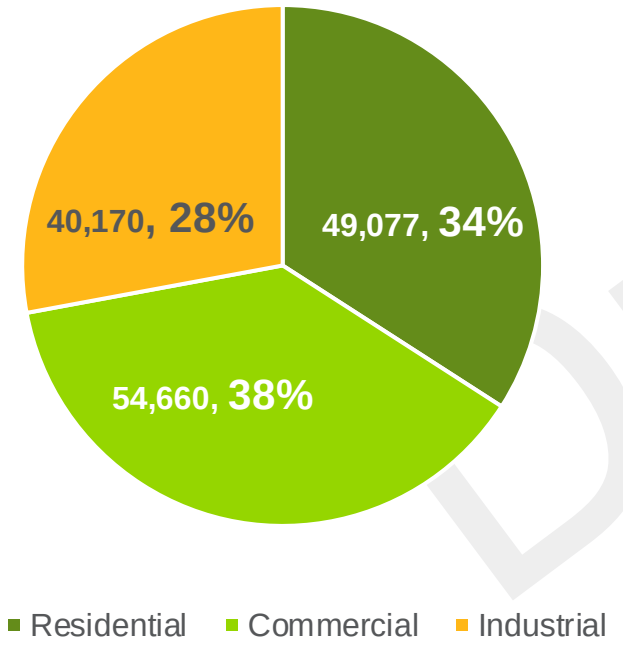
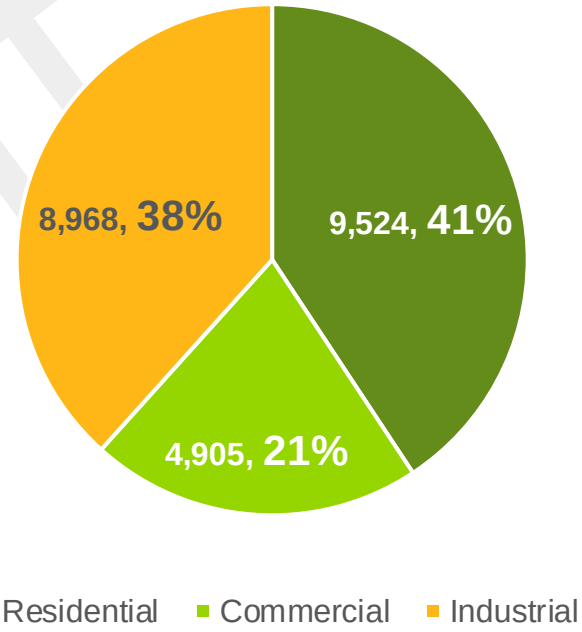
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: OVERVIEW OF SECTORAL CONSUMPTION

Electricity Consumption (GWh)



Natural Gas Consumption (million cubic meters)



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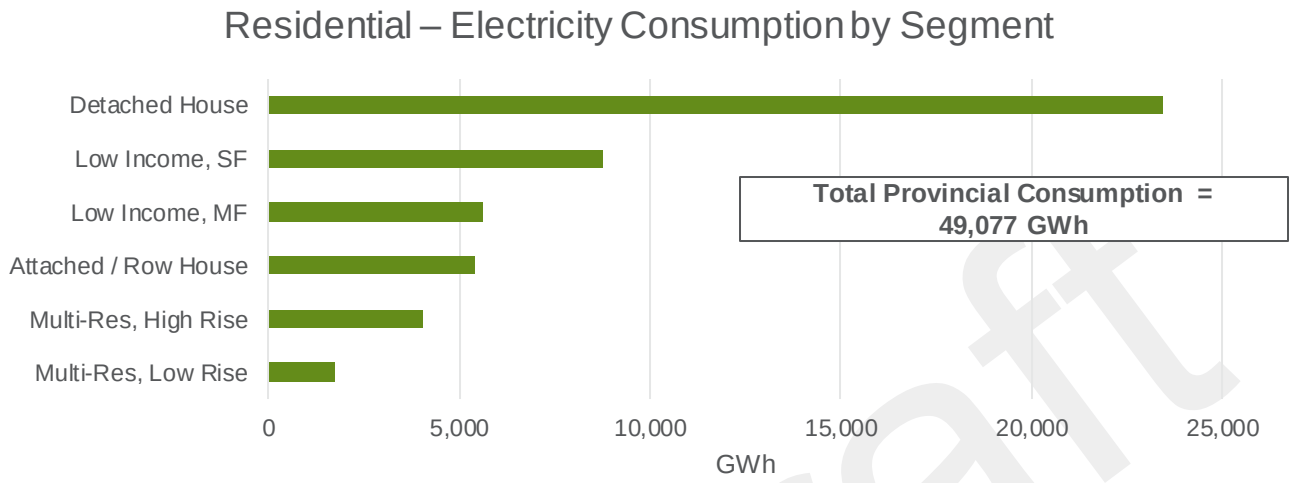
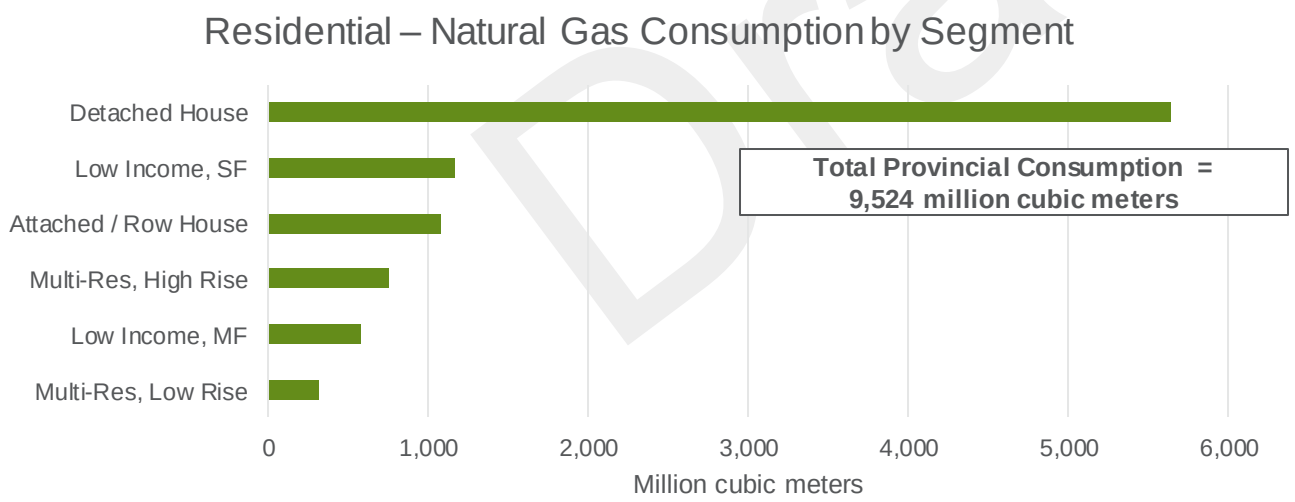
TASK 02 – BASE YEAR DISAGGREGATION

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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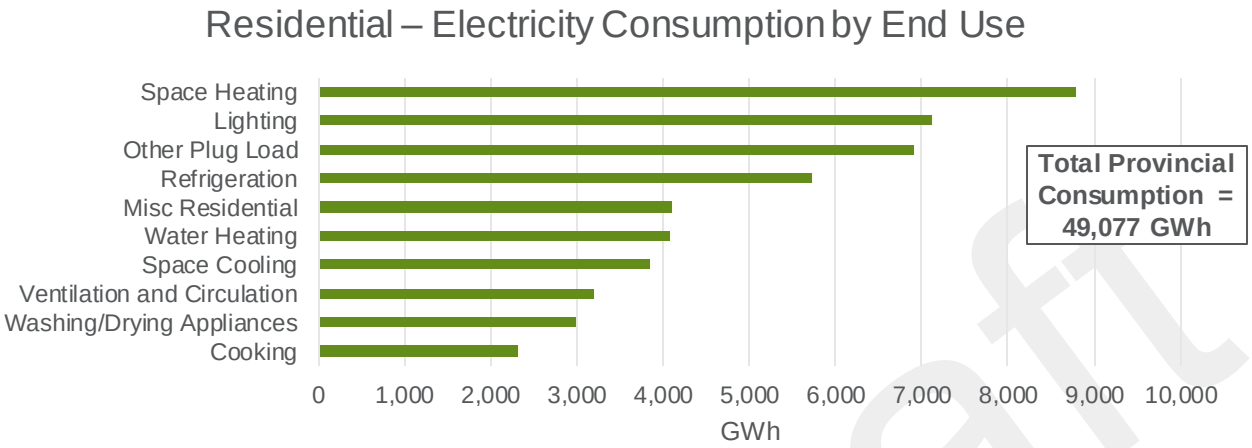
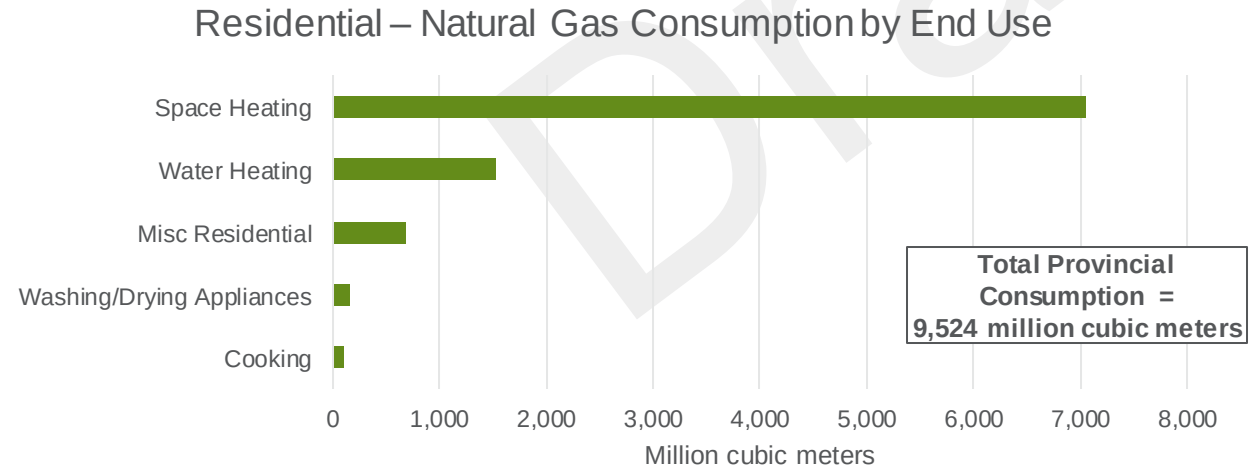
TASK 02 – BASE YEAR DISAGGREGATION

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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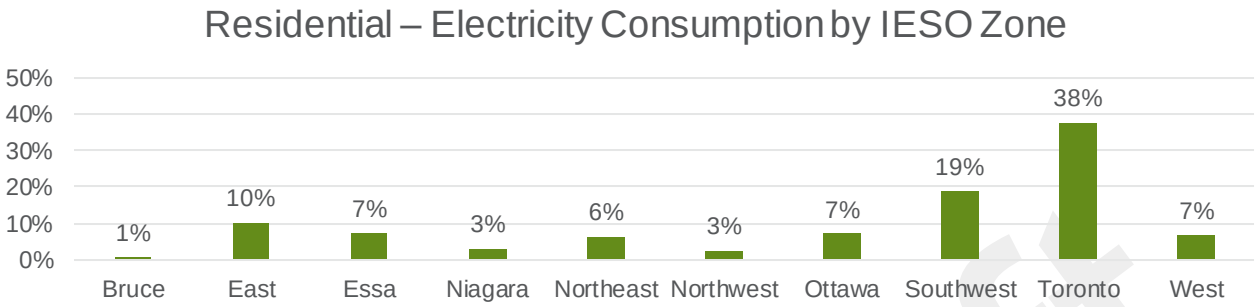
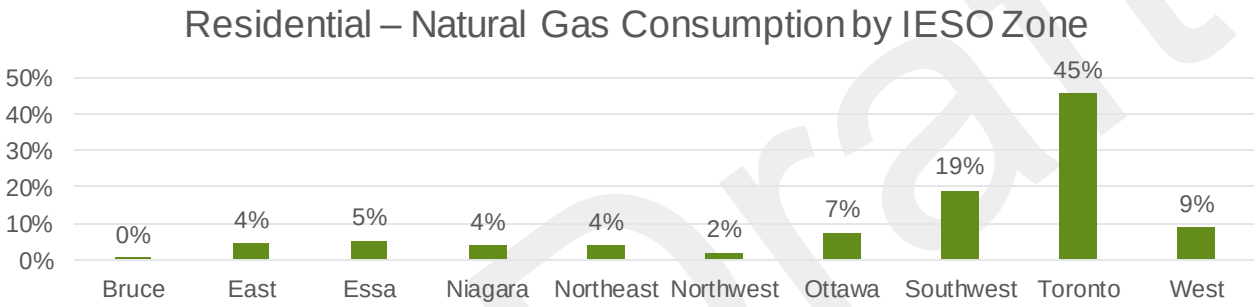
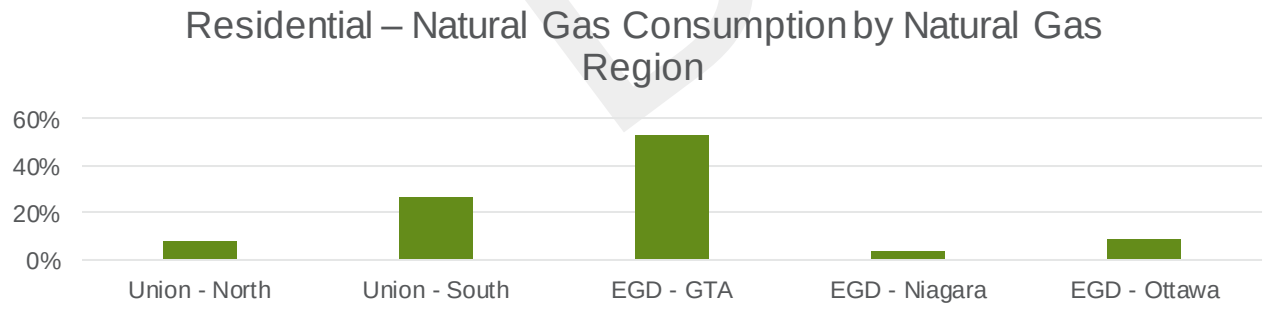
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: PROVINCIAL RESIDENTIAL CONSUMPTION BY IESO ZONE, NG REGION







- The **distribution** of residential gas and electricity **consumption** matches population patterns.
- The distribution of **gas consumption is materially skewed to regions where gas connections are more common** (e.g., 10% of electricity consumption is in East, a zone that accounts for only 4% of gas consumption).

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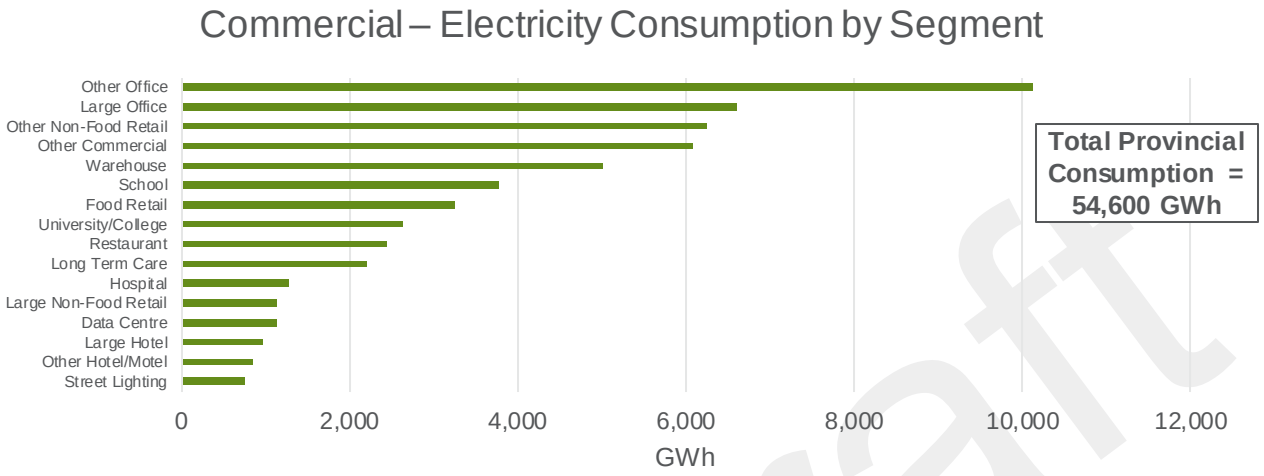
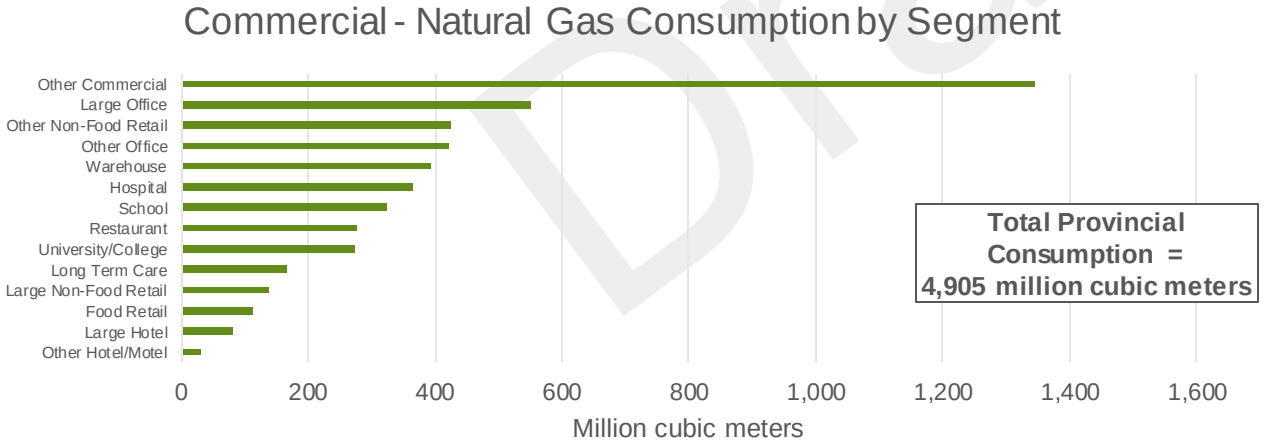
TASK 02 – BASE YEAR DISAGGREGATION

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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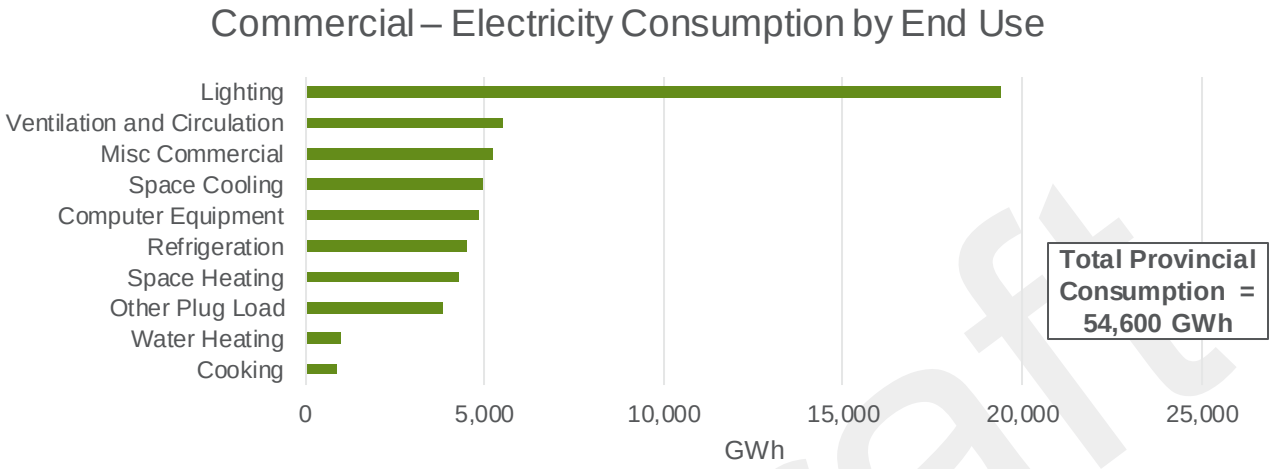
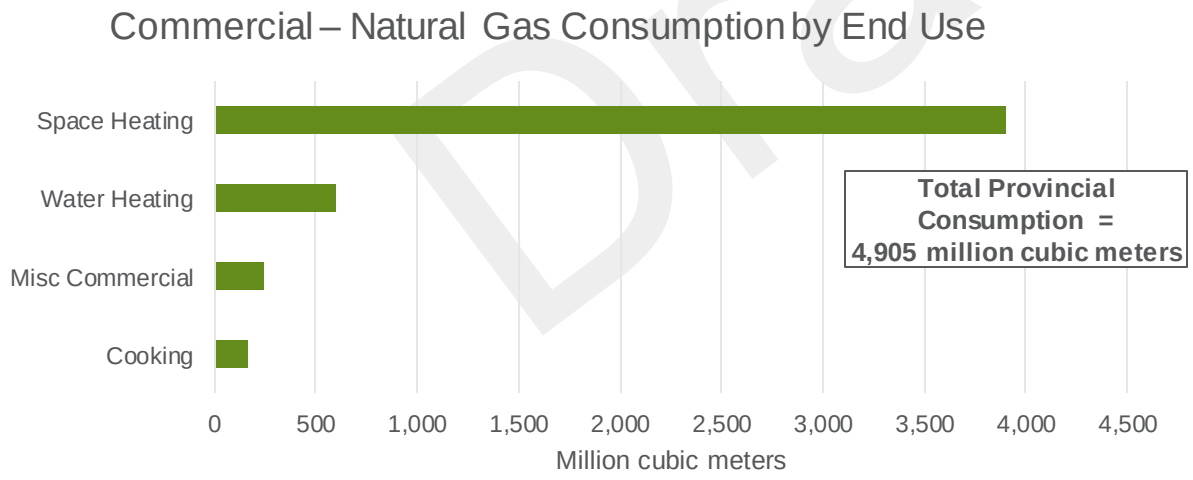
TASK 02 – BASE YEAR DISAGGREGATION

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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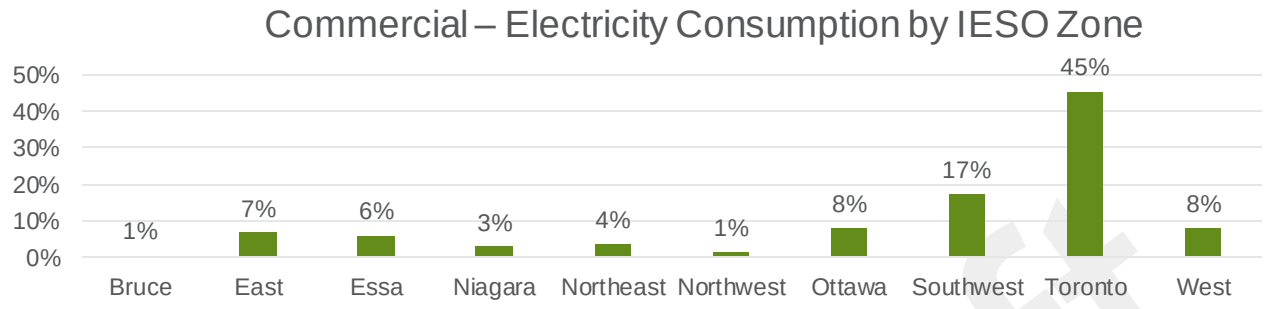
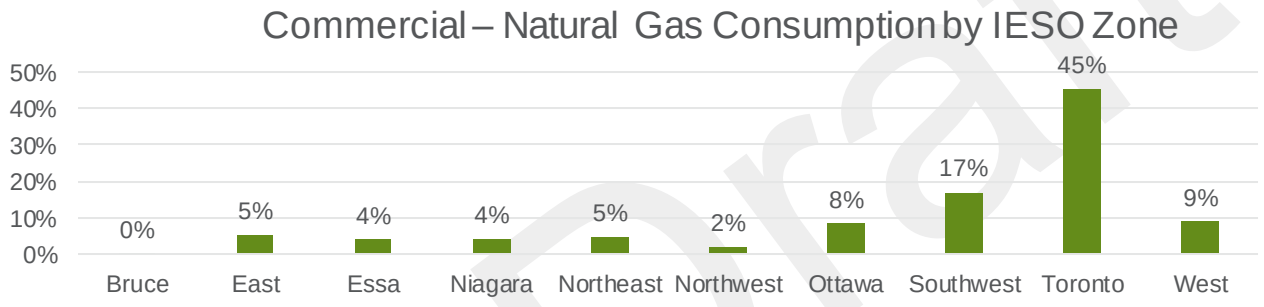
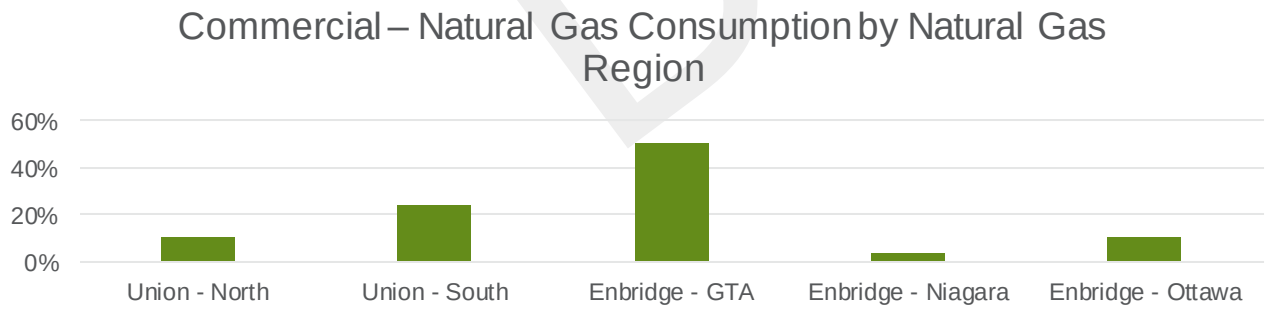
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: PROVINCIAL COMMERCIAL CONSUMPTION BY IESO ZONE, NG REGION







- The **distribution** of commercial gas and electricity **consumption** matches population patterns.
- The distribution of gas consumption is **much more consistent with the distribution of electricity consumption in the commercial sector than it is in the residential sector.** Even in IESO regions with less gas availability, businesses tend to be gas connected.

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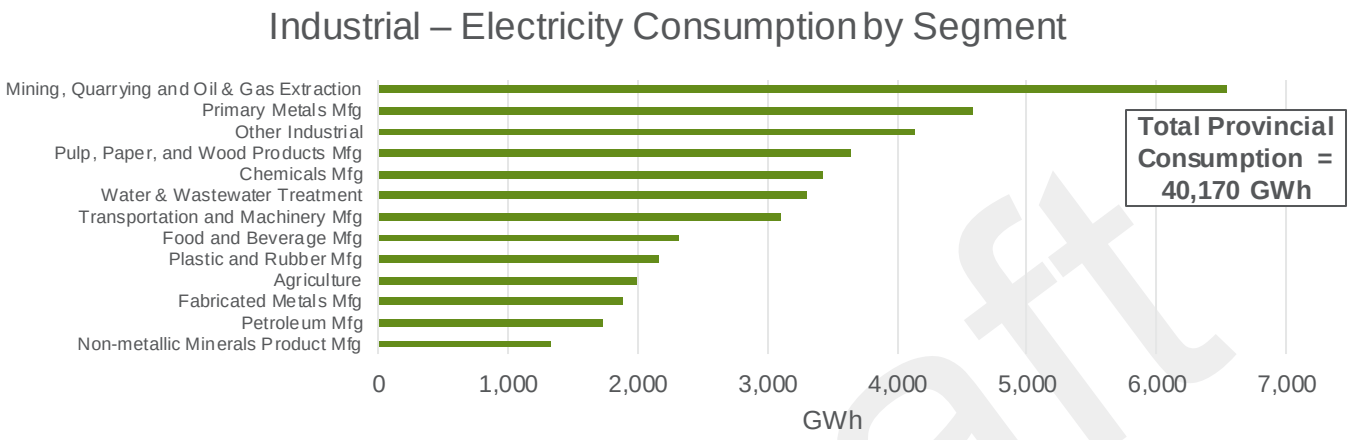
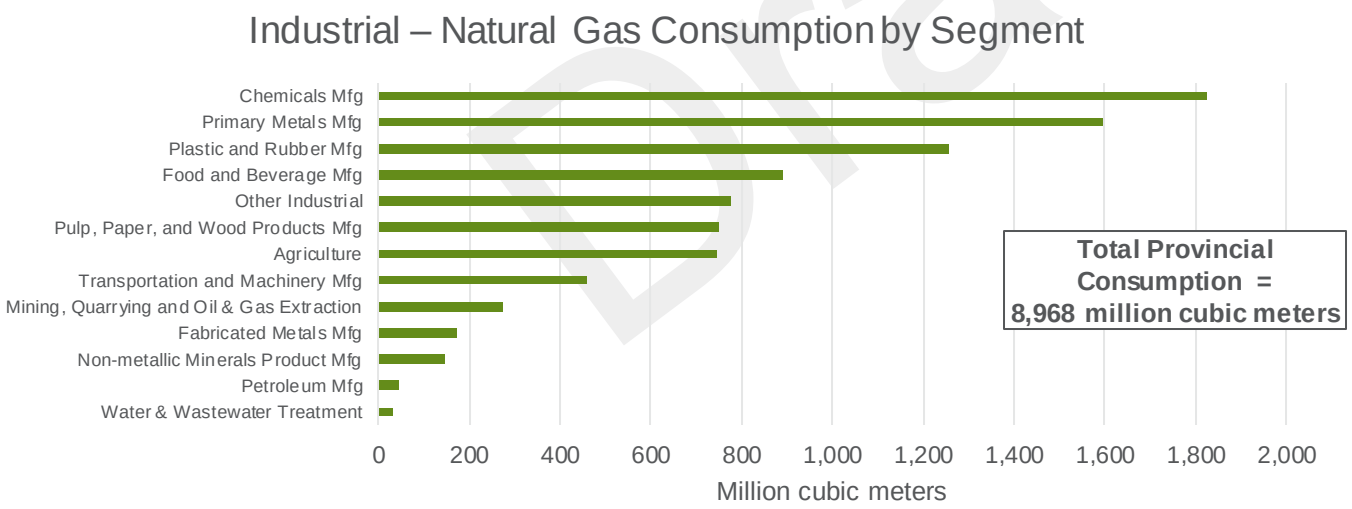
TASK 02 – BASE YEAR DISAGGREGATION

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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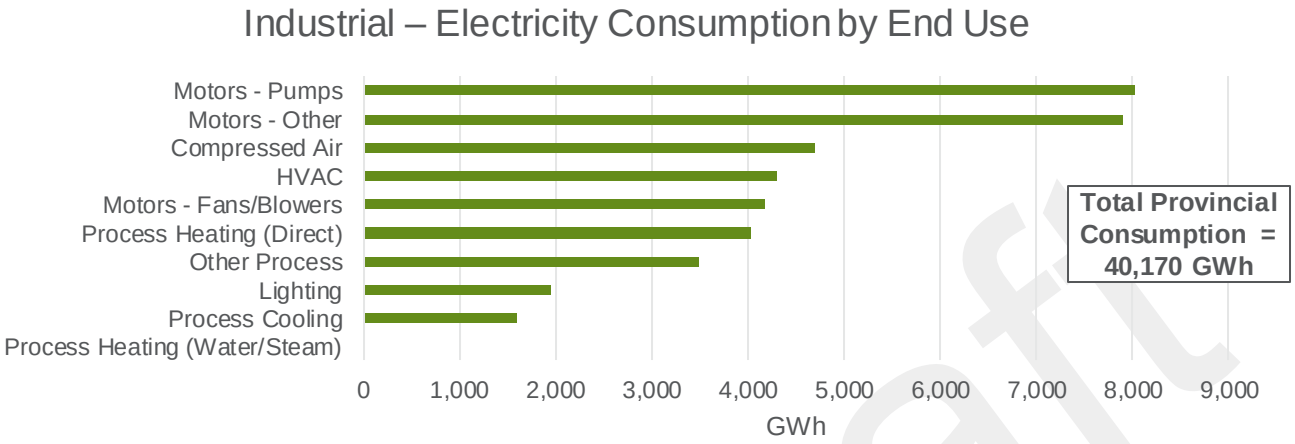
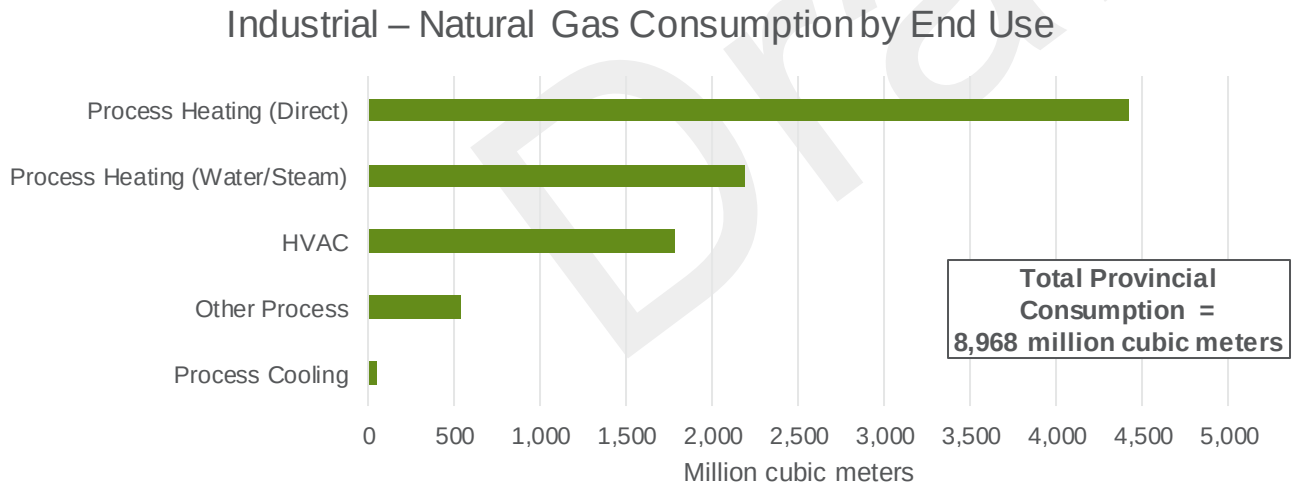
TASK 02 – BASE YEAR DISAGGREGATION

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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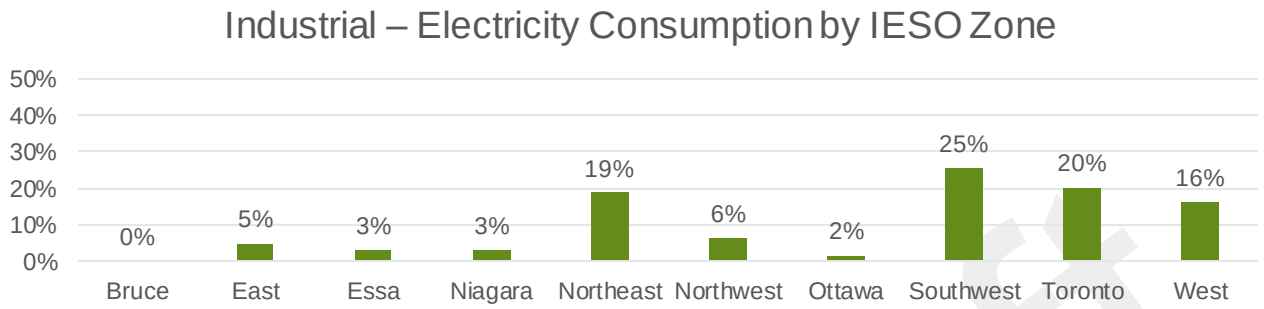
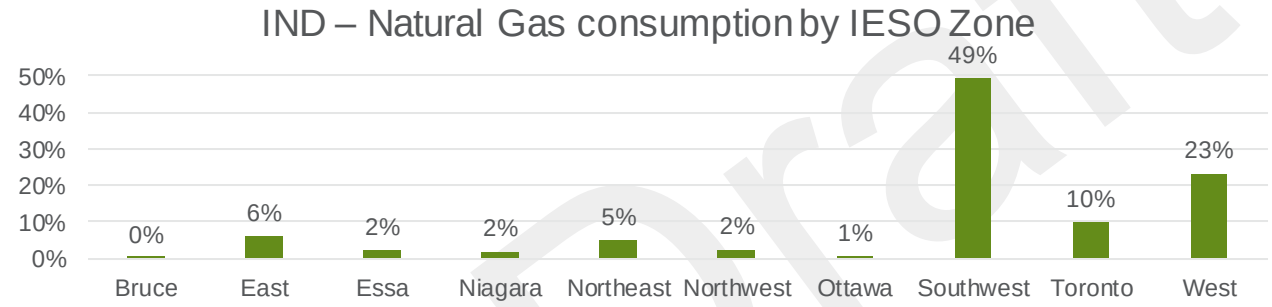
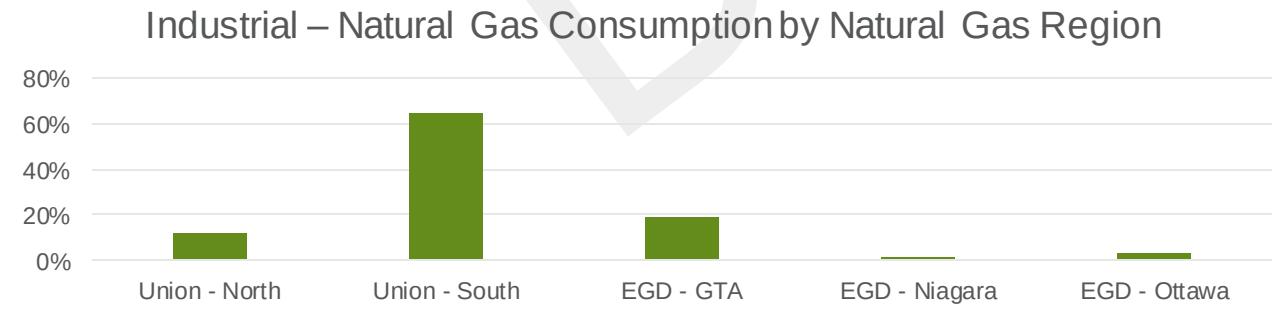
TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: INDUSTRIAL CONSUMPTION BY IESO ZONE, NG REGION







- Unlike either Residential or Commercial energy consumption, **Industrial energy consumption does not reflect the distribution of the population**.
- The provincial distribution of Industrial energy use reflects the concentration of industrial production in regions with access to key inputs to production, and markets.

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TASK 02 – BASE YEAR DISAGGREGATION

RESULTS: FINAL OUTPUTS

The key final outputs of the Residential and Commercial BYD are segment-specific end-use intensities (EUIs). For the Industrial BYD, end-use allocation factors (AFs) are the key final output.

These BYD outputs make up one component of the inputs into the reference case forecast, along with stock forecasts (residential and commercial only) and IESO- and utility-provided consumption forecasts.

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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.

Electricity

- Input Granularity
  - Detailed forecast by IESO defined Sector, Segment and End Use
  - Forecast available for each IESO zone
- Time Frame
  - 2018 to 2038

Natural Gas

- Input Granularity
  - Sector level forecast
  - Forecast available for utility service territory
- Time Frame
  - 2018 to 2028

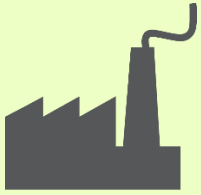
Key Takeaways:

- The forecasts provided by the Natural Gas Utilities and the IESO are used with as little modification as possible, while ensuring compatibility* between the forecasts, for consistency with input forecasts used by IESO and the utilities for planning.
- Appropriate mappings and or allocations to APS segments and end uses have been implemented as required.

** Please see appendix for details on the Electricity and Natural Gas forecast Compatibility Analysis.*

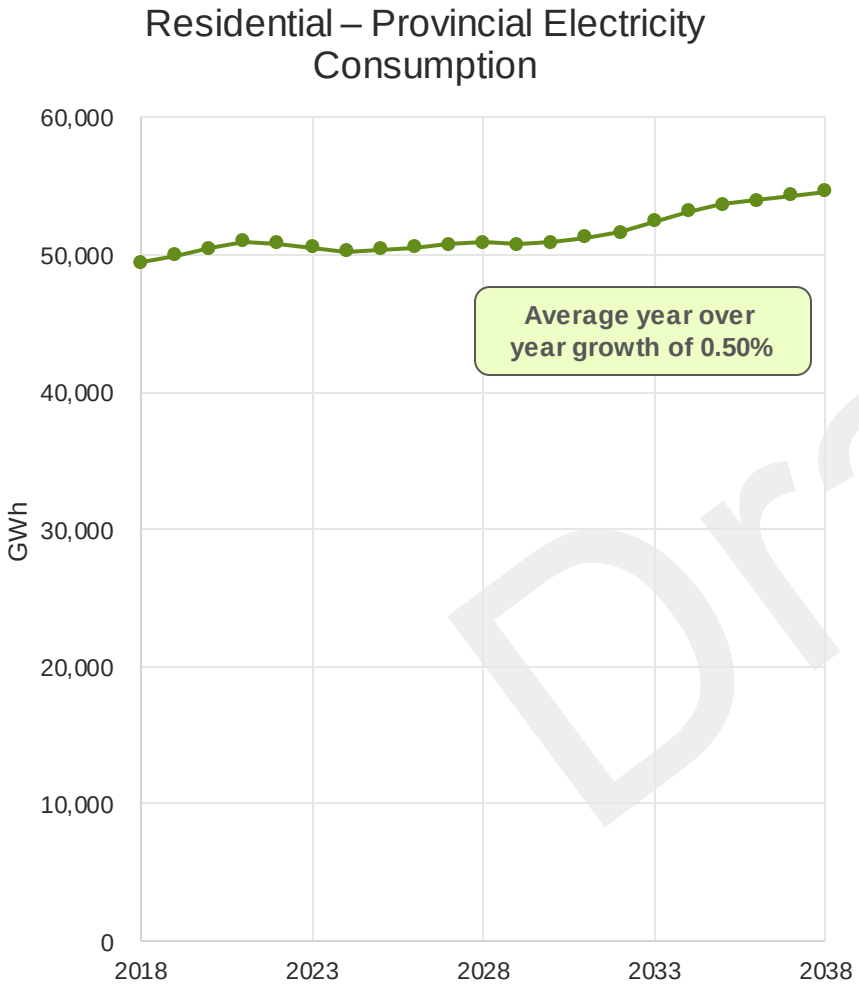
Electricity and Natural Gas Forecasts mapped to APS segments and end uses. Calibration ensures aggregated values match original forecast from IESO / gas utilities.

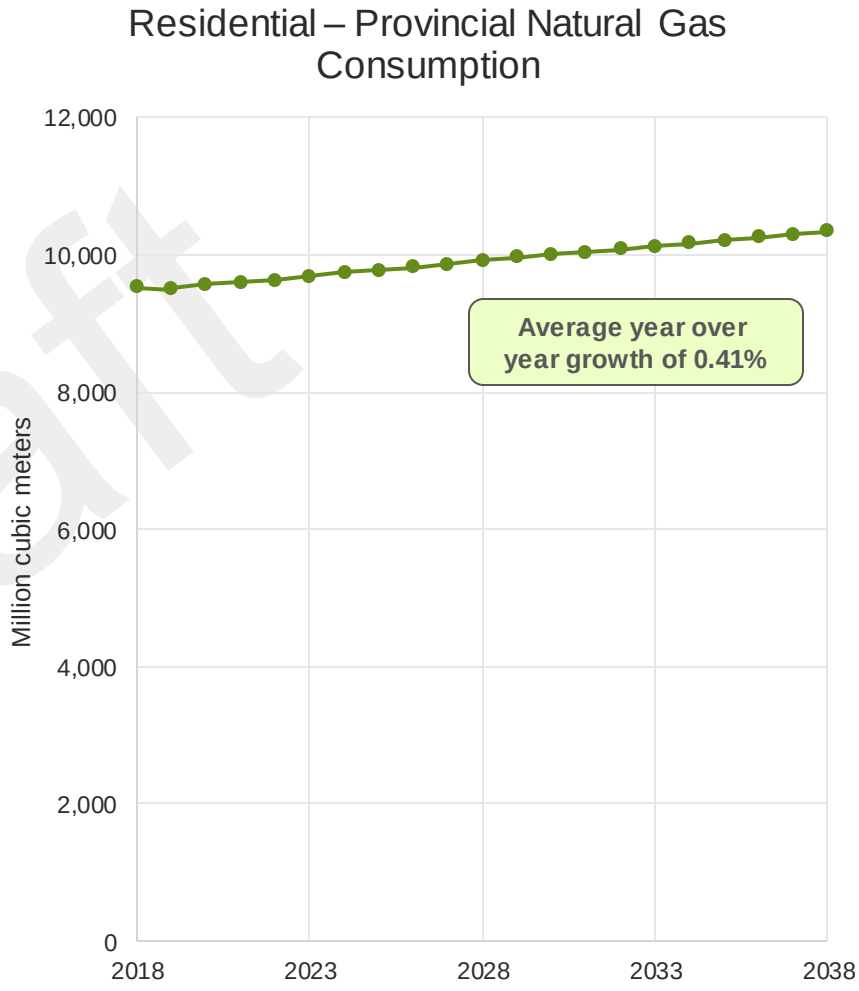
Key Transformations

	Electricity	Natural Gas
Residential 	Segment Allocation: • Low Income, Single Family • Low Income, Multi-Family	Forecast Extrapolation for 2029 to 2038 Segment Allocation End-Use Allocation Fuel Share (Gas-Connected Stock)
Commercial 	Segment Allocation: • Data Centres	Forecast Extrapolation for 2029 to 2038 Segment Allocation End-Use Allocation Fuel Share (Gas-Connected Stock)
Industrial 	End-Use Allocation: • Agriculture and Waste Water segments not split by end-use.	Forecast Extrapolation for 2029 to 2038 Segment Allocation End-Use Allocation

RESIDENTIAL WORKBOOKS

CONSUMPTION BY PROVINCE





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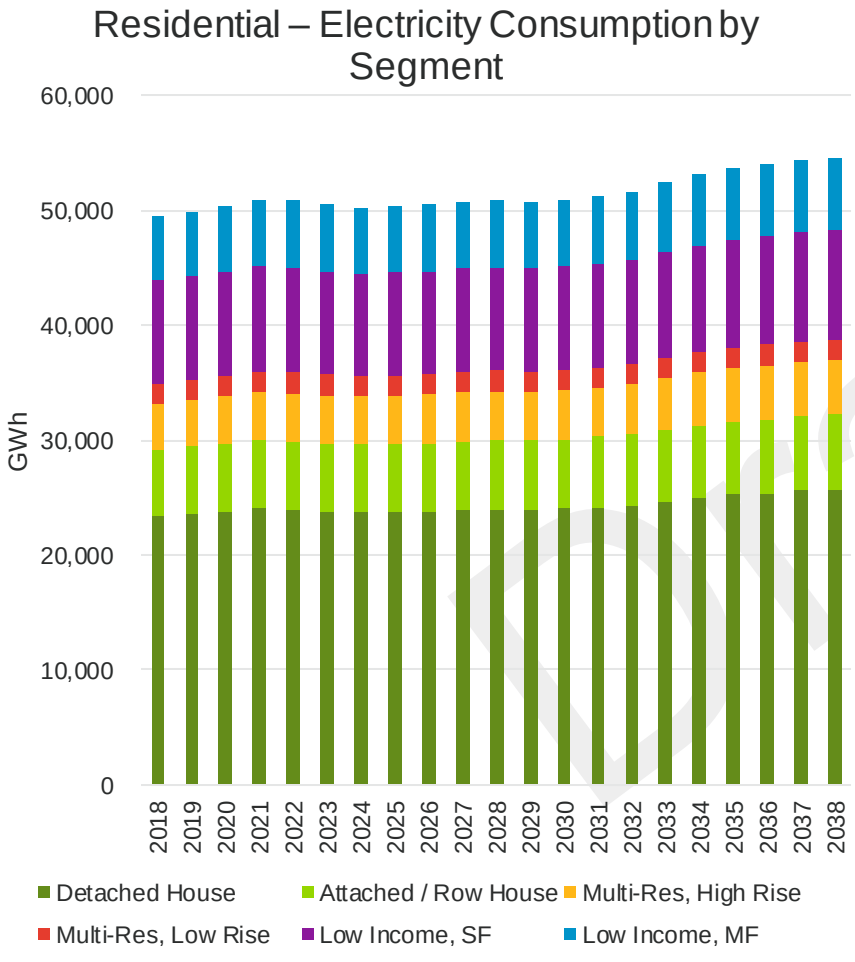
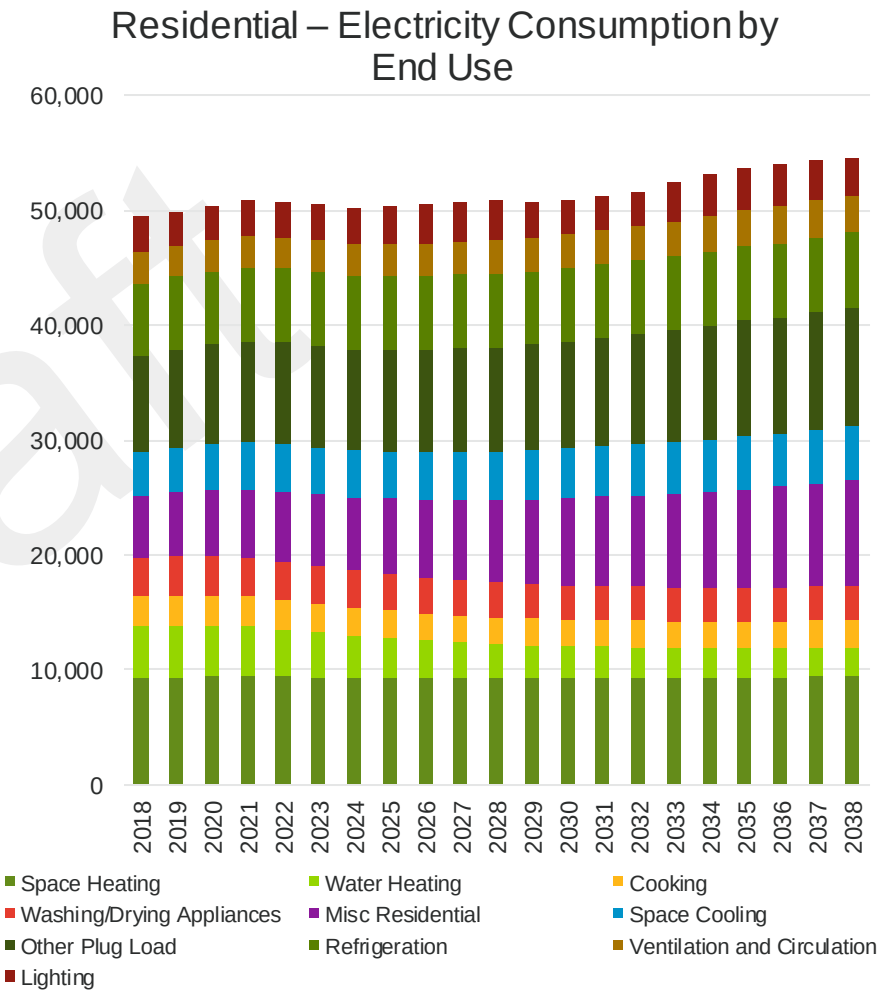
RESIDENTIAL WORKBOOKS

ELECTRICITY CONSUMPTION BY PROVINCE, SEGMENT AND END-USE





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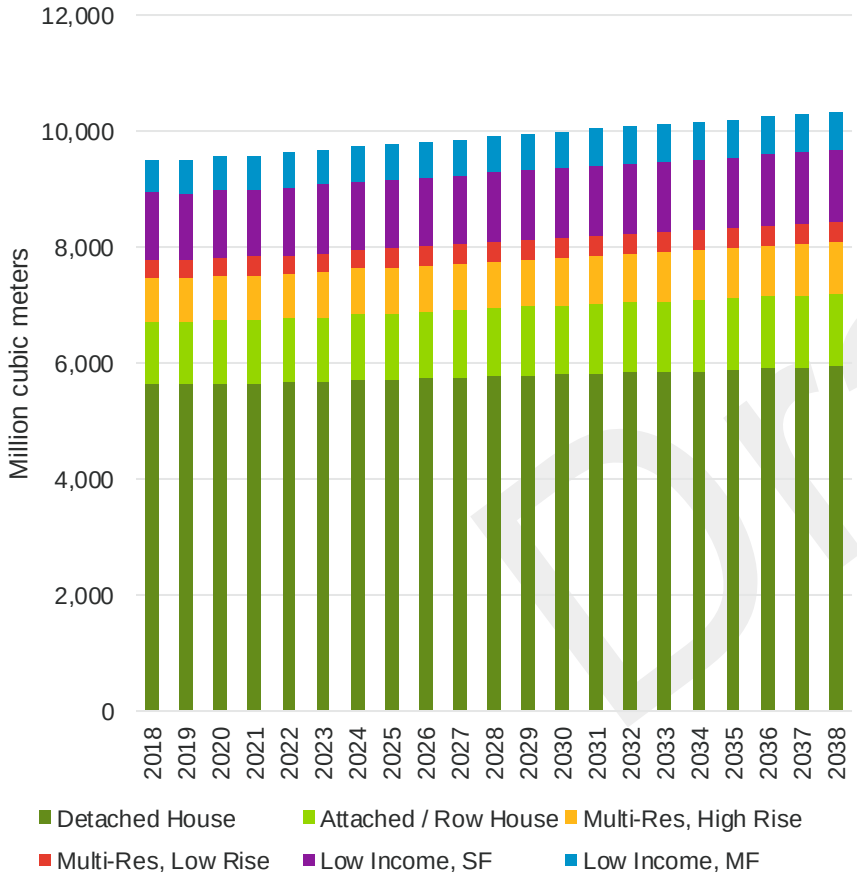
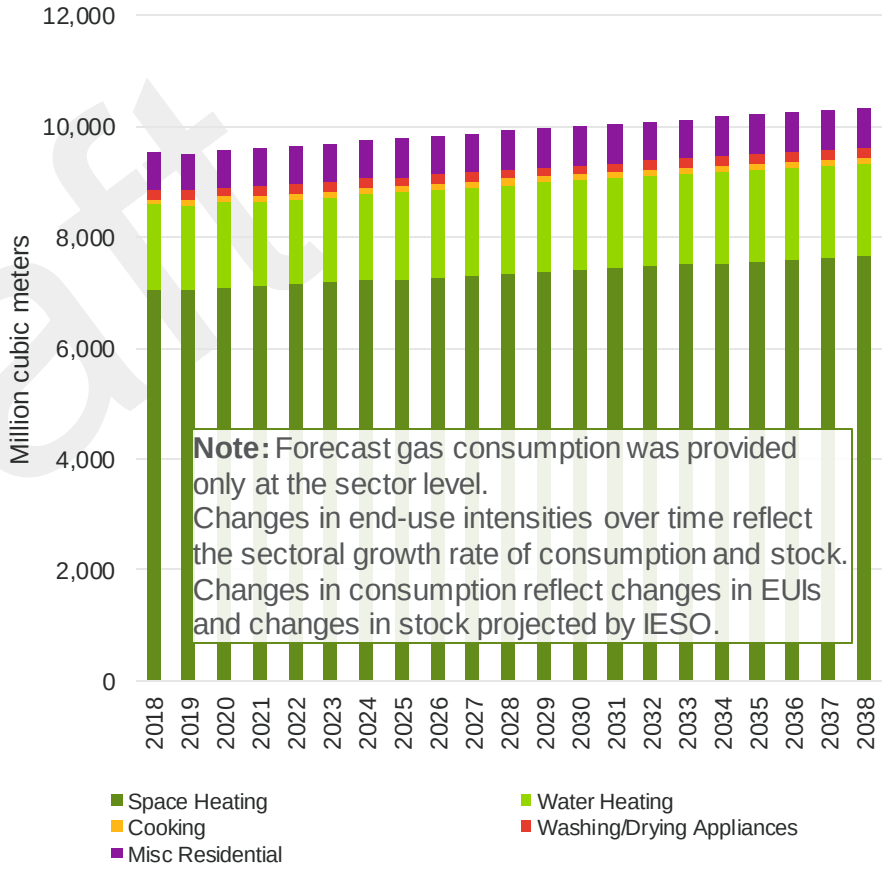
RESIDENTIAL WORKBOOKS

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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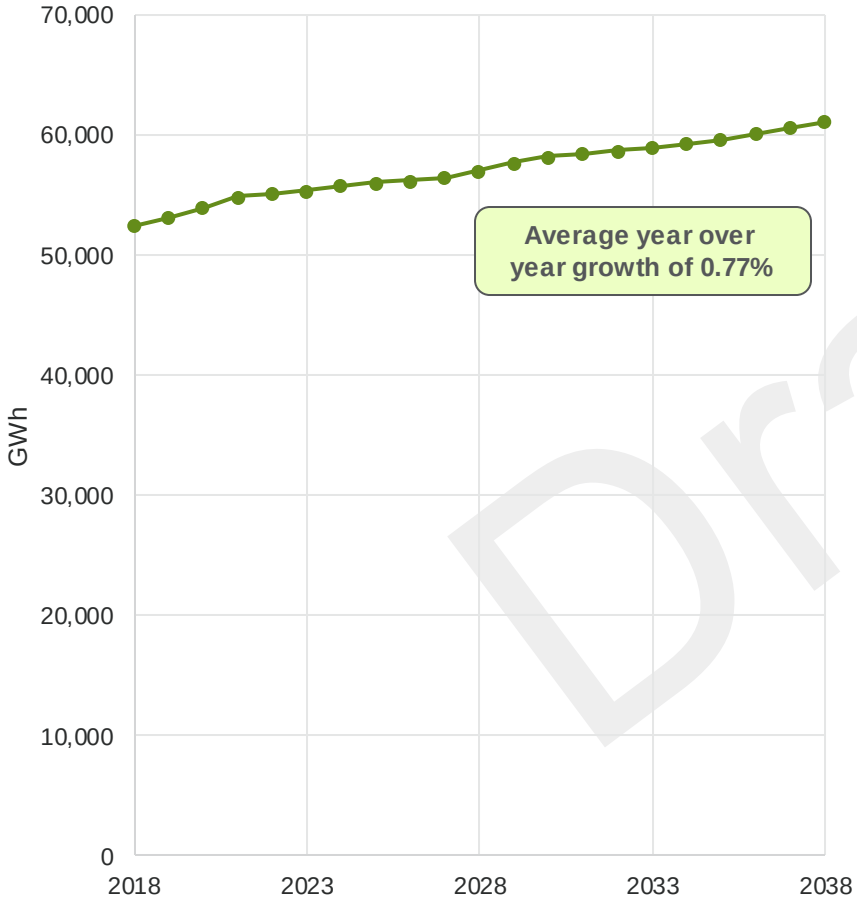
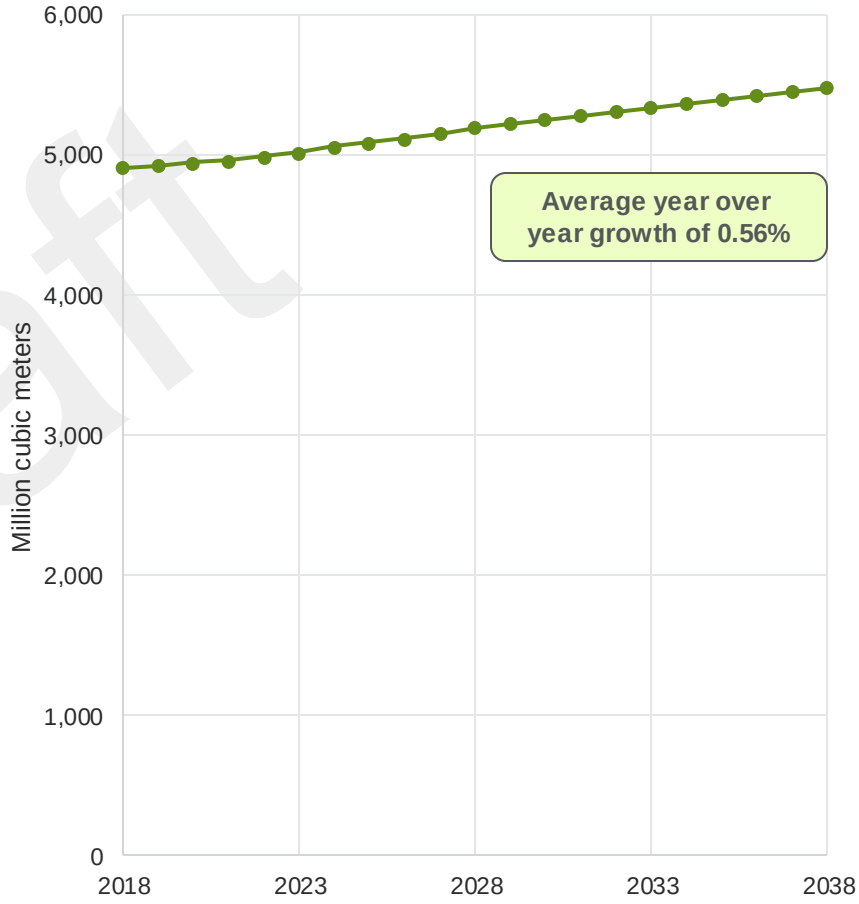
COMMERCIAL WORKBOOKS

CONSUMPTION BY PROVINCE

Commercial – Provincial Electricity Sales



Commercial – Provincial Natural Gas Sales



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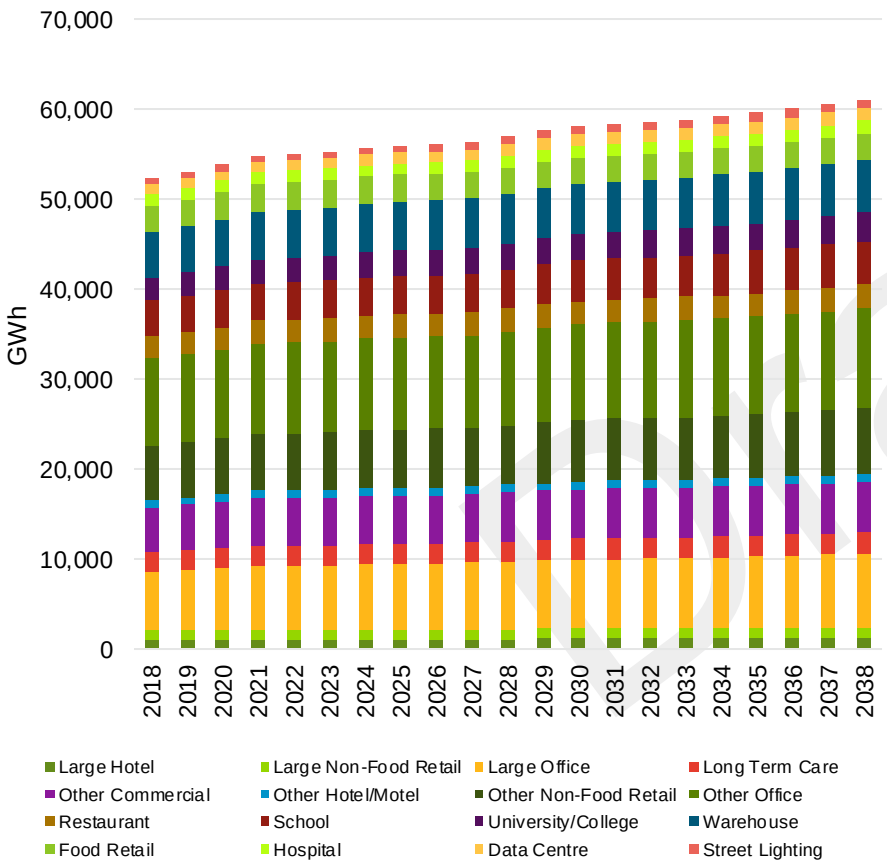
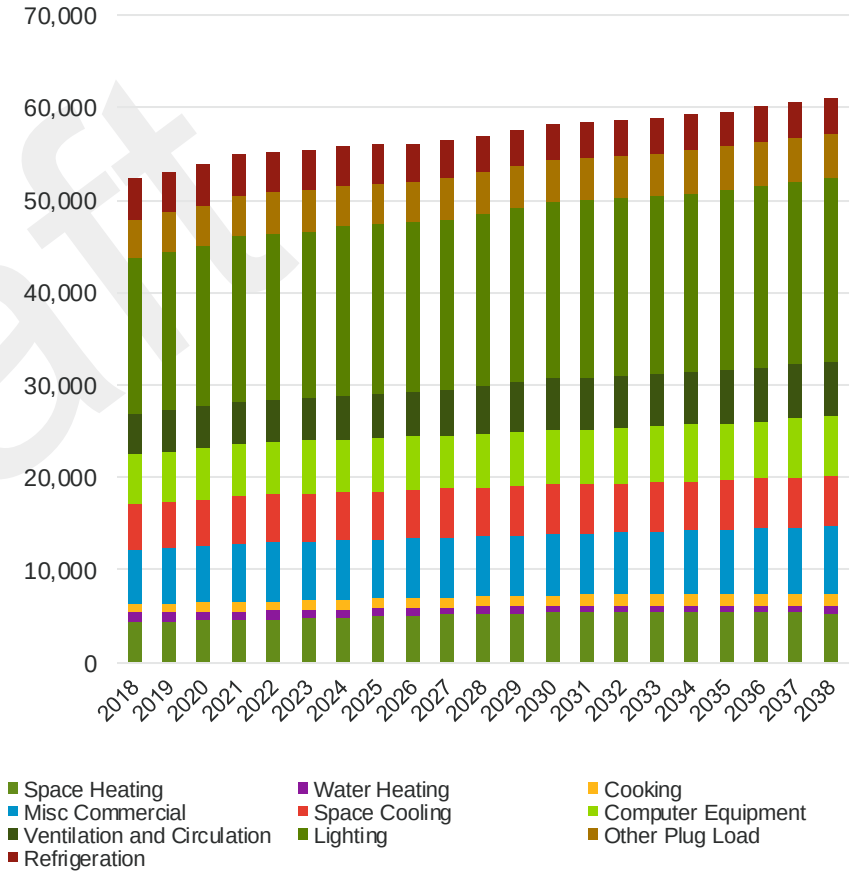
COMMERCIAL WORKBOOKS

ELECTRICITY CONSUMPTION BY PROVINCE, SEGMENT AND END-USE

Commercial - Electricity Consumption by Segment



Commercial – Electricity Consumption by End Use



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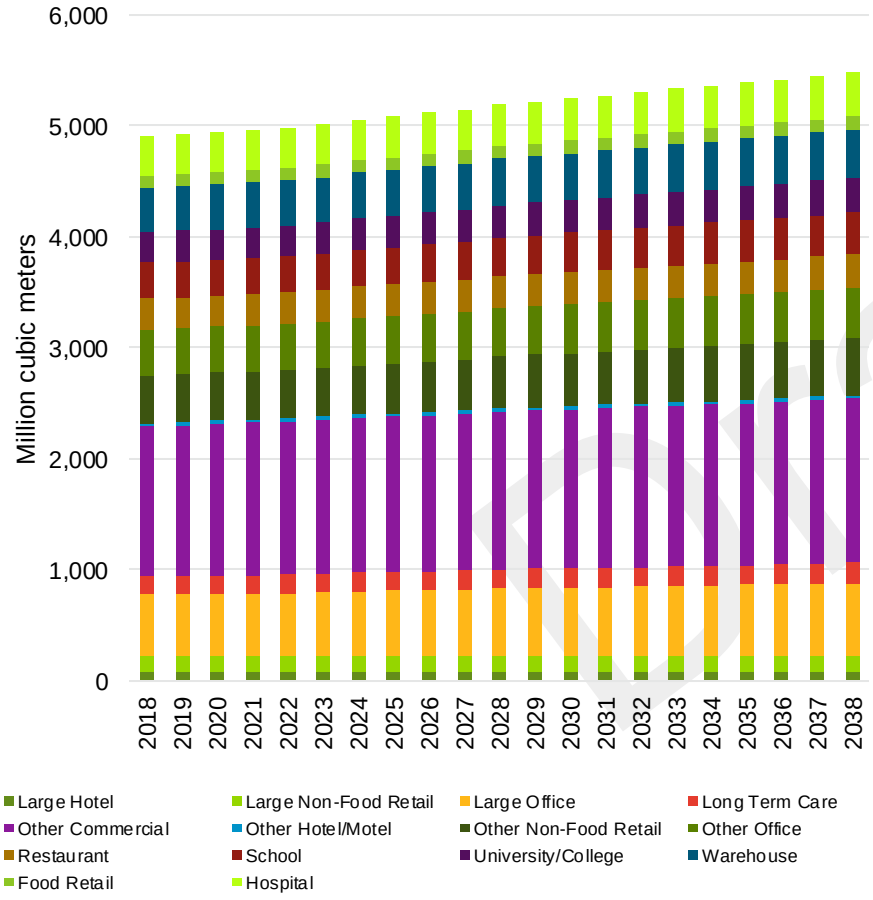
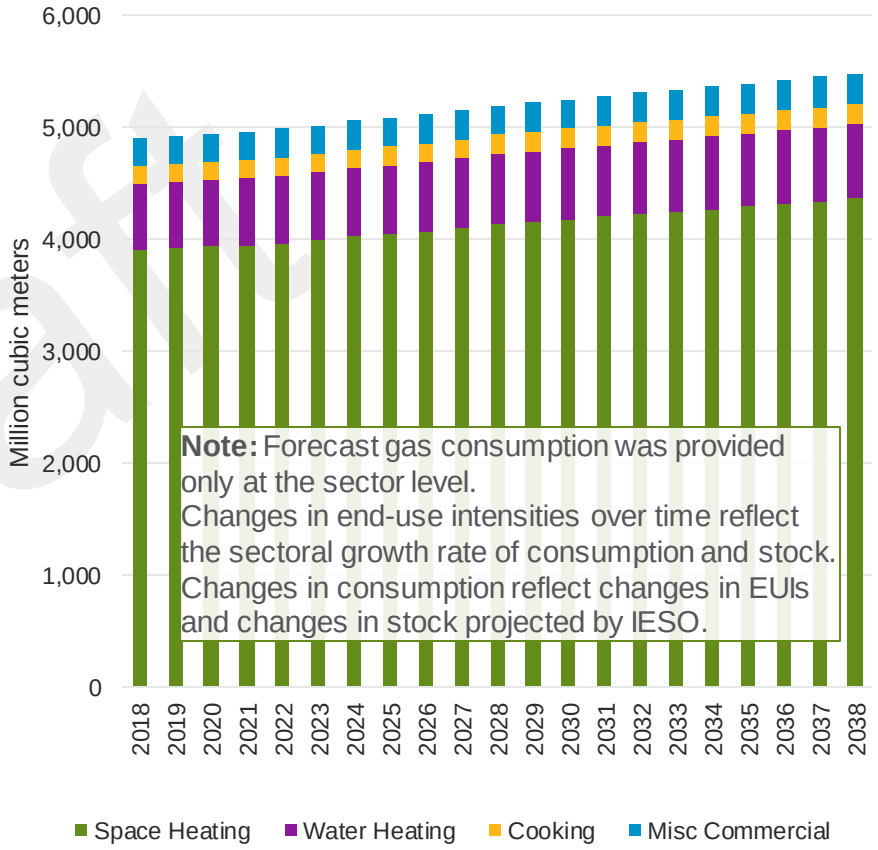
COMMERCIAL WORKBOOKS

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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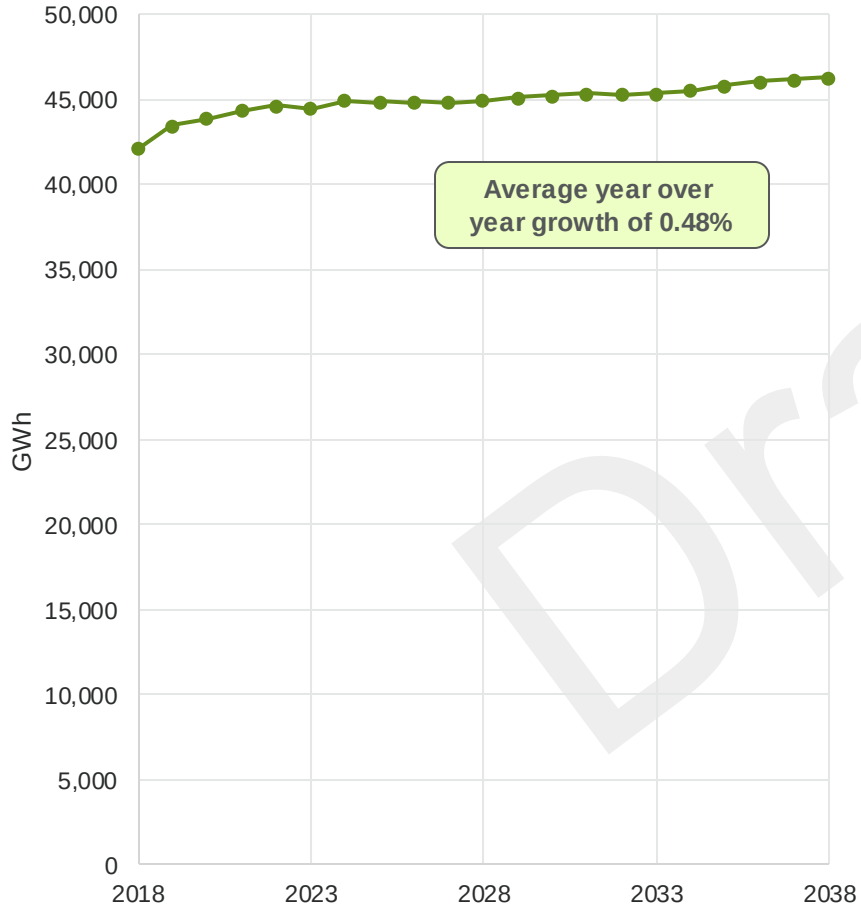
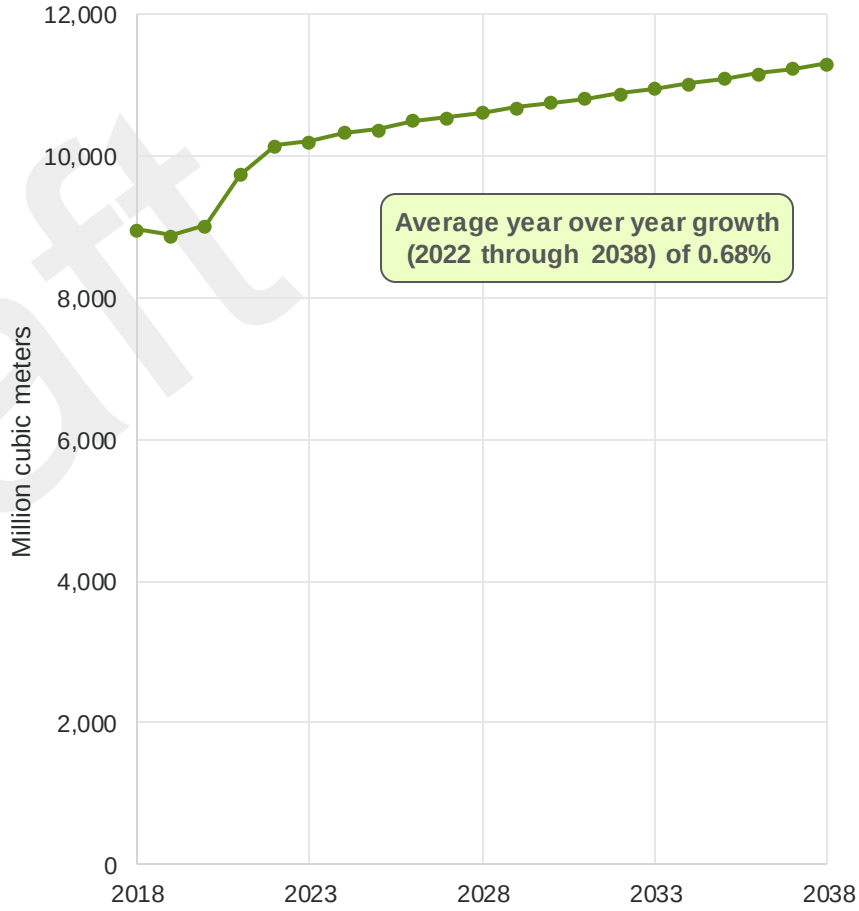
INDUSTRIAL WORKBOOKS
CONSUMPTION BY PROVINCE

Industrial – Provincial Electricity Sales



Industrial – Provincial Natural Gas Sales



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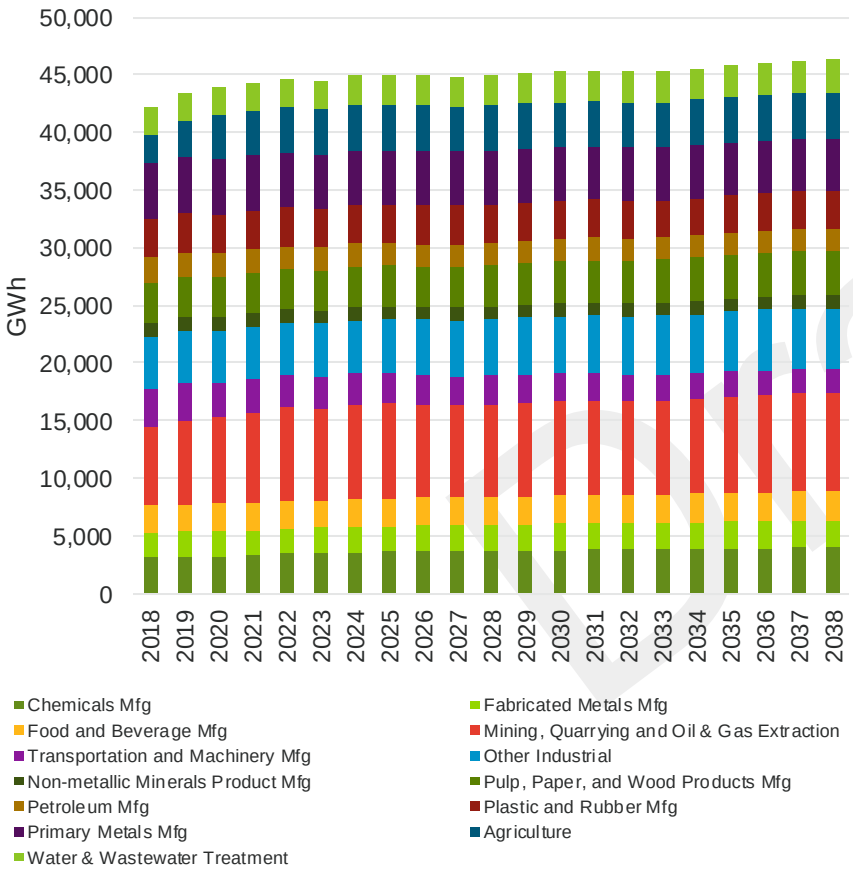
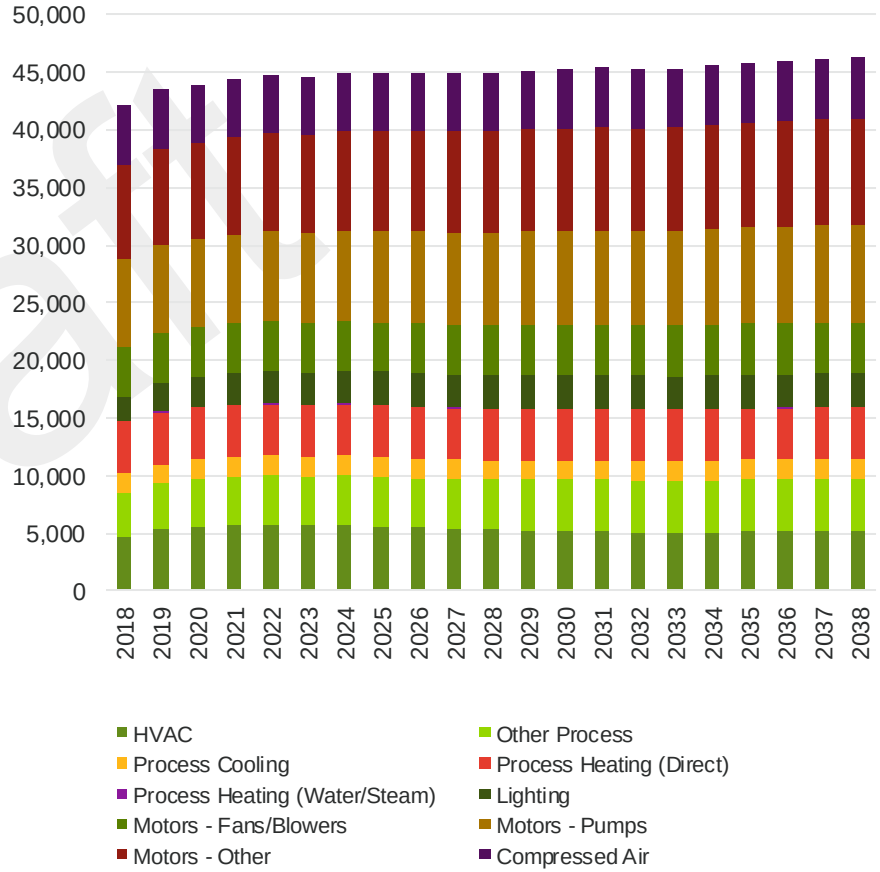
INDUSTRIAL WORKBOOKS

ELECTRICITY CONSUMPTION BY PROVINCE, SEGMENT AND END-USE

Industrial – Electricity Consumption by Segment



Industrial – Electricity Consumption by End Use



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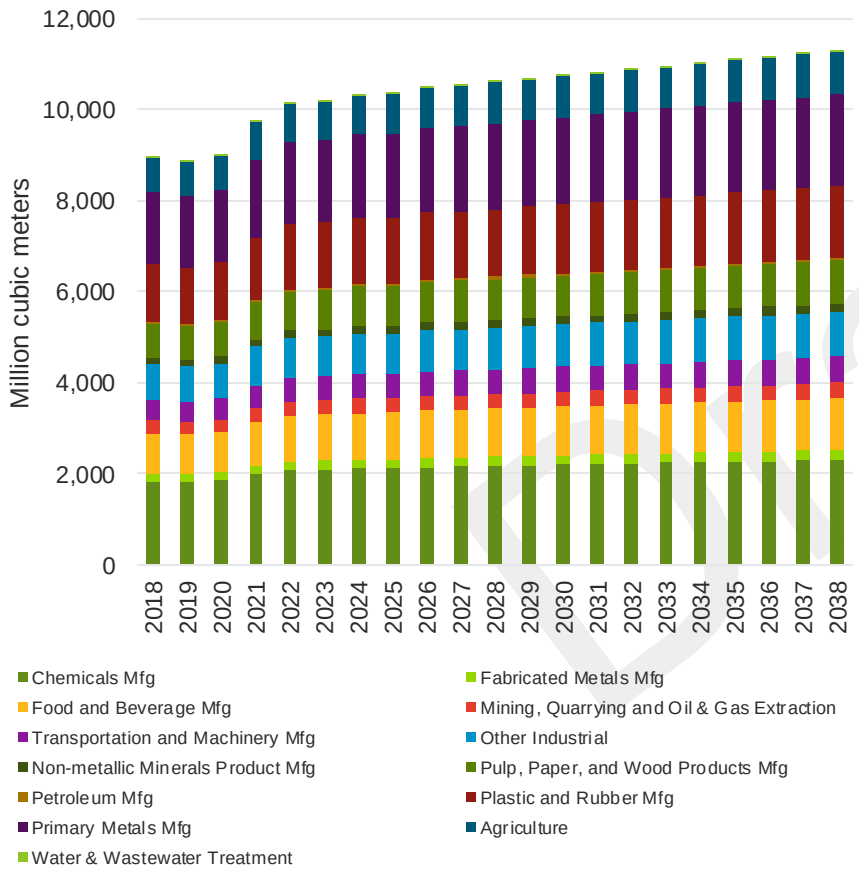
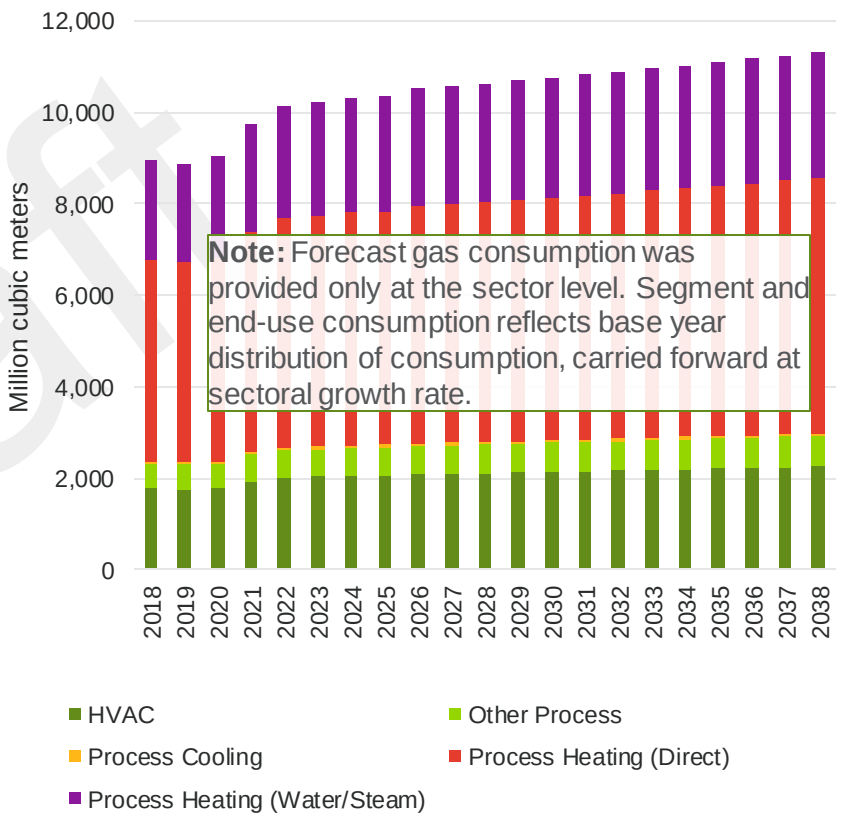
Industrial – Natural Gas Consumption by Segment



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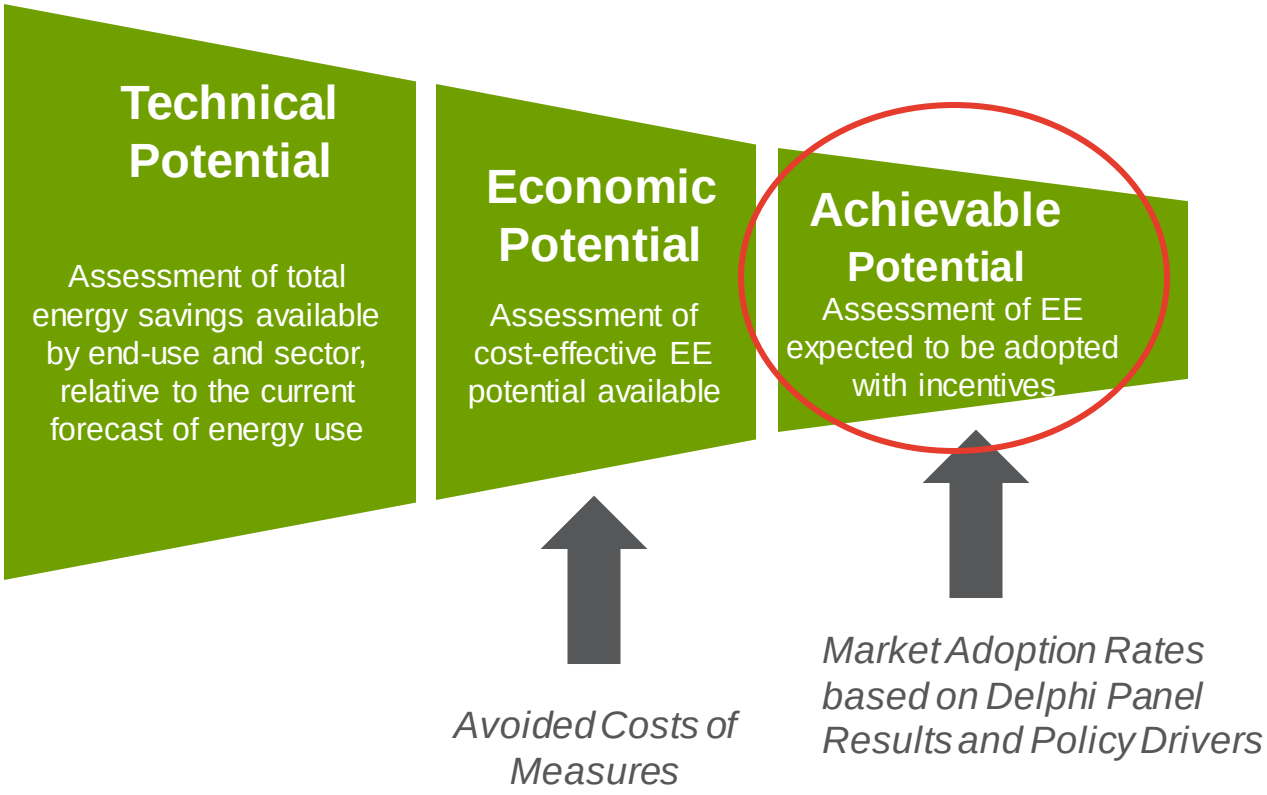
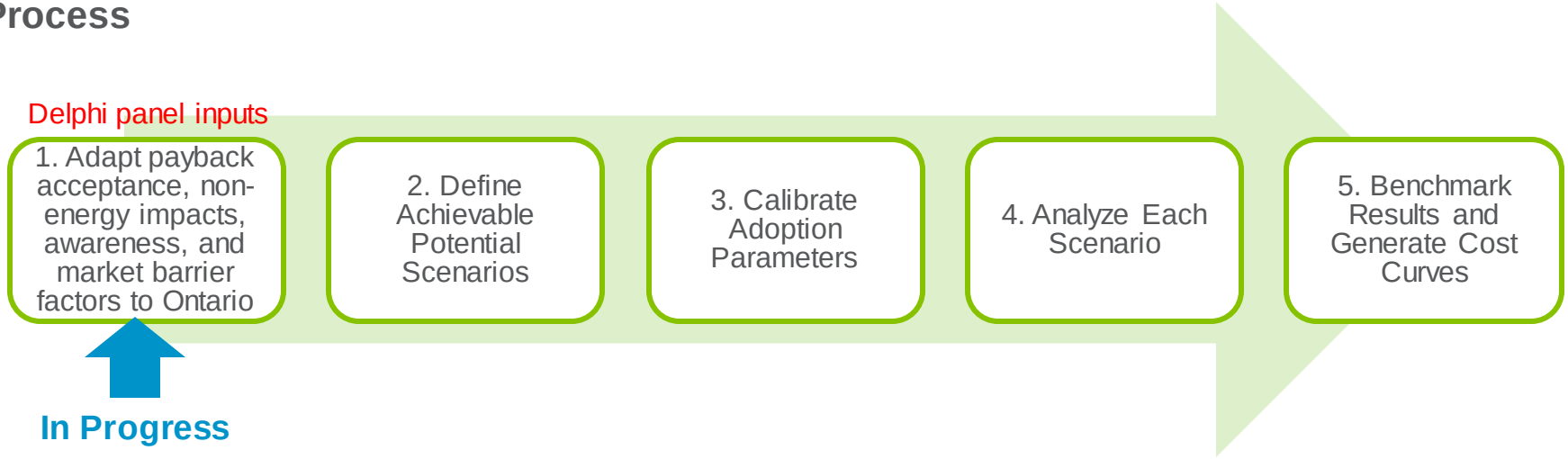
What is Achievable Potential? How does it compare to Economic Potential?



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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Key Considerations: Decisions Required

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

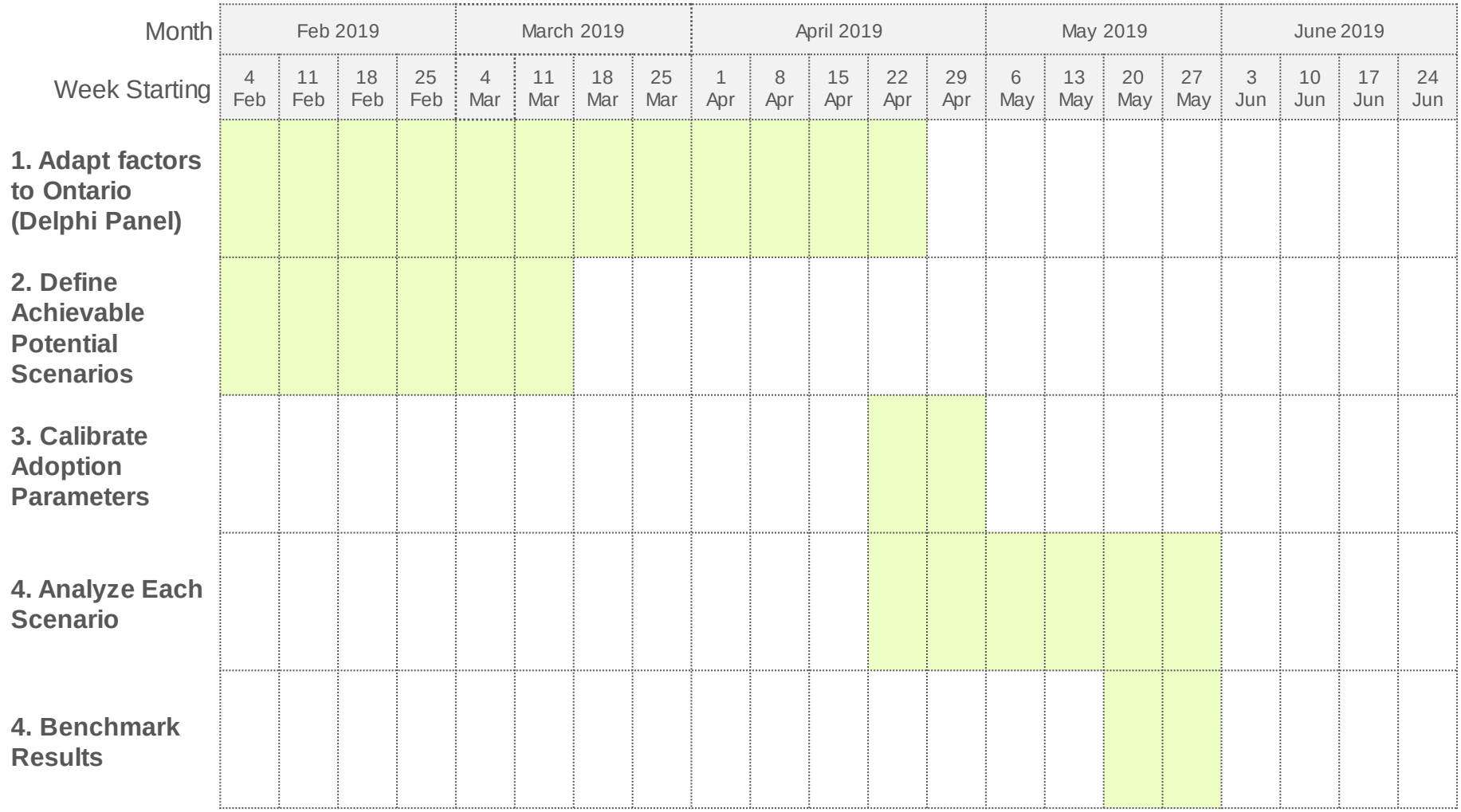
How much do we have to spend to get to a given potential?

Other

Interesting "what if" scenarios

TASK 07: ACHIEVABLE POTENTIAL

OVERVIEW



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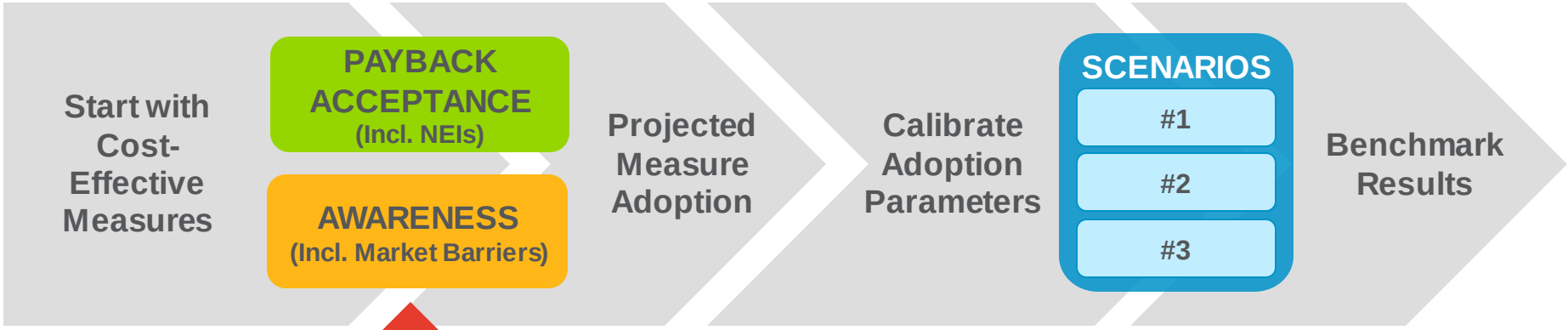
There are important considerations within each step of the Achievable Potential process.

*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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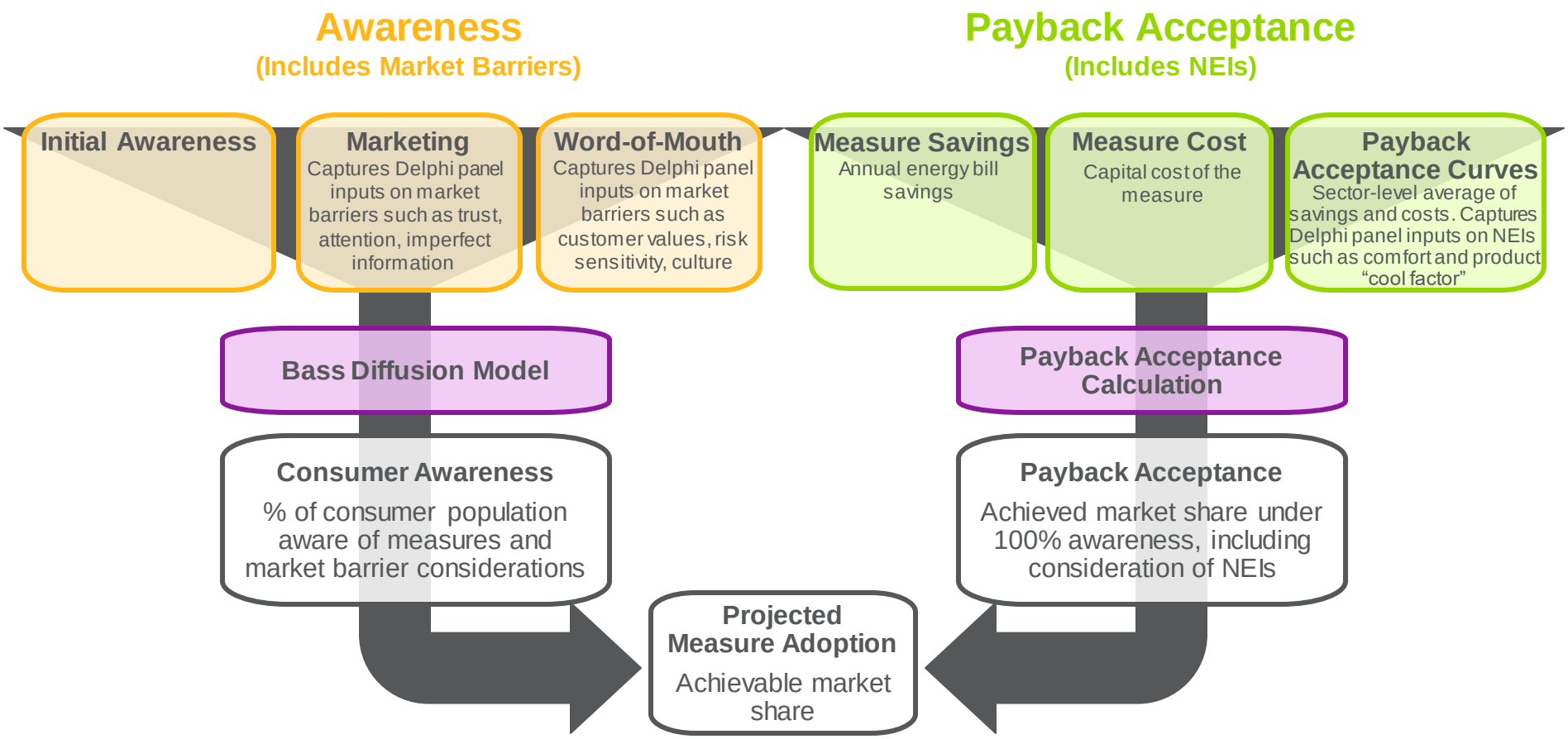
Two analytical processes, when combined, arrive at the projected measure adoption (or achievable market share):



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There are 10 key model levers within the Achievable Potential process:

Lever	Impact on Achievable Potential	Source(s)
Initial Awareness	Awareness factor; starting point of the awareness curve	*Informed by Delphi Panel, calibrated using historical results.*
Marketing	Awareness factor; determines speed of initial traction, strongest at beginning of the awareness curve	
Word-of-Mouth	Awareness factor; determines ramp speed, strongest during the growth stage of the awareness curve	
Market Barriers	Affects initial awareness; reflects access to information and markets	
Simple Financial Payback Acceptance	Payback factors; payback acceptance curves dictate willingness to adopt a measure	*Delphi Panel*
Non-Energy Impacts	Adjustments to simple financial payback acceptance driven by non-energy impacts	
Incentive Levels and Strategies	Scenario lever; impacts market share as driven by the customer's payback period	*Stakeholders and project team*
Admin Costs	Scenario lever; contributes to budget, potentially limiting potential if under a budget target scenario	
Budget Levels	Scenario lever; constrains potential to what can be achieved given a specific budget	
Re-participation Rates	Scenario lever; impacts potential in later years of study period	*Model assumption, project team verified*

Payback acceptance and market awareness curves are used to determine achievable potential.

Payback Acceptance
(sector level analysis)

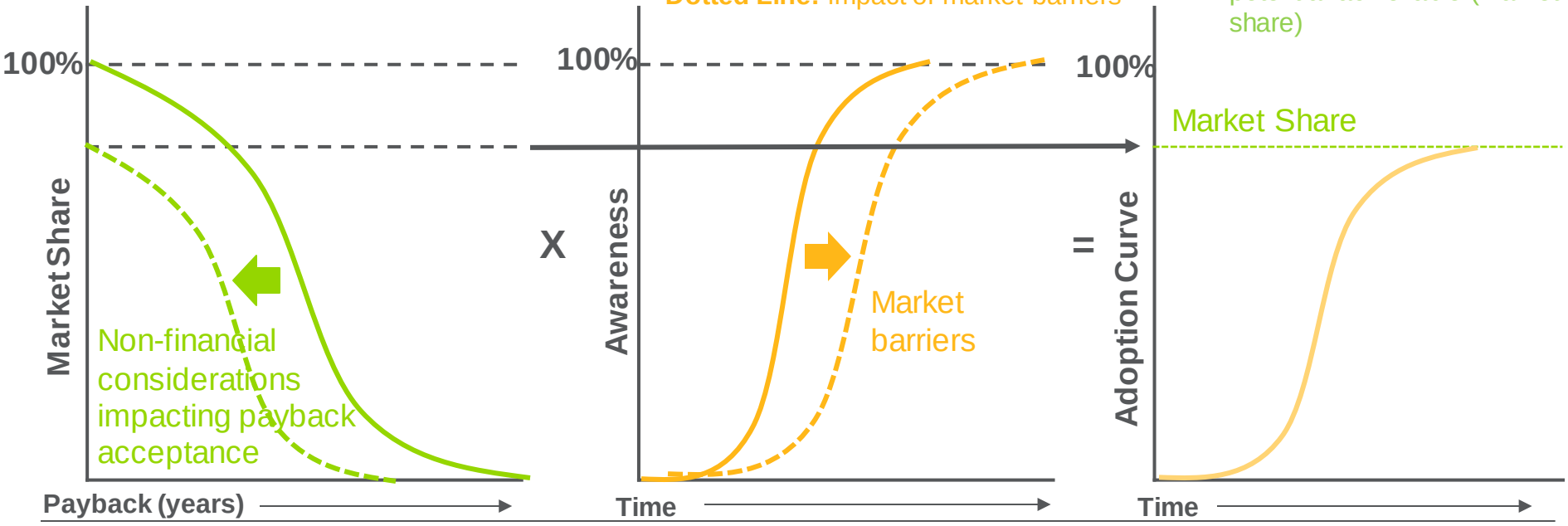
- Derived from Delphi Panel inputs
- **Solid Line:** sensitivity to payback (market share driven by incentives)
- **Dotted Line:** impact of NEIs

Awareness and Barriers
(measure level analysis)

- Derived from Delphi Panel inputs
- **Solid Line:** initial awareness, marketing effectiveness, and word-of-mouth strength (determines rate at which awareness grows)
- **Dotted Line:** impact of market barriers

Achievable Potential

- Result of combining payback acceptance and awareness
- **Solid Line:** Growth of awareness/adoption
- **Dotted Line:** Maximum potential achievable (market share)



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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" energy or demand savings potential?)
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)

TASK 09: SENSITIVITY ANALYSIS

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Methodology

Purpose & Context

- **Achievable Potential** is the sum of many parts, each with their own level of uncertainty
- Projection of future savings is inherently uncertain. Sensitivity analysis provides insight into **how variation in certain inputs can affect results**:
  - Provides insights into which variables have the greatest impact on results, allowing users to **strategically focus review efforts**
  - Acts as an early indicator that can **assist in QC efforts** for reference forecasts and measure inputs
  - Is a tool to **benchmark against** similar variables in **other studies** to indicate variables that may need some additional review

Key Considerations: Decisions Required

1. Which 10 variables should be included in the sensitivity analysis?
2. What bounds should be applied to the selected variables?

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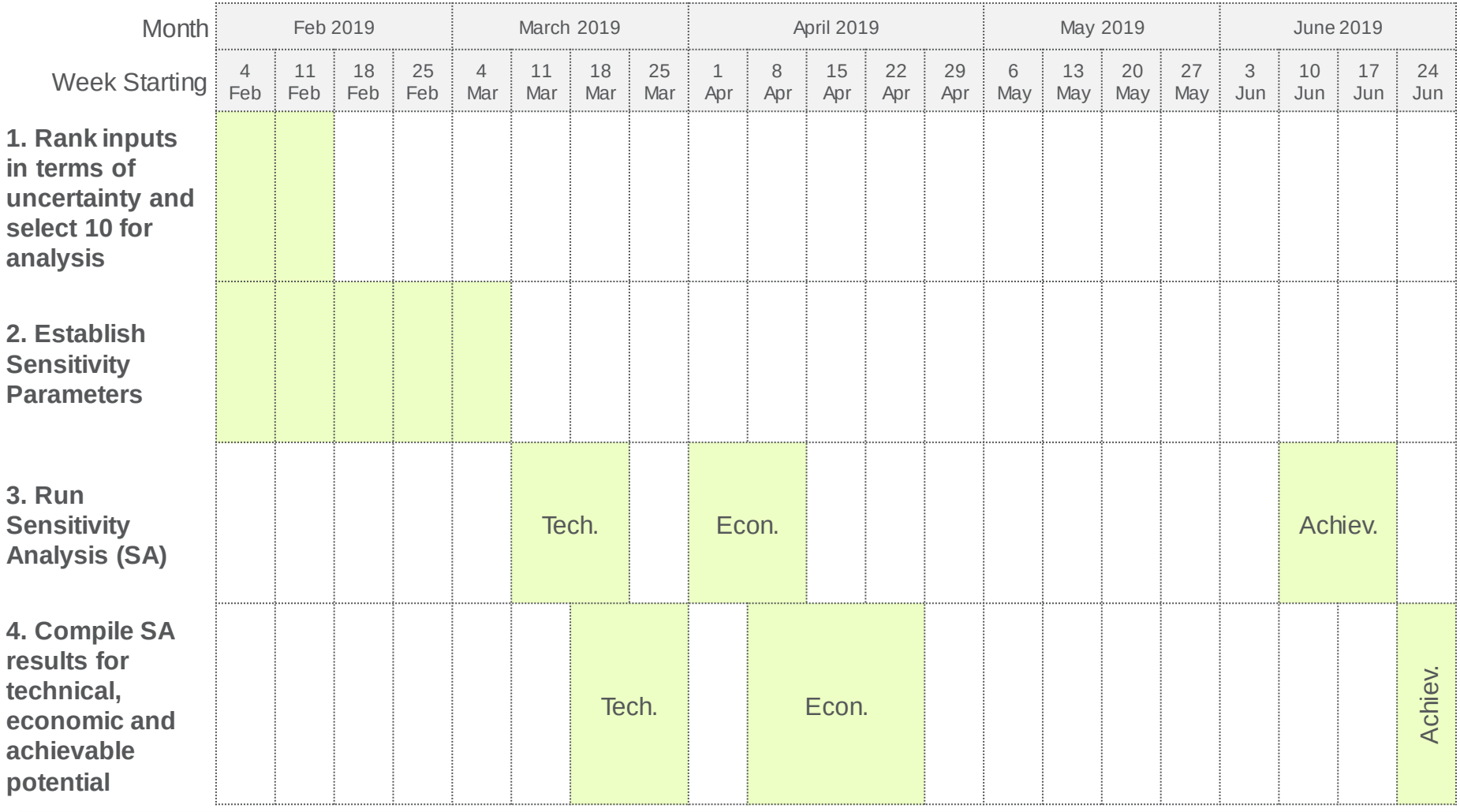
TASK 09: SENSITIVITY ANALYSIS

OVERVIEW



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Illustrative example of sensitivity analysis on retail rates to understand the impact on Achievable Potential if retail rates were 25% higher and lower.

Assume: the baseline retail rate for electricity is $0.10/kWh.

For this sensitivity analysis, Achievable Potential would be calculated three times:

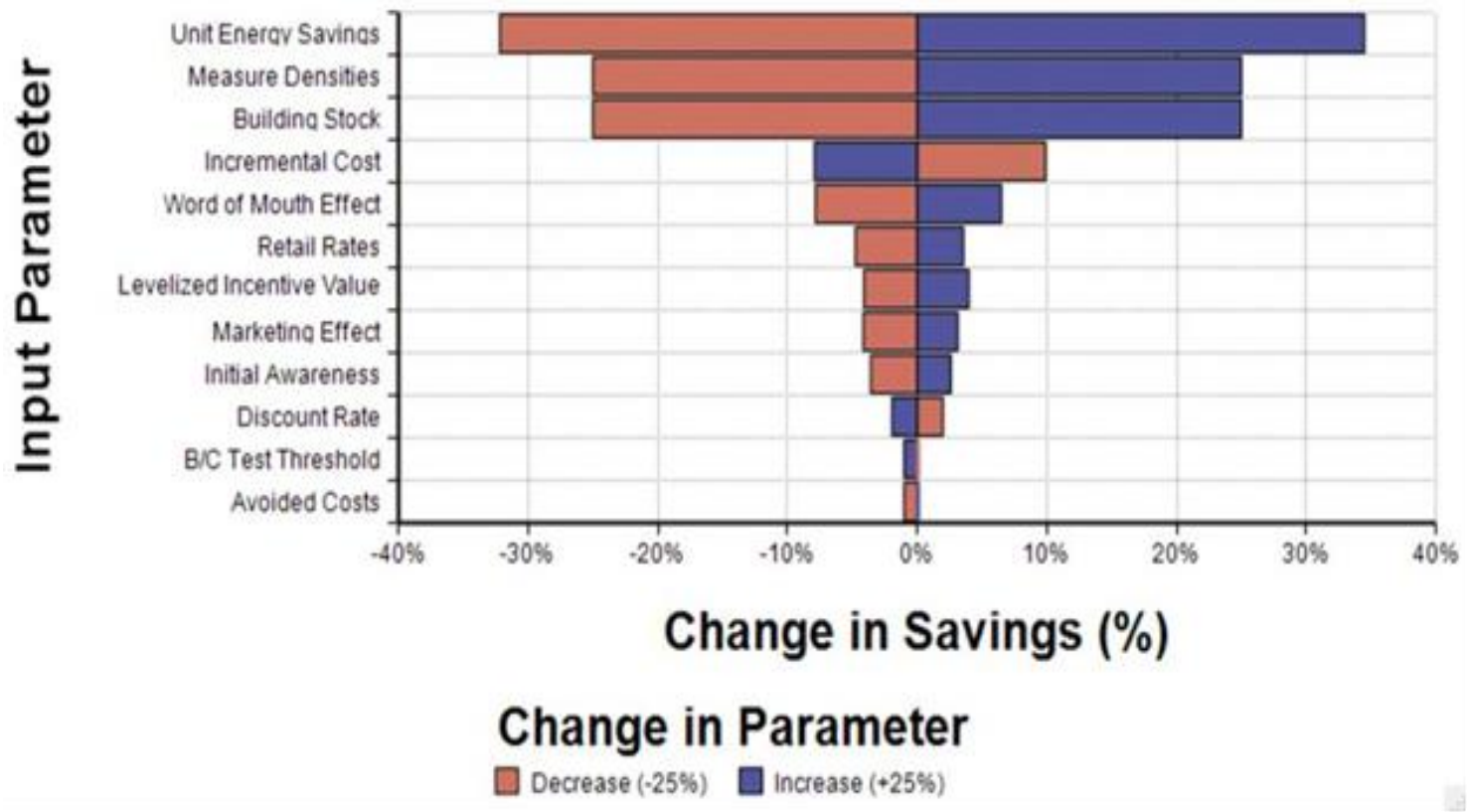
(1) Baseline rate of $0.10/kWh
(2) Upper bound rate of $0.125/kWh (25 percent higher)
(3) Lower bound rate of $0.075/kWh (25 percent lower)

The model would generate the following results:

Scenario	Low (-25%)	Baseline	High (+25%)
Input ($/kWh)	0.075	0.10	0.125
Output (GWh)	90	120	135

As expected, lower rates would produce lower potential since it would take a customer longer to pay back the cost of the project from electricity cost savings

Navigant's DSMSim™ model provides a rich set of sensitivity analysis (SA) tools that allow a user to explore the impact of different input assumptions on the model results.



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1 Which 10 Variables should be Included in the Sensitivity Analysis?

1. Incentives
2. Word-of-Mouth Effect *(Delphi panel input)*
3. Marketing Effect *(Delphi panel input)*
4. Initial Awareness *(Delphi panel input)*
5. Value of Non-Energy Impacts *(Delphi panel input)*
6. Incremental Measure Cost
7. Discount Rate
8. Benefit/Cost Test Threshold
9. Avoided Costs
10. Retail Rates
11. Measure Densities
12. Unit Energy Savings
13. Building Stock
14. Initial Efficient Technology Saturation
15. Stacking Frequency
16. Baseline Technology's Energy Consumption *(effectively applying codes/standards to all measures)*
17. Forecasted Energy Sales
18. Forecasted EUIs
19. Payback Acceptance *(Delphi panel input)*
20. Participation
21. Others?

2 **What Bounds should be Applied to the Selected Variables?**

Context

- Goal is to capture the bounds of true variability of most variables
- Larger values are likely to be unrealistic in most cases (e.g., it is unlikely that technology costs would increase or decrease so dramatically year-over-year)
- Easier to compare relative sensitivities across variables to prioritize which variables to scrutinize in the study and monitor in the future

± X%

- Bounds are applied in terms of % of the base case of the variable.
- The same bounds are applied to all variables for ease of comparison and operation of the model.
- Example bounds: +/-10%, +/-25%, +/-100%

Next Steps & 60 Day Outlook

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NEXT STEPS AND 60 DAY OUTLOOK

Task 3: Reference Forecast

1. Complete draft report chapter

Task 4: Measure Characterisation

1. Continue ongoing QC and address reviewer comments

Task 5: Technical Potential

1. Estimate and benchmark Technical Potential

Task 6: Economic Potential

1. Intake required input data (avoided costs, etc.)
2. Intake and QC of measure cost data and QC model cost diffusion.
3. Apply selected cost-effectiveness screening approach.

Task 7: Achievable Potential

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

Task 8: Whole Building Analysis

1. Complete recruitment and engage with working group
2. Begin estimation of historical relationships

Wrap-Up

- Thank you for your continued input and discussions today.
- Next meeting is April 11, 2019.
- Please submit comments on achievable potential scenarios using the comment form provided to engagement@ieso.ca by March 1, 2019.
- Please continue to reach out to the Project Team with any additional feedback or new issues that may arise between meetings.

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Powering Tomorrow.