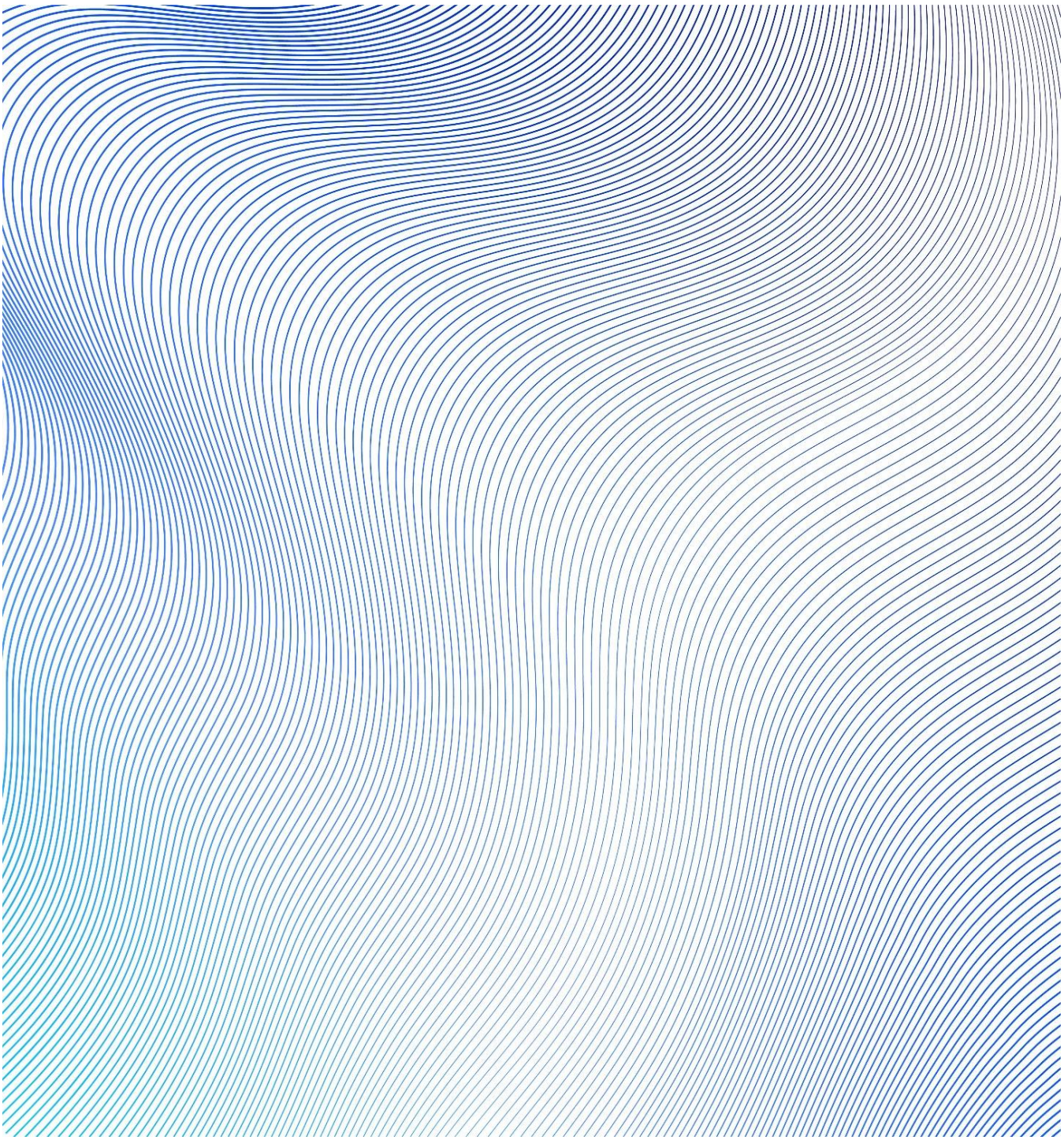
District of Saanich Building Retrofit Strategy

Final Report

April 2023



Introba

Issue	**Description**	**Date** (MM.DD.YY)	**Prepared By**	**Signed Off**
01	Draft	03.28.2023	SS	MDB/LW
02	Final	04.14.2023	SS	MDB/LW

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Disclaimer

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1 Introduction

1.1 Context

In early 2020, Council at the District of Saanich Council adopted Saanich's Climate Plan, which commits the District to:

- Cut emissions in half by 2030 (relative to 2007 levels)
- Achieve net zero emissions by 2050
- Transition to 100% renewable energy by 2050, and
- Prepare for a changing climate.

In pursuit of these goals, the District of Saanich is in the process of building on existing work to support community-wide building energy retrofits by developing a Building Retrofit Strategy. This strategy presents an opportunity to ensure an ambitious pathway to achieving the District's goals and outline the actions needed to support the rapid uptake of building retrofits.

Overall, the purpose of the Building Retrofit Strategy is to:

- Improve baseline building data and undertake analysis that provides more detailed direction on how to scale Saanich's current activities as well as any additional measures that may be required
- Ensure that current and planned actions related to building retrofits are sufficient to meet Saanich's Climate Plan targets and identify any necessary amendments, acceleration or additional actions
- Apply an equity lens to the development and prioritization of actions, and
- Identify the resources required for implementation.

The District engaged Introba to support the data inputs and modelling for the Strategy development, and the associated stakeholder engagement. This includes the development of a refined GHG inventory and modelling the GHG emissions reduction impact of current and future actions.

1.2 Purpose of this Report

Work carried out by Introba was split into two key phases:

- **Phase 1 – Refined GHG Inventory:** Drawing on available data, Introba developed a refined inventory of GHG emissions in the building sector for the District of Saanich (note this is not technically a "GHG Inventory" as defined under the criteria established in the Global Protocol for Communities, but rather an estimated accounting of emissions by building type).
- **Phase 2 – Policy Modelling:** Based on assumptions agreed with the District of Saanich and using an Excel-based GHG emissions model, Introba explored the GHG emissions reduction impact of current and future actions.

This report documents the methodology and results for each of these phases. Other deliverables for this project (provided separately from this report) include:

- **Renewable Natural Gas Memo**: This memo explores the extent to which renewable gas can be expected to support decarbonization in British Columbia and informs the assumptions for renewable natural gas (RNG) used in the modelling.
- **Workshop Summary:** A summary of the workshop hosted by the District of Saanich, Introba and the Community Energy Association (CEA) which was designed to solicit feedback on the state of existing building policy in British Columbia and a draft of Saanich's Building Retrofit Strategy.

2 Phase 1

2.1 Building Stock Assessment

The prime data source used for understanding the building stock was an extract of property tax data from 2021 for the District of Saanich collected by the British Columbia Assessment Authority (BC Assessment). This data was reviewed to establish a breakdown of the existing building stock by building type. The BC Assessment data includes a record for each building or part of a building, that is required to report tax information, as such individual strata units are recorded separately, rather than as one building. For this analysis, the data has been aggregated based on address, to determine the number of actual buildings.

The BC Assessment data set does not contain an attribute that relates to a concise list of building types suitable for analyzing the building stock. Instead, a set list of building types was identified by the project team, agreed upon with the client, and assigned to each record in the data based on the *Actual Use Code*, an attribute that denotes a property's primary use. Building types identified by the project team were selected to allow for alignment with policy scenarios that would be explored as part of the project. In the case of mixed-use commercial buildings, the building type was assigned based on the primary use; if there is no single dominant use, the building is assigned as 'Other Commercial'. In the case of mixed-use residential and commercial buildings, the residential and commercial portions have been kept separate to allow for more precise energy and policy analysis, though this may result in an overcount of the number of buildings.

A breakdown of the existing building stock by sector and building type is provided in Table 1 and represents a key component of the baseline model necessary to explore the impacts of various policy scenarios for the District of Saanich's Building Retrofit Strategy.

For residential building types, the building stock is further broken down by primary heating fuel type. For single family homes, the primary fuel type breakdown is primarily based on a 2021 survey of over 2,500 homes in Saanich (and over 10,000 across the Capital Regional District) by the Victoria Real Estate Board (VREB) and shared with Introba by the Capital Regional District. The survey found that the primary heating fuel type for single family homes in Saanich is as follows: 52% electric, 30% gas, 12% oil, 2% propane and 4% wood. A more recent survey completed on behalf of the District of Saanich estimates that there is a total of 2,537 oil-heated homes in the District, this equates to 9% of all single family homes identified through the BC Assessment data. This difference in oil-heated homes may be a result of various targeted efforts to fuel switch away from oil; regardless, as the Saanich oil survey is based on actual fuel tank records, it is considered more reliable than a statistical sample. The breakdown used in the baseline model is adjusted to reflect this and is 54% electric, 31% gas, 9% oil, 2% propane, and 4% wood.

For multi-family homes, this breakdown is based on NRCAN's Comprehensive Energy Use Database (CEUD) which provides data on the breakdown of heating system type for all apartments in British Columbia. The breakdown used in the baseline model focuses just on the split between gas and electric, which is 37% electric, and 61% gas. This breakdown potentially overestimates the number of multi-family homes using gas, as gas was introduced later on Vancouver Island than to other parts of the Province, but in lieu of data specifically for Vancouver Island, or for Saanich itself, the CEUD data provides the best available insights for multi-family homes.

The commercial floor area is not broken down by primary heating type due to insufficient reference data.

Table 1 – Breakdown of Existing Building Stock by Sector, Building Type and Primary Heating Fuel Type

Building Type	Number of Units	Number of Buildings	Floor Area (m^2)	Floor Area (ft^2)	Percent of Floor Area
Residential	46,065	30,109	6,184,191	66,566,058	71%
Single Family	36,312	29,798	5,344,149	57,523,945	61%
Single Family Detached	23,154	21,238	3,445,681	37,088,960	39%
Electricity	12,480	11,447	1,857,222	19,990,949	21%
Gas	7,247	6,647	1,078,498	11,608,844	12%
Oil	1,968	1,805	292,883	3,152,562	3%
Propane	463	425	68,914	741,779	1%
Wood	1,019	934	151,610	1,631,914	2%
Single Family Attached	13,158	8,560	1,898,469	20,434,985	22%
Electricity	7,092	4,614	1,023,275	11,014,457	12%
Gas	4,118	2,679	594,221	6,396,150	7%
Oil	1,118	728	161,370	1,736,974	2%
Propane	263	171	37,969	408,700	0%
Wood	579	377	83,533	899,139	1%
Multifamily	9,753	311	840,041	9,042,112	10%
MURB Rental	3,853	88	320,017	3,444,635	4%
Electric	1,503	34	124,807	1,343,408	1%
Gas	2,350	54	195,210	2,101,228	2%
MURB Condo	5,900	223	520,024	5,597,477	6%
Electric	2,301	87	202,810	2,183,016	2%
Gas	3,599	136	317,215	3,414,461	4%
Commercial and Industrial	4,225	1,005	2,563,412	27,592,340	29%
Institutional	1,243	147	1,111,436	11,963,399	13%
Healthcare & Other	1,084	72	283,787	3,054,653	3%
Government	102	57	142,108	1,529,633	2%
Education	57	18	685,542	7,379,113	8%
Commercial and Industrial	2,982	858	1,451,976	15,628,940	17%
Retail	499	152	453,522	4,881,663	5%
Other Commercial	576	130	295,938	3,185,463	3%
Office	301	109	178,122	1,917,291	2%
Industrial & Farm	1,606	467	524,394	5,644,523	6%
Grand Total	50,290	31,114	8,747,603	94,158,398	100%

2.2 Energy Use

In the baseline model, energy use is estimated by taking the average site *energy use intensity* (EUI) of different fuels for each building type, derived from regional studies and datasets, and multiplying these by the floor areas derived from BC Assessment data.

Average EUIs of different fuels for single family homes are based on pre-retrofit EUIs from EnerGuide data for the whole of the *Capital Regional District* (CRD), a sample comprising data for over 13,000 homes collected between 2007 and 2021. EUIs were first derived for homes with different primary heating fuel types and then averaged out based on the percentage breakdown of homes by primary heating fuel type.

The average EUIs for gas and electricity for both Multi-Unit Residential Building (MURB) rental and MURB condo buildings have been determined using an average of the EUIs found in the following studies:

- RDH's Phase 2 Strata Energy Study (2019)
- RDH's Market Rental Revitalization Study (2018)
- RDH's Deep Condo Retrofit - Context and Analysis Report (2016)
- RDH's Summary Report of MURB Emission Reduction Potential (2015)
- U.S. EIA's Residential Energy Consumption Survey (RECS) for the West Region (2014)

As with single family homes, EUIs were first derived for MURB buildings with different primary heating fuel types and then averaged out based on the percentage breakdown of primary heating fuel type.

The average EUI of gas and electricity for each commercial and industrial building type is an average of the EUIs found for that building type in the following studies:

- 2022 Building Benchmark BC Data for Saanich, Victoria and Esquimalt (2022)
- PUMA Utility Monitoring Inc's 2021 Benchmarking Reports (2022)
- RDH's Commercial Electrification Study (2020)
- RDH's Commercial Retrofit Energy Modelling Report (2019)
- U.S. EIA's Commercial Buildings Energy Consumption Survey (CBECS) for the West Region (2018)
- Stantec Consulting's Commercial Building Energy Modeling Study (2014)

For commercial and industrial buildings, EUIs were not determined for buildings with different primary heating fuel types. This is mainly because commercial buildings do not always have one dominant heating source, and as such, there is limited data on both the breakdown of the stock by fuel type and specific EUIs for buildings with different heating types. An average EUI for other fuel types was derived for each building type based on the data from the District of Saanich's 2020 GHG Inventory, where heating oil GHG emissions were estimated based on the number of known tanks, average heated floor areas and fuel volume intensity. The EUI of oil is assumed to be the same for all commercial and industrial building types.

Table 2 details all average EUIs used in the baseline model, which were adjusted proportionally to ensure energy use totals in the baseline model aligned with the 2021 utility data from BC Hydro and Fortis BC and the District of Saanich's 2020 GHG Inventory completed by Stantec Consulting Ltd

Figure 1 illustrates how the total energy use in the baseline model compares with these two benchmarks. It was agreed with the client to align the baseline model more closely with the 2021 utility data.

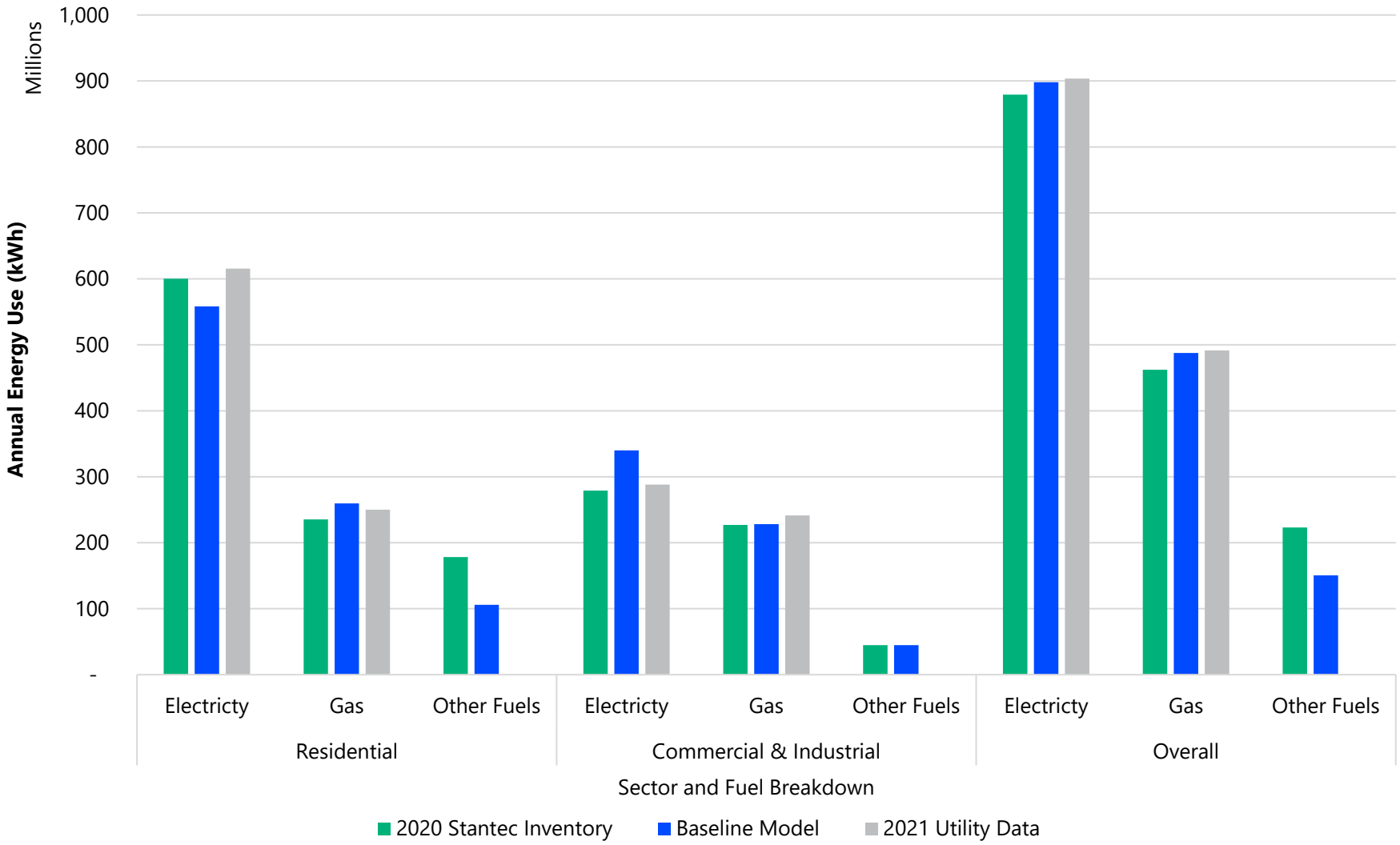
Sectoral estimates for gas and electricity use in the baseline model differ from the utility data and inventory data. This is a typical result, as the inventory and utility data include some multi-unit residential buildings, or some common area portions thereof, as part of the 'Commercial and Industrial' sector, whereas all multi-unit residential buildings are considered as part of the 'Residential' sector in the baseline model. As a result, the alignment of the baseline model with utility data totals focuses on overall energy use rather than sectoral energy use.

It is also worth noting that the main substation for the University of Victoria, one of the largest energy consumers in the area, is located in Saanich. This means that the electricity use for much of their campus will be captured in the utility data for Saanich, whilst roughly half of their buildings are actually physically located in Saanich. In the building stock assessment, the building count and floor area may only capture the buildings that are physically in Saanich; thus, the electricity use intensities in the commercial sector may be overestimated. Estimates of energy use from other fuels (i.e., oil, propane and wood) are lower in the baseline model than in the District of Saanich's 2020 GHG Inventory for residential buildings; it is believed that oil energy use is overestimated in the latter.

Table 2 – Average EUI Assumptions by Sector, Building Type and Primary Heating Fuel Type

Building Type	Total EUI (kWh/m²)	Electric EUI (kWh/m²)	Natural Gas EUI (kWh/m²)	Oil EUI (kWh/m²)	Propane EUI (kWh/m²)	Wood EUI (kWh/m²)
Residential	149.4	90.3	42.0	8.1	2.0	7.1
Single Family	144.7	91.8	33.1	9.3	2.3	8.2
Single Family Detached	144.7	91.8	33.1	9.3	2.3	8.2
Electricity	134.3	129.7	3.9	0.0	0.0	0.7
Gas	140.3	40.9	99.0	0.0	0.0	0.3
Oil	167.2	56.7	0.0	109.7	0.0	0.8
Propane	167.4	56.3	0.0	0.0	110.9	0.2
Wood	246.8	71.4	0.0	0.0	1.4	174.0
Single Family Attached	144.7	91.8	33.1	9.3	2.3	8.2
Electricity	134.3	129.7	3.9	0.0	0.0	0.7
Gas	140.3	40.9	99.0	0.0	0.0	0.3
Oil	167.2	56.7	0.0	109.7	0.0	0.8
Propane	167.4	56.3	0.0	0.0	110.9	0.2
Wood	246.8	71.4	0.0	0.0	1.4	174.0
Multi Family	178.8	80.3	98.5	-	-	-
MURB Rental	178.8	80.3	98.5	-	-	-
Electric	163.9	121.4	42.4	-	-	-
Gas	188.3	54.0	134.3	-	-	-
MURB Condo	178.8	80.3	98.5	-	-	-
Electric	163.9	121.4	42.4	-	-	-
Gas	188.3	54.0	134.3	-	-	-
Commercial and Industrial	239.1	132.6	89.0	17.5	-	-
Institutional	210.7	107.6	85.7	17.5	-	-
Healthcare & Other	301.7	164.0	120.2	17.5	-	-
Government	203.8	100.1	86.2	17.5	-	-
Education	174.5	85.7	71.3	17.5	-	-
Commercial and Industrial	260.7	151.8	91.5	17.5	-	-
Retail	275.9	184.4	74.0	17.5	-	-
Other Commercial	481.5	266.8	197.3	17.5	-	-
Office	187.7	112.5	57.7	17.5	-	-
Industrial & Farm	147.9	71.9	58.5	17.5	-	-

Figure 1 – Benchmarking Sectoral and Overall Annual Energy Use by Fuel Type



2.3 GHG Emissions

In the baseline model, emissions factors are applied to the estimated energy use totals to estimate GHG emissions, as detailed in Table 3. As 2020 emission factors are used in the District of Saanich's 2020 GHG Inventory completed by Stantec Consulting, 2020 emission factors were applied to the baseline model to allow for comparison, and then updated to 2021 emissions factors.

Estimated GHG emissions from the baseline model with both 2020 and 2021 emission factors are shown in Figure 2 and compared with the District of Saanich's 2020 GHG Inventory. GHG emissions related to electricity energy use drop significantly when 2021 emission factors are used due to the decarbonization of B.C.'s Grid. 2021 factors are used in the summary in Table 4 and Figure 3.

It is important to note that the baseline model established for this project is not a "GHG Inventory" per se. Under the criteria established by the GHG Protocol, inventories need to be based (to the greatest extent possible) on real energy use information. However, it does provide useful data for planning and is critical to supporting the next phase of this strategy development.

Figure 2 – Benchmarking Overall Annual GHG Emissions by Fuel Type

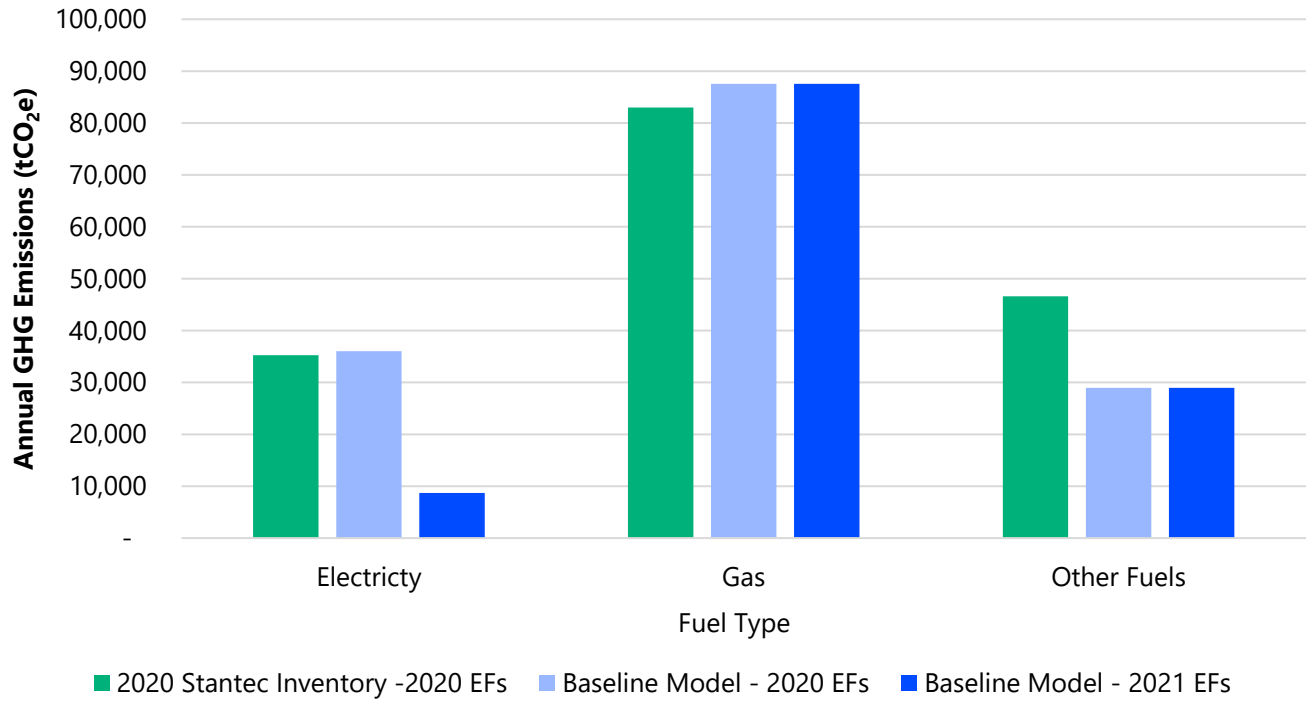


Table 3 – Emission Factors

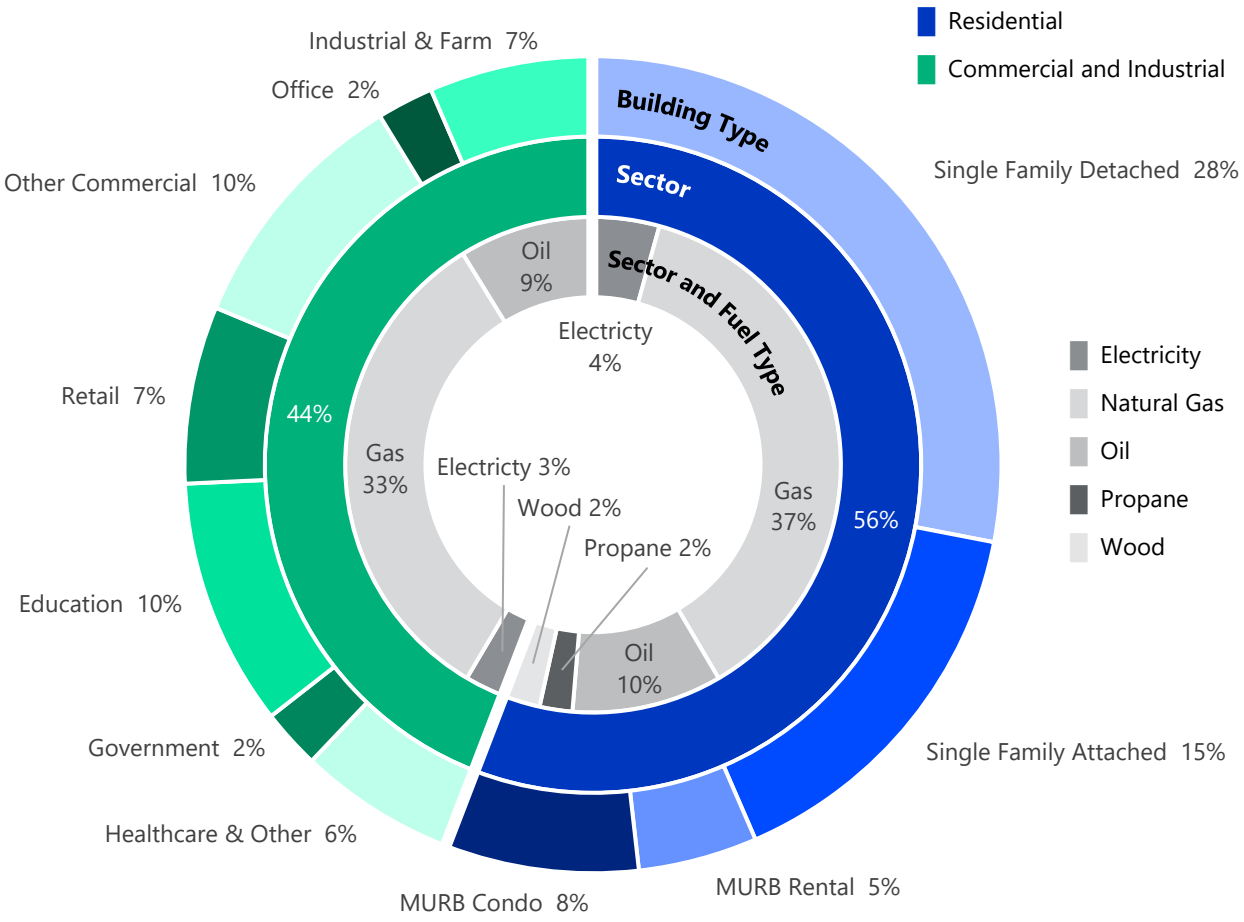
Fuel Type	2020	2021	Units
Electricity	40.1	9.7	tCO_2e / GWh
Natural Gas	49.9	49.9	kg/GJ
Propane	61.2	61.2	kg/GJ
Oil	68.4	68.4	kg/GJ
Wood	19.1[1] / 23.5[2]	19.1	kg/GJ

[1] Emission Factor for Wood Fuel according to BC Climate Action Secretariat.
[2] Emission Factor for Wood Fuel used in The District of Saanich's 2020 GHG Inventory completed by Stantec Consulting.

Table 4 – Baseline Model Energy Use and GHG Emission Breakdown by Sector, Building Type and Primary Heating Fuel Type

Building Type	Energy Use (MWh)	Percentage of Energy Use	GHG Emissions (tCO_2e)	Percentage of GHG Emissions
Residential	923,667	60%	69,974	56%
Single Family	773,479	50%	54,468	43%
Single Family Detached	498,706	32%	35,119	28%
Electricity	249,507	16%	3,730	3%
Gas	151,273	10%	19,623	16%
Oil	48,972	3%	8,083	6%
Propane	11,537	1%	1,721	1%
Wood	37,419	2%	1,962	2%
Single Family Attached	274,773	18%	19,349	15%
Electricity	137,471	9%	2,055	2%
Gas	83,347	5%	10,812	9%
Oil	26,982	2%	4,454	4%
Propane	6,356	0%	948	1%
Wood	20,617	1%	1,081	1%
Multi Family	150,188	10%	15,506	12%
MURB Rental	57,215	4%	5,907	5%
Electric	20,454	1%	1,098	1%
Gas	36,761	2%	4,809	4%
MURB Condo	92,973	6%	9,599	8%
Electric	33,237	2%	1,784	1%
Gas	59,736	4%	7,814	6%
Commercial and Industrial	612,800	40%	55,274	44%
Institutional	234,200	15%	23,035	18%
Healthcare & Other	85,613	6%	7,795	6%
Government	28,959	2%	2,949	2%
Education	119,628	8%	12,292	10%
Commercial and Industrial	378,600	25%	32,239	26%
Retail	125,122	8%	8,786	7%
Other Commercial	142,498	9%	12,519	10%
Office	33,426	2%	2,805	2%
Industrial & Farm	77,554	5%	8,129	6%
Grand Total	1,536,466	100%	125,247	100%

Figure 3 – Baseline Model GHG Emission Breakdown by Sector, Building Type and Primary Heating Fuel Type



3 Phase 2

3.1 Methodology

3.1.1 Overview

Introba developed an Excel-based GHG emissions model to explore and inform policy actions for existing buildings in the District of Saanich. The baseline developed in Phase 1 is used as the starting point for projections of GHG emissions and the impact of various policies between 2022 and 2050. Introba used the model to estimate future energy consumption and GHG emissions under various scenarios. Each scenario is compared against a projection of the baseline, which assumes growth in economic activity and population, but does not include energy efficiency or renewable energy policies at the Regional, Provincial, or Federal levels.

The model is intended to inform the District of Saanich on how it can achieve its building sector GHG emissions reduction targets. It is not meant to quantify all actions or assign savings to specific actions; rather, it calculates GHG emissions reductions by strategy area (e.g., Clean Electricity, Part 9 Building Energy Efficiency, Part 9 Building Fuel Switching etc.).

All data in the model is annualized; the model does not account for hourly or seasonal variation in energy use or emissions. The model is not intended to be a predictive tool and does not account for costs or externalities other than GHG emissions. The specific design and implementation of many of these actions will take further analysis, including understanding their cost-effectiveness and required regulatory mechanisms.

3.1.2 Scenarios

Three main scenarios were developed and agreed upon with the District of Saanich:

- **Business-as-Usual (BAU)** – GHG emissions reduction as a result of policies that are already in place.
- **Planned Provincial and Federal Policies (PFP)** – GHG emissions reduction as a result of the policies the Province and the Federal Government are planning to introduce. These policies are layered on top of or provide variation to the policies modelled in the BAU scenario,
- **Potential Local Policies (LP)** – GHG emissions reduction as a result of potential actions that the District of Saanich are considering in their Building Retrofit Strategy. These actions are layered on top of or provide variation to the policies modelled in the PFP scenario.

These scenarios intend to understand the GHG emissions reduction that will be achieved if no further action is taken, how far the planned Provincial and Federal policies will get Saanich in terms of their reduction targets, and what local policies are required to ensure those targets are met.

3.1.3 Modelled Policies and Actions

A high-level summary of the policies and actions modelled, the building types they apply to, the strategy areas where they drive GHG emissions reduction and details of their variation for each of the three main scenarios is provided in the following table.

Existing – Included in BAU Scenario
Planned – Introduced in PFP Scenario
Potential – Introduced in the LP Scenario

Table 5 – Description of Modelled Policies

Policy/Action	Building Types	Implementing Actor	High-Level Description
Clean Electricity Delivery Standard	All Buildings	BC Hydro	A requirement that 100% of electricity delivered in the province be generated by clean, renewable sources by 2030.
Renewable Natural Gas (RNG)	All Buildings	Fortis BC	Supply of RNG to homes and businesses in BC by Fortis BC, modelled based on proportional supply, irrespective of customer purchase.
BC Step Codes for Redevelopment and Major Renovations	All Buildings	Province of BC + District of Saanich	BC Energy Step Energy Code has increasing efficiency requirements over time; the new Zero Carbon Step Code (which the District has adopted ahead of the Province) will require new buildings built after 2025 to meet Greenhouse Gas Intensity targets.
Provincial and Federal Rebates / Financing and Saanich Top Ups	Part 9 Buildings	Province of BC + BC Hydro + Government of Canada	Existing energy efficiency and electrification incentives and financing offers available for homes.
Highest Efficiency Equipment Standard	All Buildings	Province of BC	Provincial requirements under development for all space heating and hot water heating systems sold or installed in BC after 2030 to be at least 100% efficient. The Province is considering an option for municipalities to introduce the requirement ahead of 2030.
Alterations Code	All Buildings	Province of BC	A Provincial building code expansion under development that would require buildings undergoing certain alterations to meet select high-efficiency code requirements.
Mandatory Part 3 Energy Benchmarking	Large Part 3 Buildings	District of Saanich	Benchmarking and annual reporting of energy use in existing municipal, commercial and multi-unit residential buildings > 20,000 gross square feet.
Heat Pump Financing Program	Part 9 Buildings	District of Saanich	District program that provides interest-free financing for homeowners switching from fossil fuel heating systems to electric heat pumps.
Requirement to Phase out Oil Heating	Part 9 Buildings	District of Saanich	Potential requirement for homeowners to cease using fuel oil as a space heating source by 2030.
Expansion of Home Energy Navigator	Part 9 Buildings	Capital Regional District + District of Saanich	Expansion of the Home Energy Navigator program (formerly "Bring it Home 4 Climate") to support retrofits of up to 3% of homes per year.
Saanich Building Performance Standard	All Part 3 Buildings	District of Saanich	A potential program requiring existing buildings to meet emissions performance requirements that decline over time—modelled on the requirements established in the City of Vancouver[1].
Saanich Revitalization Tax Exemption	All Part 3 Buildings	District of Saanich	Revitalization tax credit program projected to incentivize ~3 MURB and 9 commercial buildings per year to electrify.
Strata Energy Advisor Program	MURB Condo	Capital Regional District + District of Saanich	Technical assistance program that embeds energy advisors with strata condominium buildings to support energy efficiency upgrades.

[1] City of Vancouver. 2022. "Annual Greenhouse Gas and Energy Limits By-Law". Accessed March 27, 2023. https://bylaws.vancouver.ca/consolidated/13472.PDF

Table 6 – Summary of Modelled Policies and Actions

Policy / Action	Building Types	Strategy Area(s)	Policy Variation by Scenario		
			BAU	PFP	LP
Clean Electricity Delivery Standard	All Buildings	Clean Electricity	On	On	On
Renewable Natural Gas	All Buildings	Renewable Natural Gas	RNG concurrent with a diversified energy outlook	RNG concurrent with deep electrification	RNG concurrent with deep electrification
BC Step Codes for Redevelopment and Major Renovations	All Buildings	BC Step Codes	BC Energy Step Code	BC Energy Step Code	BC Energy Step Code + Zero Carbon Step Code
Provincial and Federal Rebates / Financing and Saanich Top Ups	Part 9 Buildings	Part 9 Fuel Switching and Energy Efficiency	As existing carried on to 2050	Incentives no longer available after 2031	Incentives no longer available after 2031
Highest Efficiency Equipment Standard	All Buildings	Part 3 and Part 9 Fuel Switching	Off	Starts in 2031	Starts in 2027
Alterations Code	All Buildings	Part 3 and Part 9 Energy Efficiency	Off	On	On
Mandatory Part 3 Energy Benchmarking	Large Part 3 Buildings	Part 3 Energy Benchmarking	Increased benchmarking without a local requirement	Increased benchmarking without a local requirement	Increased benchmarking with a local requirement
Heat Pump Financing Program	Part 9 Buildings	Part 9 Fuel Switching	Off	Off	On
Requirement to Phase out Oil Heating	Part 9 Buildings	Part 9 Fuel Switching	Off	Off	On
Expansion of Home Energy Navigator	Part 9 Buildings	Part 9 Fuel Switching and Energy Efficiency	Off	Off	On
Saanich Building Performance Standard	All Part 3 Buildings	Part 3 Fuel Switching and Energy Efficiency	Off	Off	On
Saanich Revitalization Tax Exemption	All Part 3 Buildings	Part 3 Fuel Switching	Off	Off	On
Strata Energy Advisor Program	MURB Condo	Part 3 Energy Efficiency	Off	Off	On

More details on the modelling assumptions for each of these policies and their variations can be found in the appendix to this report. These assumptions were developed and refined with District of Saanich staff - where possible these assumptions were derived from insights provided by the external stakeholders responsible for the respective policies and programs and from peer-reviewed research.

3.1.4 Targets

The results of the modelling are compared with the District of Saanich's climate action targets and the Province's sectoral target for buildings and communities. These targets are as follows:

- *Saanich 2030 Overall Target:* 50% reduction relative to the 2007 baseline
- *Saanich 2050 Overall Target:* Net zero emissions
- *Provincial 2030 Buildings and Communities Target*: 59-64% reduction relative to the 2007 baseline

The District of Saanich's climate change targets extend to their overall community GHG emissions and were not specifically developed or intended as targets for GHG emissions reduction in existing buildings, but they provide a useful reference point. While all targets are relative to a 2007 baseline, the 2007 baseline referenced in this model refers only to the GHG emissions from Saanich's building stock in 2007.

3.1.5 GHG Intensity Assumptions

It will be noted that all charts in the sections below show a large drop in GHG emissions from 2020 to 2022. This is due to a change in methodology for modelling of electricity emissions by the BC Climate Action Secretariat, which reduced the assumed electricity emission intensity factor from 40.1 tCO_2e/GWh in 2020 to 9.7 tCO_2e/GWh in 2021. As over 95% of electricity in British Columbia comes from renewable hydropower, small changes in the amount of hydro generation, and thus the amount of imported electricity from gas and coal combustion in Alberta and the U.S., can greatly change the GHG intensity of electricity from year to year.[2] This volatility is responsible for much of the historical variation shown in the GHG charts below. Natural Gas and Fuel Oil GHG intensity factors are also based on data from the BC Climate Action Secretariat but are a function of chemistry and do not vary over time.

3.2 Modelling Results

Modelling results for each of the scenarios are presented in this section. Results are either present as an annual operational GHG emissions reduction or a cumulative operational GHG emissions reduction. Annual reduction denotes the reduction that could be expected in any given year compared to a baseline, this helps to understand how policies affect reduction year on year. All targets explored in this analysis relate to annual reduction over a baseline. Cumulative reduction denotes the total reduction that could be expected between 2022 and 2050, this is helpful to understand the total GHG emissions that can be avoided as a result of taking action – by taking action earlier more GHG emissions can be avoided.

3.2.1 Business-as-Usual

From Table 7 and Figures 4 and 5, it can be seen that implementing the policies already in place could yield a 37% reduction in GHG emissions from the building sector by 2030 and a 42% reduction by 2050, over the 2007 baseline. While significant, GHG emissions reductions for the building sector would not meet either the District of Saanich's 2030 or 2050 targets or the Province of BC's 2030 buildings and communities sector targets.

The majority of GHG emissions reductions achieved in this scenario are a result of:

- Cleaner electricity enforced through the *Clean Electricity Delivery Standard*.
- Current rates of fuel switching in Part 9 buildings driven by Provincial and Federal incentives and Saanich's top-ups.
- The application of the *BC Energy Step Code* to redevelopment and major renovations.

[2] BC Climate Secretariat. 2022. "Electricity emission intensity factors for grid-connected entities." *Province of British Columbia.* Accessed March 27, 2023. https://www2.gov.bc.ca/assets/gov/environment/climate-change/ind/quantification/electricity_emission_intensity_factors_for_grid-connected_entities_faq.pdf

- The use of renewable natural gas (RNG) to meet a portion of natural gas demand, modelled as a decrease in the natural gas grid emission factor.

It can also be seen that RNG provides significant reductions before 2032, but far less after 2035. The supply of RNG before 2032 is based on projections from FortisBC and their current RNG supply contracts, many of which are with RNG suppliers outside of the province. It is assumed that as demand for RNG increases across North America, securing supply from other provinces and from the United States will be more difficult, and therefore FortisBC may only be able to procure RNG from sources within the province. For more details on these assumptions, please refer to the accompanying *Renewable Natural Gas Memo*.

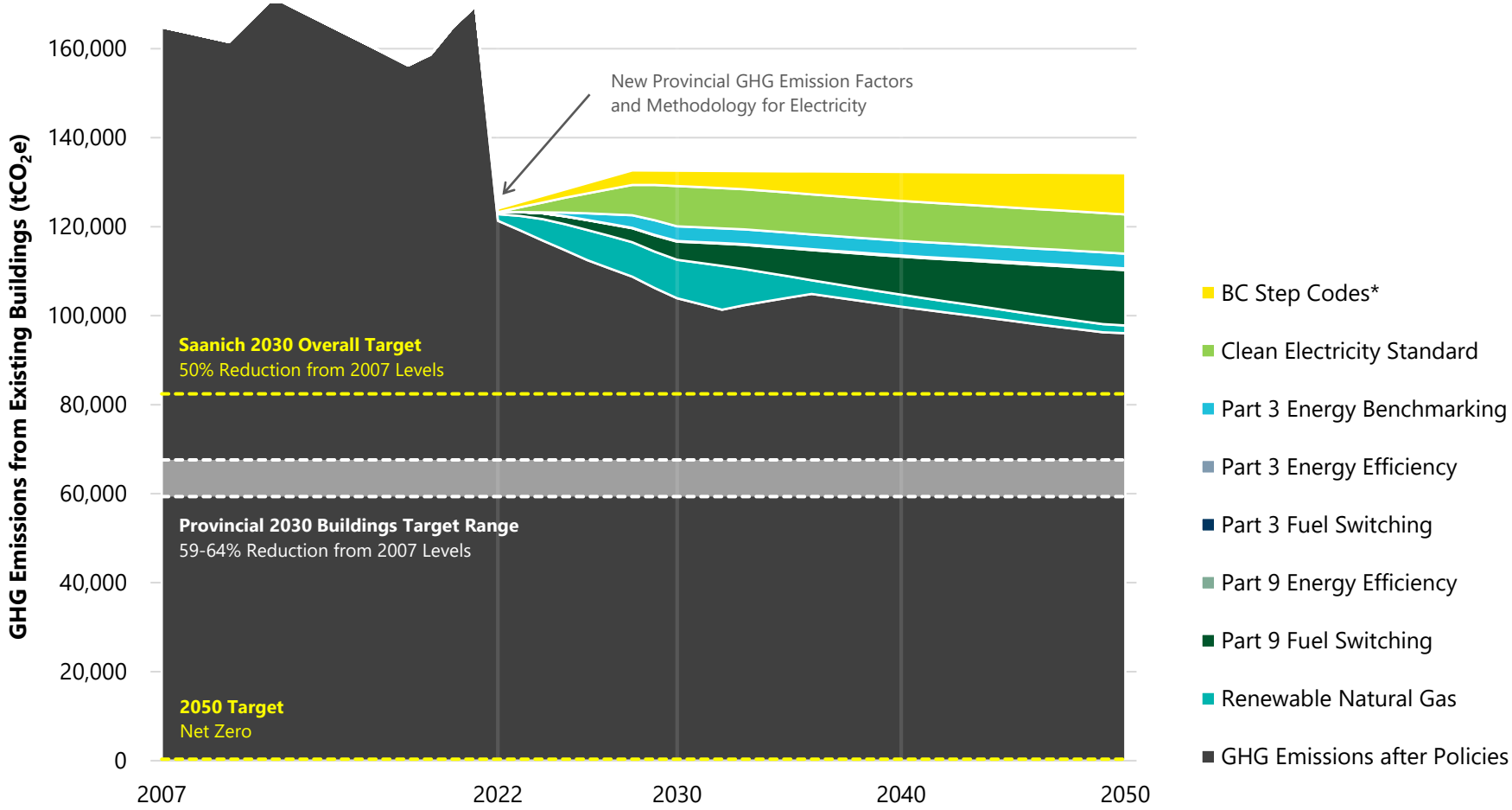
Figure 4 also highlights how the projected baseline increases from 2022 to 2028. It is assumed that from 2025, the *BC Energy Step Code* and the *Zero Carbon Step Code* will apply to all new construction. As such, these buildings will achieve a level of performance that is aligned with the District of Saanich's climate action targets. However, it is assumed that buildings permitted before 2025 will need retrofitting in the future and therefore should be included in the projected baseline. Due to the delays between permitting and a building being built and fully occupied, the GHG impacts lag the adoption year by 2 years for Part 9 buildings and by 3 years for Part 3 buildings, and baseline emissions increase up to 2028.

Table 7 – Annual Operational GHG Emissions Reduction in 2030, 2040 and 2050, Business-as-Usual

	GHG Reductions[1] in 2030		GHG Reductions[1] in 2040		GHG Reductions[1] in 2050	
	tCO_2e	% Reduction	tCO_2e	% Reduction	tCO_2e	% Reduction
Projected Baseline	**132,575**	**-**	**132,298**	**-**	**132,020**	**-**
BC Step Codes[2]	3,443	3%	6,490	5%	9,264	7%
Clean Electricity	9,049	7%	8,954	7%	8,818	7%
Part 3 Energy Benchmarking	3,310	2%	3,310	3%	3,310	3%
Part 3 Energy Efficiency	-	0%	-	0%	-	0%
Part 3 Fuel Switching	-	0%	-	0%	-	0%
Part 9 Energy Efficiency	127	0%	267	0%	393	0%
Part 9 Fuel Switching	4,083	3%	8,551	6%	12,427	9%
Renewable Natural Gas	8,638	7%	2,690	2%	1,740	1%
Total GHG Emissions Reduction	**28,649**	**22%**	**30,262**	**23%**	**35,952**	**27%**
GHG Emissions after Policies	**103,927**	**-**	**102,035**	**-**	**96,068**	**-**
% Reduction from 2007 Baseline[3]	**-37%**	**-**	**-38%**	**-**	**-42%**	**-**

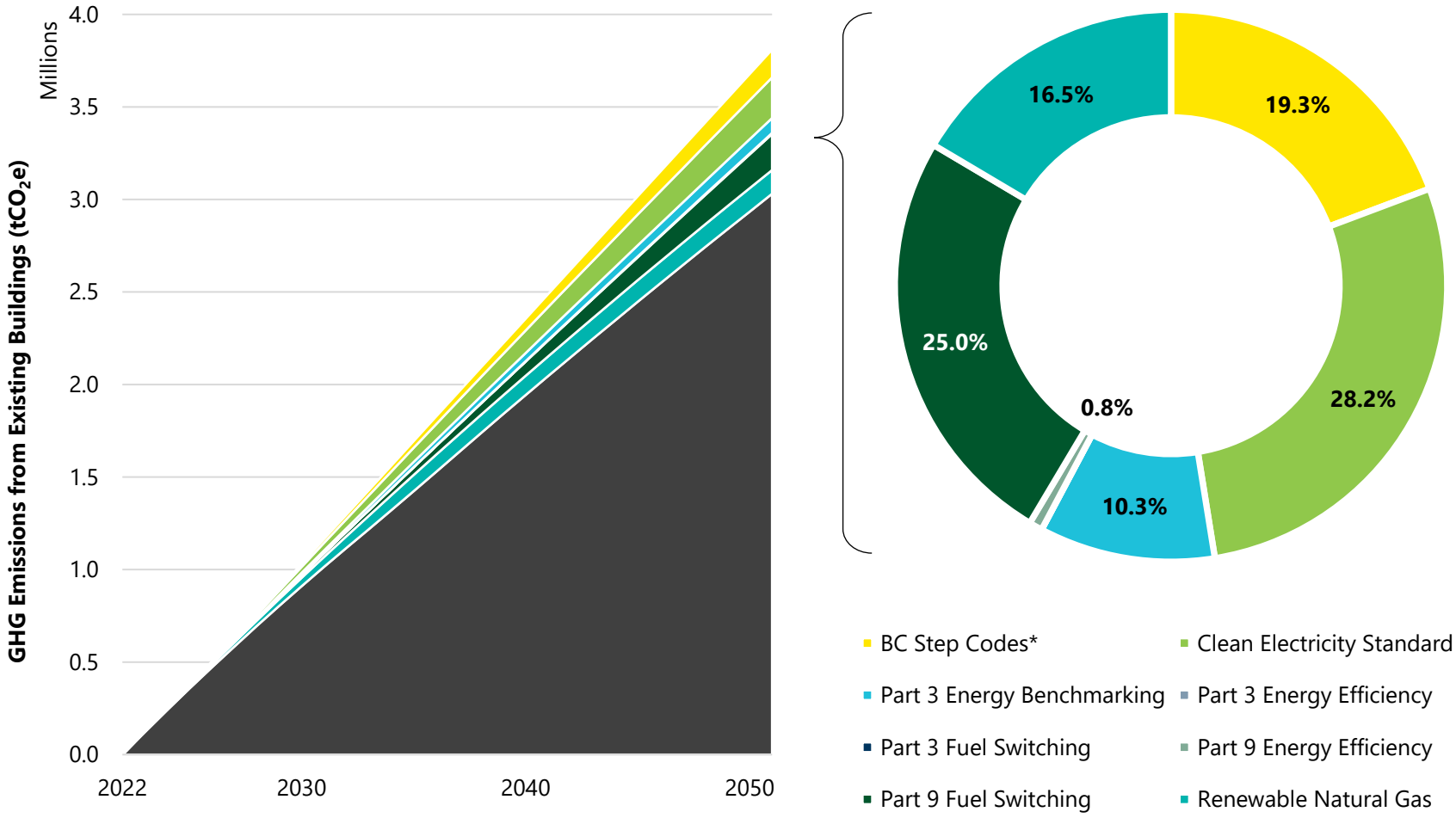
[1] GHG Emissions Reduction from the Projected Baseline
[2] BC Step Codes for Redevelopment and Major Renovations
[3] The 2007 Baseline is 164,857 tCO_2e

Figure 4 – Annual Operational GHG Emissions Reduction Trajectory, Business-as-Usual



*BC Step Codes for Redevelopment and Major Renovations

Figure 5 – Cumulative Operational GHG Emissions Reduction, Business-as-Usual



*BC Step Codes for Redevelopment and Major Renovations

3.2.2 Planned Provincial and Federal Policies

From Table 8 and Figure 6 and 7, it can be seen that a significant increase in GHG emissions reduction over the BAU scenario occurs when planned Provincial and Federal policies are modelled. As such, the District of Saanich could expect a 40% reduction in GHG emissions from the building sector by 2030 and an 89% reduction by 2050 (over the 2007 baseline). Even with this increased emission reduction, it is still not enough to meet Saanich's 2030 or 2050 targets or the Province of BC's 2030 buildings and communities sector targets. Planned policies include the *Highest Efficiency Equipment Standard* and the *Alterations Code*, which are modelled to start in 2031 and 2025 respectively.

The increase in GHG emissions reduction in this scenario is mainly a result of:

- High levels of fuel switching in Part 3 and Part 9 buildings, driven by the introduction of the *Highest Efficiency Equipment Standard*.
- Low levels of energy efficiency improvements for Part 3 and Part 9 buildings, driven by the introduction of the *Alterations Code*.

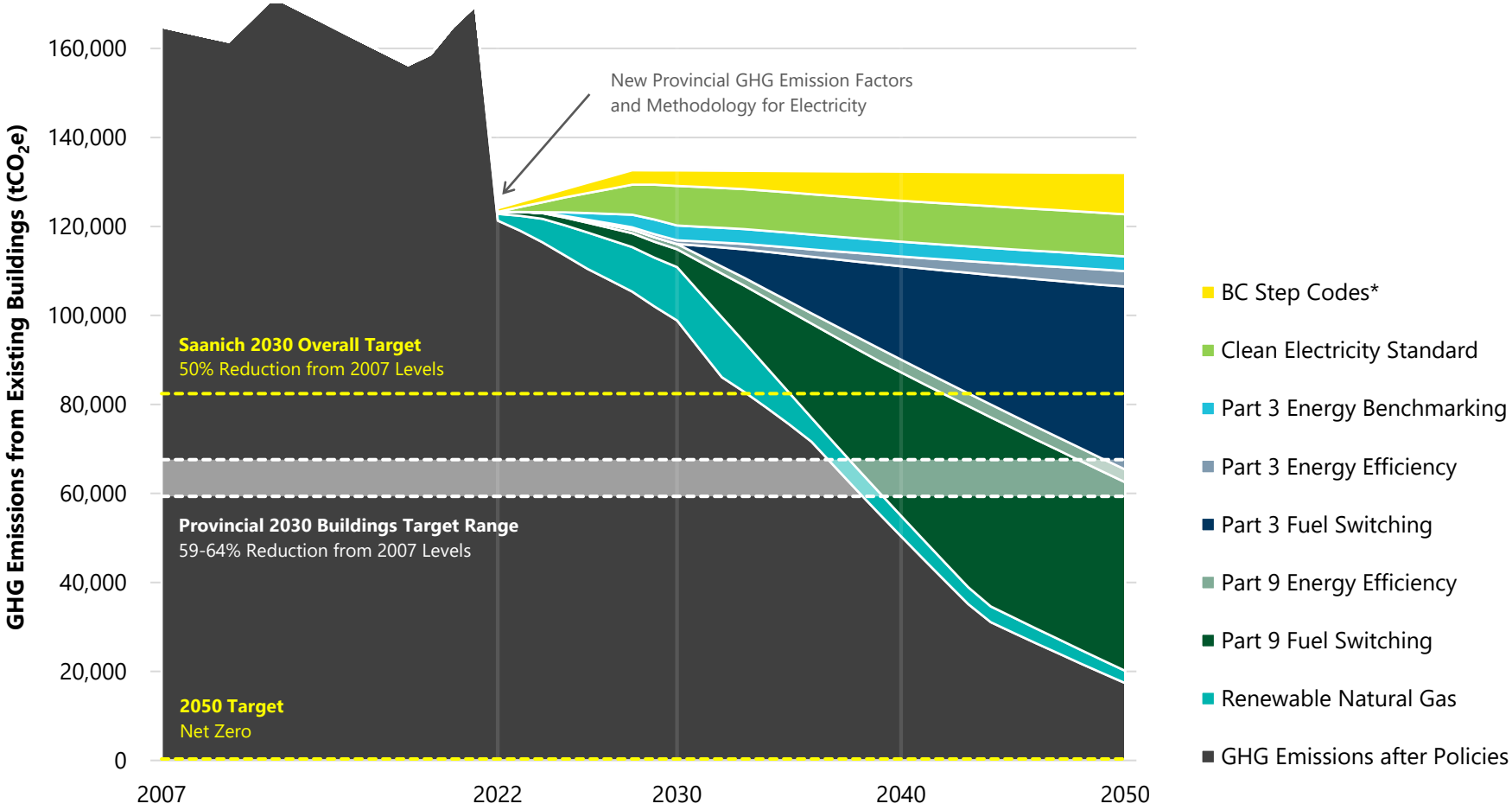
Based on these estimates, it is apparent that local policies and actions will be required to meet Saanich's climate targets as well as the Province of BC's buildings and communities sector targets. There is only a small increase (3%) in GHG emissions reduction in 2030 over the BAU scenario, as a result of the *Alterations Code* starting in 2025.

Table 8 – Annual Operational GHG Emissions Reduction in 2030, 2040 and 2050, Planned Provincial and Federal Policies

	GHG Reductions[1] in 2030		**GHG Reductions[1] in 2040**		**GHG Reductions[1] in 2050**	
	tCO_2e	% Reduction	tCO_2e	% Reduction	tCO_2e	% Reduction
Projected Baseline	**132,575**	**-**	**132,298**	**-**	**132,020**	**-**
BC Step Codes[2]	3,465	3%	6,512	5%	9,286	7%
Clean Electricity	8,903	7%	9,206	7%	9,463	7%
Part 3 Energy Benchmarking	3,310	2%	3,310	3%	3,310	3%
Part 3 Energy Efficiency	830	1%	2,210	2%	3,446	3%
Part 3 Fuel Switching	-	0%	20,981	16%	41,133	31%
Part 9 Energy Efficiency	1,206	1%	2,880	2%	2,872	2%
Part 9 Fuel Switching	4,004	3%	32,261	24%	42,372	32%
Renewable Natural Gas	12,004	9%	4,587	3%	2,761	2%
Total GHG Emissions Reduction	**33,721**	**25%**	**81,947**	**62%**	**114,644**	**87%**
GHG Emissions after Policies	**98,854**	**-**	**50,351**	**-**	**17,376**	**-**
% Reduction from 2007 Baseline[3]	**-40%**	**-**	**-69%**	**-**	**-89%**	**-**

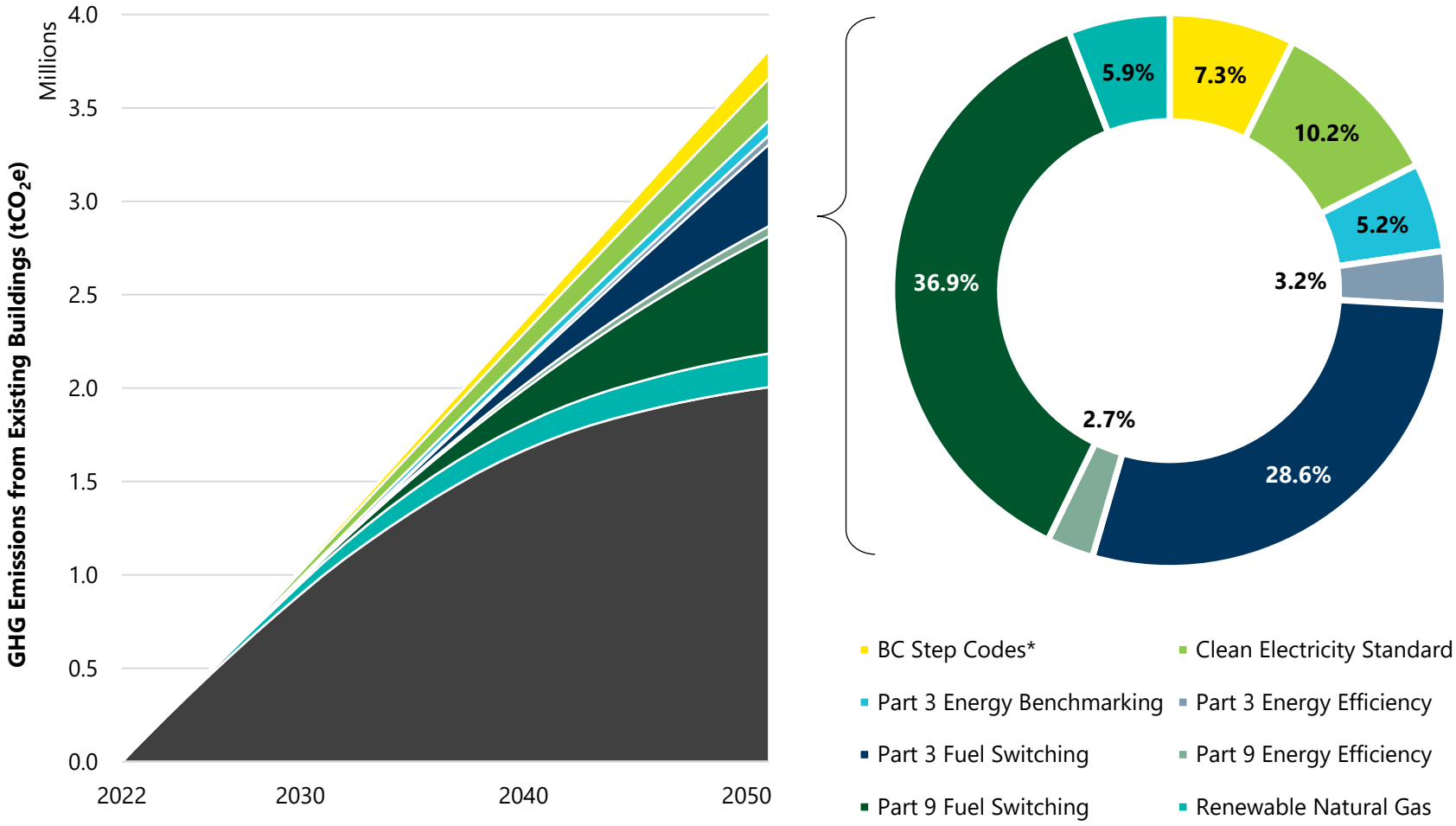
[1] GHG Emissions Reduction from the Projected Baseline
[2] BC Step Codes for Redevelopment and Major Renovations
[3] The 2007 Baseline is 164,857 tCO_2e

Figure 6 – Annual Operational GHG Emissions Reduction Trajectory, Planned Provincial and Federal Policies



*BC Step Codes for Redevelopment and Major Renovations

Figure 7 - Cumulative Operational GHG Emissions Reduction, Planned Provincial and Federal Policies



*BC Step Codes for Redevelopment and Major Renovations

3.2.3 Potential Local Policies

From Table 9 and Figures 8 and 9, it can be seen that even greater emissions reduction is achieved when the local policies being explored by the District of Saanich are layered on top of the planned Provincial and Federal policies. Saanich could expect a 59% reduction in GHG emissions from the building sector by 2030 and a 99% reduction by 2050, over the 2007 baseline. This level of GHG emissions reduction exceeds Saanich's 50% reduction target and is just below the Province of BC's buildings and communities sector target of 59% for 2030. The 99% reduction by 2050 shows that these policies put the District of Saanich on track to achieve the net zero emissions target by 2050. No concerted effort was taken to try and demonstrate exactly 100% GHG emissions reduction given that these are estimates and a level of tolerance should be expected.

The increase in GHG emissions reduction in this scenario, in particular those achieved by 2030, over the Planned Provincial and Federal Policies scenario, is a result of:

- An increase of fuel switching in Part 3 and Part 9 buildings, as a result of introducing elements of the *Highest Efficiency Equipment Standard* early, starting in 2027 (using an opt-in accelerated roll-out similar to the current approach for the *BC Energy Step Code*).
- A further increase of fuel switching in Part 9 buildings, driven by the proposed *requirement to phase out oil heating by 2030* and the continuation of the *heat pump financing program* in the interim.
- A further increase of fuel switching in Part 3 buildings, driven by Saanich's proposed *Revitalization Tax Exemption*.
- An increase in GHG emissions reduction associated with energy benchmarking driven by the proposal to introduce a mandatory benchmarking program.
- Further energy efficiency and fuel switching in Part 3 buildings triggered by Saanich's proposed *Building Performance Standard* and *Strata Energy Advisor Program*.
- Further efficiency and fuel switching in Part 9 buildings encouraged by the proposed expansion of the *Home Energy Navigator*.

It is important to note that many of the policies included in this scenario address GHG emissions in the same strategy area (e.g., The *Highest Efficiency Equipment Standard* and Saanich's proposed *Building Performance Standard* both target fuel switching in Part 3 buildings). These policies do not always provide significant additionality to one another (see Section 4.1 on how additionality has been modelled); as such, GHG emissions reductions cannot exclusively be attributed to one policy or the other. Further analysis of the trade-offs between various policies is explored in Section 3.3.

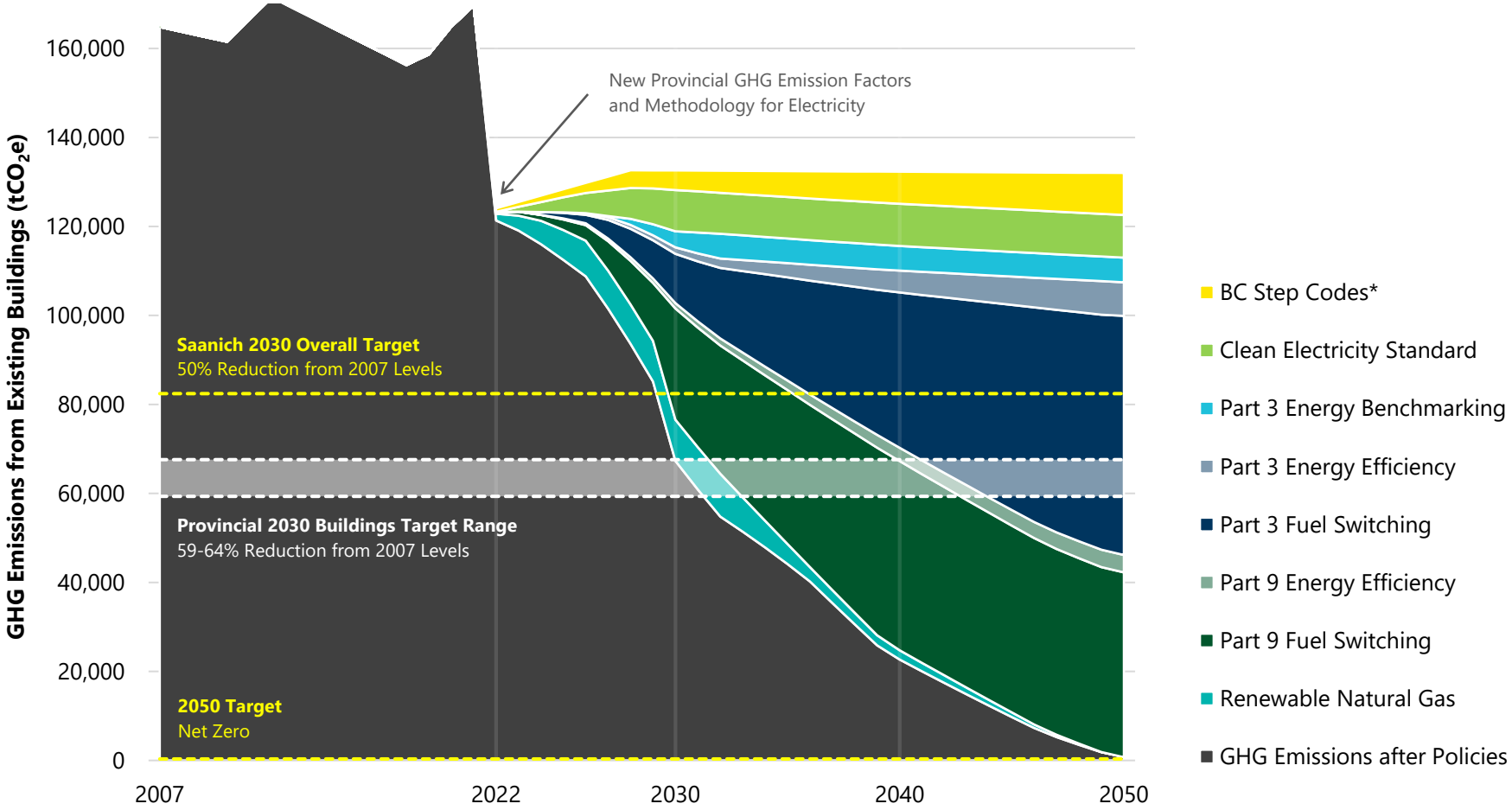
Comparing Table 8 and Table 9, it can be seen that even with the *Highest Efficiency Equipment Standard* starting in 2027 and the *requirement to phase out oil heating* by 2030, a very similar level of GHG emissions reduction as a result of fuel switching in Part 9 buildings is achieved by 2050 in this scenario (32%) and the Planned Provincial and Federal Policies scenario (31%). This is because heating equipment for Part 9 buildings is assumed to have a lifespan of 15 years, meaning that even without these policies, the same number of fuel switches will occur by 2050. The significance of these two policies is their ability to drive GHG emissions reduction before 2030, which is required to meet the 2030 targets. Conversely, there is a greater level of GHG emissions reduction as a result of fuel switching in Part 3 buildings by 2050, 41% compared to 31%. This is because the heating equipment for Part 3 buildings is assumed to have a life span of 25 years, and as such by moving the start date of the *Highest Efficiency Equipment Standard* forward from 2031 to 2027, a greater number of fuel switches are realized.

Table 9 - Annual Operational GHG Emissions Reduction in 2030, 2040 and 2050, Potential Local Policies

	GHG Reductions[1] in 2030		GHG Reductions[1] in 2040		GHG Reductions[1] in 2050	
	tCO_2e	% Reduction	tCO_2e	% Reduction	tCO_2e	% Reduction
Projected Baseline	**132,575**	**-**	**132,298**	**-**	**132,020**	**-**
BC Step Codes[2]	4,391	3%	7,202	5%	9,436	7%
Clean Electricity	9,282	7%	9,468	7%	9,592	7%
Part 3 Energy Benchmarking	3,595	3%	5,550	4%	5,550	4%
Part 3 Energy Efficiency	1,457	1%	4,911	4%	7,536	6%
Part 3 Fuel Switching	11,085	8%	34,911	26%	53,739	41%
Part 9 Energy Efficiency	1,206	1%	2,985	2%	3,918	3%
Part 9 Fuel Switching	24,977	19%	42,518	32%	41,534	31%
Renewable Natural Gas	9,282	7%	2,061	2%	(124)	0%
Total GHG Emissions Reduction	**65,276**	**49%**	**109,604**	**83%**	**131,180**	**99%**
GHG Emissions after Policies	**67,300**	**-**	**22,694**	**-**	**840**	**-**
% Reduction from 2007 Baseline[3]	**-59%**	**-**	**-86%**	**-**	**-99%**	**-**

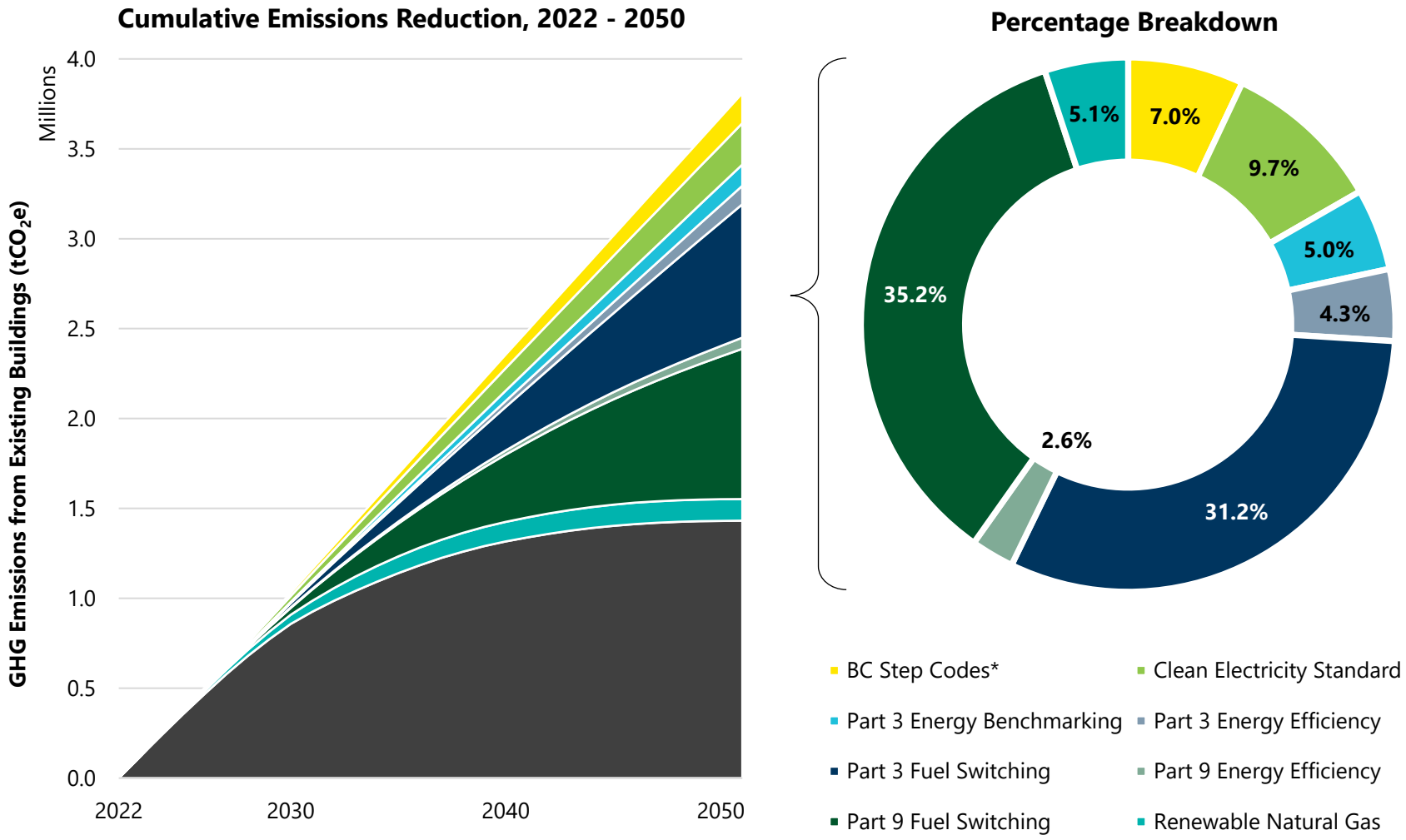
[1] GHG Emissions Reduction from the Projected Baseline
[2] BC Step Codes for Redevelopment and Major Renovations
[3] The 2007 Baseline is 164,857 tCO_2e

Figure 8 – Annual Operational GHG Emissions Reduction Trajectory, Potential Local Policies



*BC Step Codes for Redevelopment and Major Renovations

Figure 9 - Cumulative Operational GHG Emissions Reduction, Potential Local Policies



*BC Step Codes for Redevelopment and Major Renovations

3.3 Policy Analysis

As discussed in the modelling results section above, many of the policies and actions explored in this report address GHG emissions in the same strategy area (e.g., The *Highest Efficiency Equipment Standard* and Saanich's proposed *Building Performance Standard* both target fuel switching in Part 3 buildings). As a result, many policies and actions do not always provide significant additionality to one another, if any. Further, many GHG emissions reductions cannot exclusively be attributed to one policy or the other. As such, comparative studies of more bespoke scenarios have been carried out to help differentiate the impact of various policies and actions. Each of these comparative studies and the scenarios within them were requested by the District of Saanich. All the scenarios explored are a variation of the Potential Local Policies scenario explored in this report and defined in Section 3.1.2.

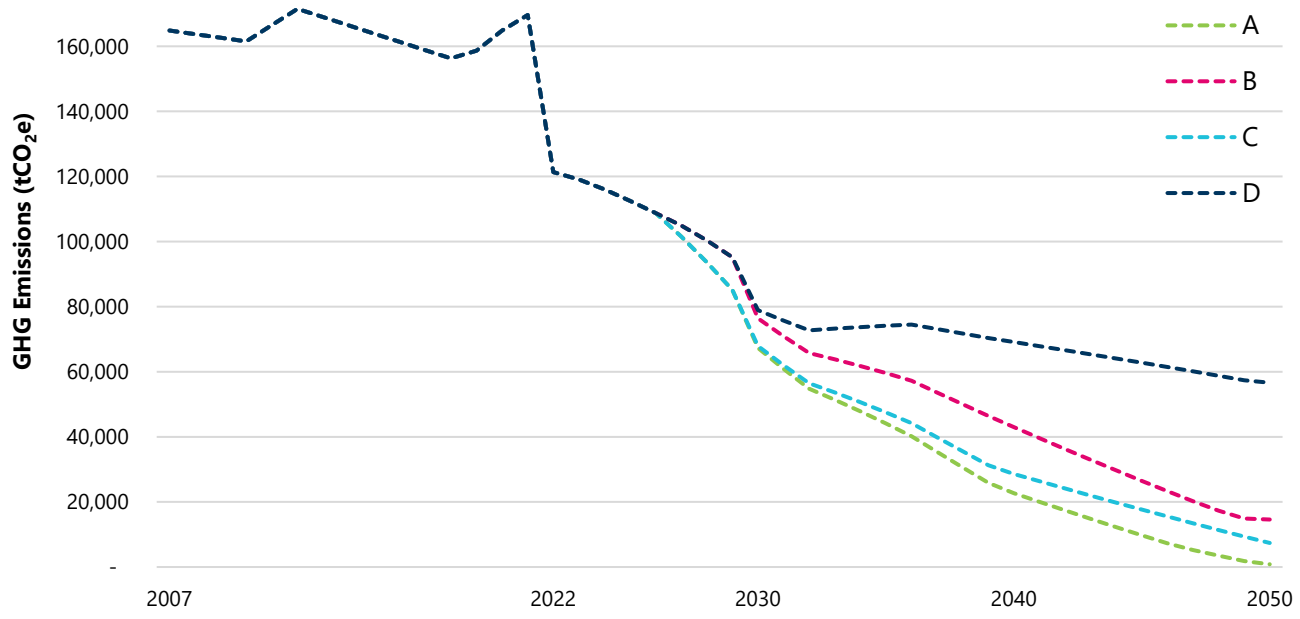
3.3.1 The Highest Efficiency Equipment Standard vs The Saanich Building Performance Standard

As requested by the District of Saanich the model was used to compare the following scenarios:

- **A** - Potential Local Policies
- **B** - Potential Local Policies without the Highest Efficiency Equipment Standard
- **C** - Potential Local Policies without the Saanich Building Performance Standard
- **D** - Potential Local Policies without Either

Comparing these scenarios provides various insights into how the *Highest Efficiency Equipment Standard* and Saanich's proposed *Building Performance Standard* could affect GHG emissions reduction in Saanich and the extent to which the two policies overlap.

Figure 10 – Comparison of Annual Operational GHG Emissions Reduction, Highest Efficiency Equipment Standard vs Saanich Building Performance Standard



From Figure 10 and Tables 10 and 11 it can be seen that:

- There is a greater impact on GHG emissions reduction achieved when the *Highest Efficiency Equipment Standard* is removed (Scenario B), than when the *Saanich Building Performance Standard is removed*

(Scenario C). This is likely because the *Highest Efficiency Equipment Standard* is modelled to start in 2027 and covers both Part 9 and Part 3 Buildings, whereas the *Saanich Building Performance Standard* is modelled to start later, in 2030, and only applies to Part 3 Buildings.

- Without either policy, there is significantly less GHG emission reduction achieved by 2050 and this is largely due to a significant drop in fuel switching for Part 3 buildings.

Table 10 – Comparison of Annual Operational GHG Emissions Reduction in 2030, Highest Efficiency Equipment Standard vs Saanich Building Performance Standard

2030	GHG Reductions	Change in GHG Reductions (tCO_2e) from Scenario A		
	A	B	C	D
GHG Emissions after Policies (tCO_2e)	**67300**	**76389**	**67916**	**78898**
% Change from 2007 Baseline	**-59%**	**-54%**	**-59%**	**-52%**
BC Step Codes	4391	0	-25	-25
Clean Electricity Standard	9282	-131	2	-157
Part 3 Energy Benchmarking	3595	0	0	0
Part 3 Energy Efficiency	1457	0	-129	-129
Part 3 Fuel Switching	11085	-4687	-547	-7350
Part 9 Energy Efficiency	1206	0	0	0
Part 9 Fuel Switching	24977	-5609	0	-5609
Renewable Natural Gas	9282	1338	82	1672
Total	**65276**	**-9089**	**-616**	**-11598**

Table 11 - Comparison of Annual Operational GHG Emissions Reduction in 2050, Highest Efficiency Equipment Standard vs Saanich Building Performance Standard

2050	GHG Reductions	Change in GHG Reductions (tCO_2e) from Scenario A		
	A	B	C	D
GHG Emissions after Policies (tCO_2e)	**840**	**14593**	**7391**	**56629**
% Change from 2007 Baseline	**-99%**	**-91%**	**-96%**	**-66%**
BC Step Codes	9436	0	-24	-24
Clean Electricity Standard	9592	-235	86	-799
Part 3 Energy Benchmarking	5550	0	0	0
Part 3 Energy Efficiency	7536	0	-2838	-2838
Part 3 Fuel Switching	53739	-4445	-4923	-50259
Part 9 Energy Efficiency	3918	0	0	0
Part 9 Fuel Switching	41534	-11765	0	-11765
Renewable Natural Gas	-2692	2692	1147	9897
Total	**128612**	**-13753**	**-6552**	**-55789**

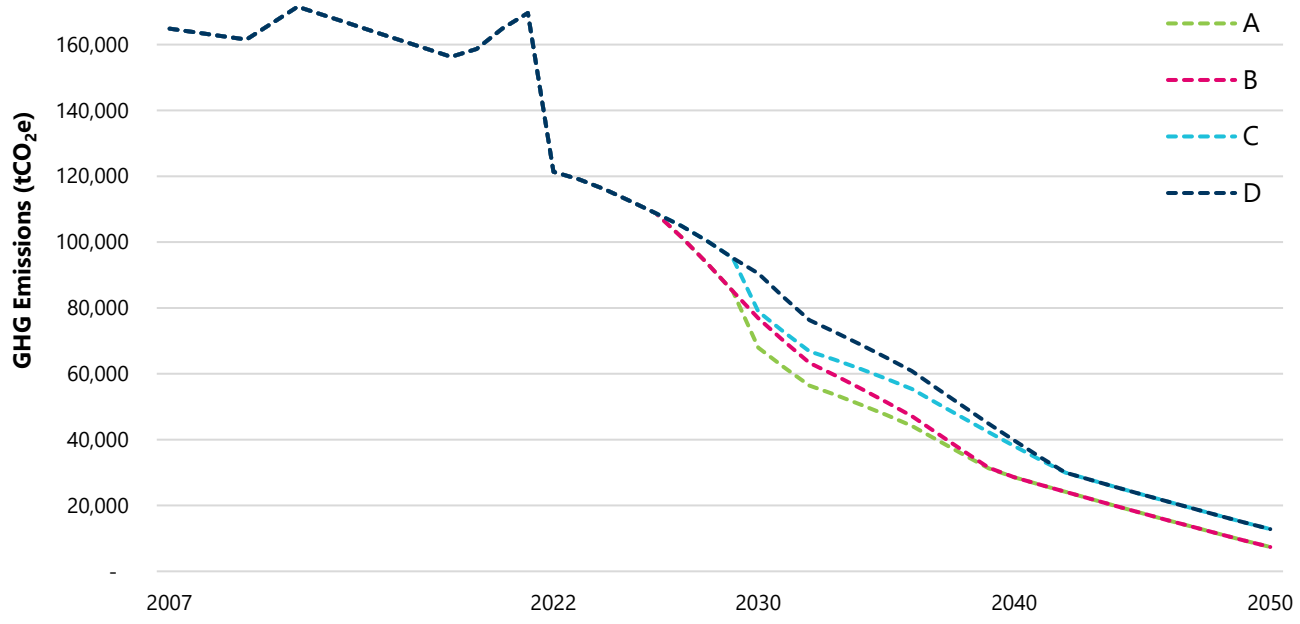
3.3.2 Highest Efficiency Equipment Standard Start Date vs Requirement to Phase Out Oil Heating

As requested by the District of Saanich the model was used to compare the following scenarios:

- **A** – Highest Efficiency Equipment Standard starting in 2027 with the Requirement to Phase Out Oil Heating by 2030
- **B** – Highest Efficiency Equipment Standard starting in 2027 without the Requirement to Phase Out Oil Heating by 2030
- **C** – Highest Efficiency Equipment Standard starting in 2031 with the Requirement to Phase Out Oil Heating by 2030
- **D** – Highest Efficiency Equipment Standard starting in 2031 without the Requirement to Phase Out Oil Heating by 2030

All other policies in these scenarios follow the assumptions for the Potential Local Policies scenario, except for the Saanich Building Performance Standard, which was not modelled in any of these scenarios. Comparing these scenarios provides various insights into how accelerating the start of the *Highest Efficiency Equipment Standard* and introducing a *Requirement to Phase Out Oil Heating* could affect GHG emissions reduction in Saanich and the extent to which the two policies overlap.

Figure 11 – Comparison of Annual Operational GHG Emissions Reduction, Highest Efficiency Equipment Standard Start Date vs Requirement to Phase Out Oil Heating



From Figure 11 and Tables 12 and 13, it can be seen that:

- In Scenario B, when the *requirement to phase out oil heating* by 2030 is removed, and Scenario C, when the start date of the *Highest Efficiency Equipment Standard* is not accelerated to 2027, less GHG emissions reduction as a result of fuel switching in Part 9 buildings is achieved by 2030. However, in both scenarios, the model shows that Saanich would still meet their 2030 target, achieving a similar GHG emissions reduction in both cases, 53% and 52% over their 2007 baseline respectively. However, in Scenario D, when both the *requirement to phase out oil heating* is removed and the start date of the

Highest Efficiency Equipment Standard is not accelerated to 2027, the model shows that Saanich would miss their 2030 target, with only a 45% reduction over their 2007 baseline.

- Both actions have a greater impact on the GHG emissions reduction achieved by 2030 than the reduction achieved by 2050.
- When the start date of the *Highest Efficiency Equipment Standard* is not accelerated to 2027 (Scenarios C and D), less GHG emissions reduction as a result of fuel switching in Part 3 buildings is achieved by 2030 and 2050.

Table 12 – Comparison of Annual Operational GHG Emissions Reduction in 2030, Highest Efficiency Equipment Standard Start Date vs Requirement to Phase Out Oil Heating

2030	GHG Reductions	Change in GHG Reductions (tCO_2e) from Scenario A		
	A	B	C	D
GHG Emissions after Policies (tCO_2e)	**67916**	**76891**	**78898**	**90494**
% Change from 2007 Baseline	**-59%**	**-53%**	**-52%**	**-45%**
BC Step Codes	4366	0	0	0
Clean Electricity Standard	9284	-88	-159	-273
Part 3 Energy Benchmarking	3595	0	0	0
Part 3 Energy Efficiency	1329	0	0	0
Part 3 Fuel Switching	10538	0	-6803	-6803
Part 9 Energy Efficiency	1206	0	0	0
Part 9 Fuel Switching	24977	-8887	-5609	-17091
Renewable Natural Gas	9365	0	1589	1589
% Change from 2007 Baseline	**64659**	**-8975**	**-10982**	**-22577**

Table 13 - Comparison of Annual Operational GHG Emissions Reduction in 2050, Highest Efficiency Equipment Standard Start Date vs Requirement to Phase Out Oil

2050	GHG Reductions	Change in GHG Reductions (tCO_2e) from Scenario A		
	A	B	C	D
GHG Emissions after Policies (tCO_2e)	**7391**	**7391**	**12820**	**12820**
% Change from 2007 Baseline	**-96%**	**-96%**	**-92%**	**-92%**
BC Step Codes	9412	0	0	0
Clean Electricity Standard	9678	0	-98	-98
Part 3 Energy Benchmarking	5550	0	0	0
Part 3 Energy Efficiency	4698	0	0	0
Part 3 Fuel Switching	48816	0	-6251	-6251
Part 9 Energy Efficiency	3918	0	0	0
Part 9 Fuel Switching	41534	0	0	0
Renewable Natural Gas	0	0	921	921
Total	**123605**	**0**	**-5428**	**-5428**

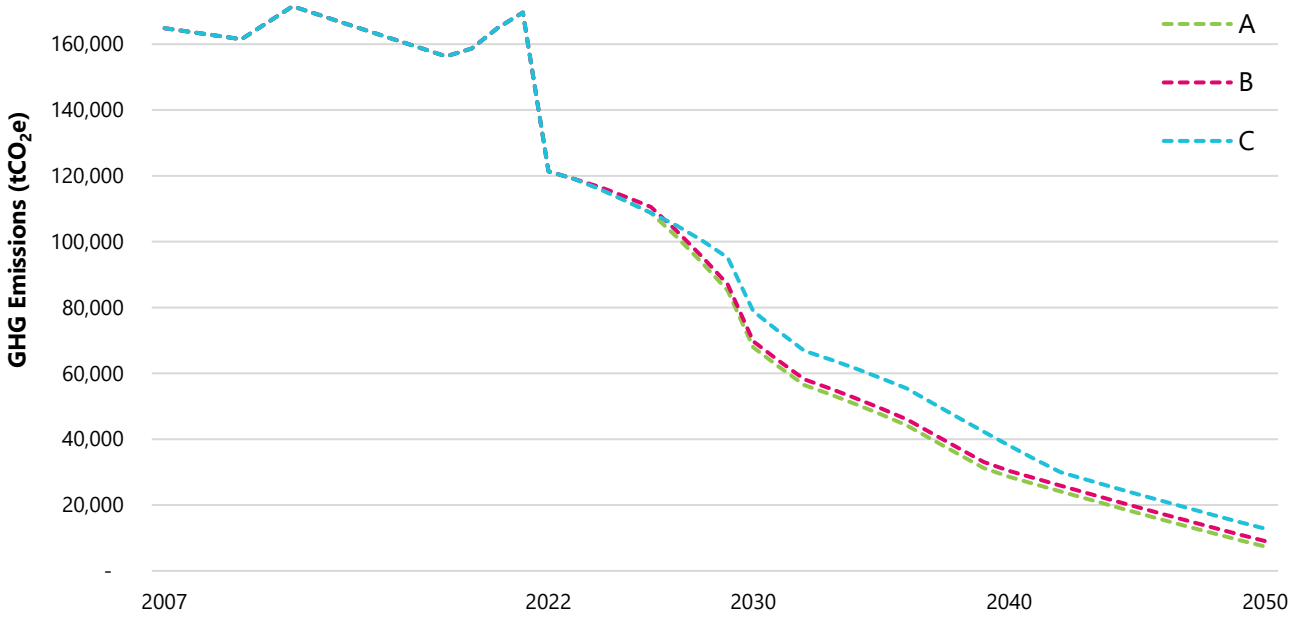
3.3.3 Impact of Revitalization Tax Exemption

As requested by the District of Saanich the model was used to compare the following scenarios:

- **A** - Highest Efficiency Equipment Standard starting in 2027, with the Saanich Revitalization Tax Exemption from 2024 to 2030.
- **B** - Highest Efficiency Equipment Standard starting in 2027, without the Saanich Revitalization Tax Exemption from 2024 to 2030.
- **C** - Highest Efficiency Equipment Standard starting in 2031, with the Saanich Revitalization Tax Exemption from 2024 to 2030.

All other policies in these scenarios follow the assumptions for potential local policies, except for the Saanich *Building Performance Standard*, which was not modelled in any of these scenarios. Comparing these scenarios provides various insights into how accelerating the start date of the *Highest Efficiency Equipment Standard* and introducing a *Saanich Revitalization Tax Exemption* affect GHG emissions reduction in Saanich and their impact on meeting 2030 targets.

Figure 12 – Comparison of Annual Operational GHG Emissions Reduction, Impact of Revitalization Tax Exemption



From Figure 12 and Tables 14 and 15 it can be seen that:

- There is a greater impact on GHG emissions reduction when the start date of the *Highest Efficiency Equipment Standard* is not accelerated to 2027 (Scenario C) than when the *Saanich Revitalization Tax Exemption* is removed (Scenario B).
- In both scenarios, when the start date of the *Highest Efficiency Equipment Standard* is not accelerated to 2027 (Scenario C) and when the *Saanich Revitalization Tax Exemption* is removed (Scenario B), there is less GHG emissions reduction as a result of fuel switching in Part 3 building by 2050.

Table 14 – Comparison of Annual Operational GHG Emissions Reduction in 2030, Impact of Revitalization Tax Exemption

2030	GHG Reductions	Change in GHG Reductions (tCO_2e) from Scenario A	
	A	B	C
GHG Emissions after Policies (tCO_2e)	**67916**	**69750**	**78898**
% Change from 2007 Baseline	**-59%**	**-58%**	**-52%**
BC Step Codes	4366	0	0
Clean Electricity Standard	9284	-28	-159
Part 3 Energy Benchmarking	3595	0	0
Part 3 Energy Efficiency	1329	0	0
Part 3 Fuel Switching	10538	-2054	-6803
Part 9 Energy Efficiency	1206	0	0
Part 9 Fuel Switching	24977	0	-5609
Renewable Natural Gas	9365	248	1589
Total	**64659**	**-1834**	**-10982**

Table 15 - Comparison of Annual Operational GHG Emissions Reduction in 2050, Impact of Revitalization Tax Exemption

2050	GHG Reductions	Change in GHG Reductions (tCO_2e) from Scenario A	
	A	B	C
GHG Emissions after Policies (tCO_2e)	**7391**	**9046**	**12820**
% Change from 2007 Baseline	**-96%**	**-95%**	**-92%**
BC Step Codes	9412	0	0
Clean Electricity Standard	9678	-30	-98
Part 3 Energy Benchmarking	5550	0	0
Part 3 Energy Efficiency	4698	0	0
Part 3 Fuel Switching	48816	-1914	-6251
Part 9 Energy Efficiency	3918	0	0
Part 9 Fuel Switching	41534	0	0
Renewable Natural Gas	-289	289	921
Total	**123317**	**-1655**	**-5428**

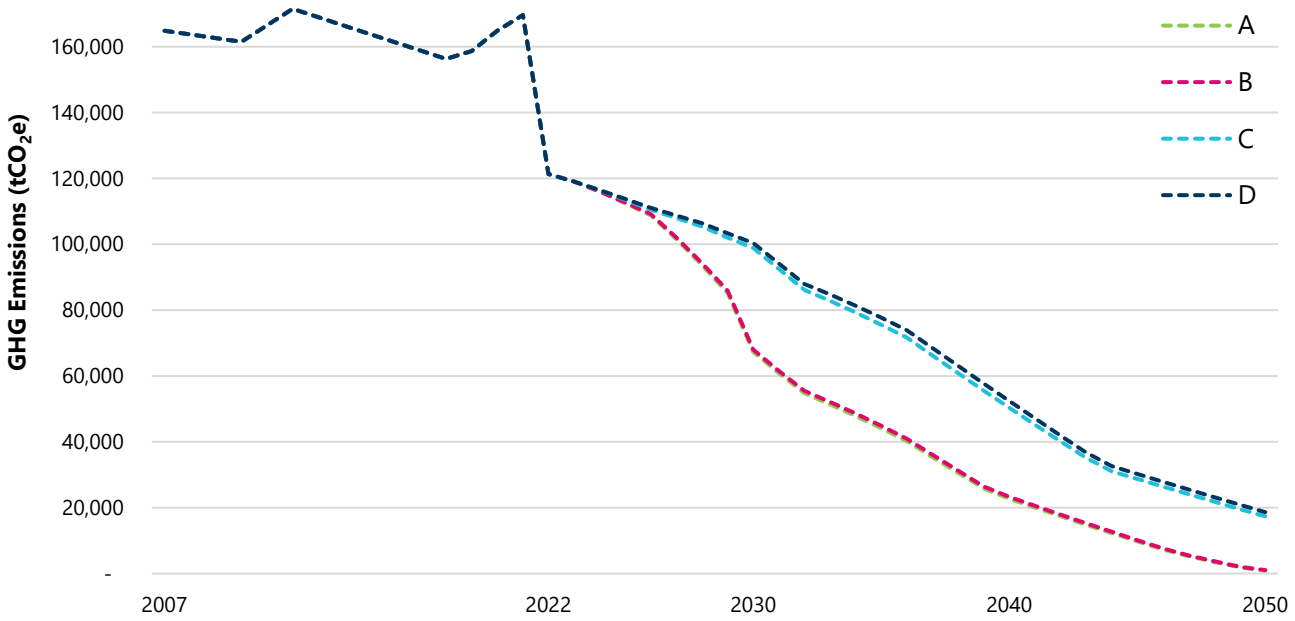
3.3.4 The Alterations Code

As requested by the District of Saanich the model was used to compare the following scenarios:

- **A** – Potential Local Policies
- **B** – Potential Local Policies without the Alterations Code
- **C** – Planned Provincial and Federal Policies
- **D** – Planned Provincial and Federal Polices without the Alterations Code

Comparing these scenarios provides various insights into how the *Alterations Code* could affect GHG emissions reduction in Saanich.

Figure 13 – Comparison of Annual Operational GHG Emissions Reduction, Highest Efficiency Equipment Standard vs Saanich Building Performance Standard



From Figure 13 and Tables 16 and 17 it can be seen that:

- There is only a slight increase in GHG emissions reduction when the *Alterations Code* is included, both as part of the Planned Provincial and Federal Policies scenario and the Potential Local Policies scenario.
- The increase in GHG emissions reduction in the Potential Local Policies scenario as a result of the *Alterations Code* is even less than that for the Planned Provincial and Federal Policies scenario, this is because other local policies address energy efficiency, such as the *Saanich Building Performance Standard* and the *Strata Energy Advisor Program*.

Table 16 – Comparison of Annual Operational GHG Emissions Reduction in 2030, Highest Efficiency Equipment Standard vs Saanich Building Performance Standard

2030	GHG Reductions	Change in GHG Reductions (tCO_2e) from Scenario A		
	A	B	C	D
GHG Emissions after Policies (tCO_2e)	**67300**	**67977**	**98854**	**100376**
% Change from 2007 Baseline	**-59%**	**-59%**	**-40%**	**-39%**
BC Step Codes	4391	-11	-927	-948
Clean Electricity Standard	9282	88	-379	-233
Part 3 Energy Benchmarking	3595	0	-285	-285
Part 3 Energy Efficiency	1457	-695	-627	-1457
Part 3 Fuel Switching	11085	114	-11085	-11085
Part 9 Energy Efficiency	1206	-491	0	-1079
Part 9 Fuel Switching	24977	223	-20973	-20894
Renewable Natural Gas	9282	94	2722	2906
Total	**65276**	**-677**	**-31554**	**-33076**

Table 17 - Comparison of Annual Operational GHG Emissions Reduction in 2050, Highest Efficiency Equipment Standard vs Saanich Building Performance Standard

2050	GHG Reductions	Change in GHG Reductions (tCO_2e) from Scenario A		
	A	B	C	D
GHG Emissions after Policies (tCO_2e)	**840**	**1032**	**17376**	**18615**
% Change from 2007 Baseline	**-99%**	**-99%**	**-89%**	**-89%**
BC Step Codes	9436	-11	-150	-172
Clean Electricity Standard	9592	254	-129	366
Part 3 Energy Benchmarking	5550	0	-2240	-2240
Part 3 Energy Efficiency	7536	-1941	-4090	-7536
Part 3 Fuel Switching	53739	1716	-12606	-10540
Part 9 Energy Efficiency	3918	-1220	-1046	-3792
Part 9 Fuel Switching	41534	977	838	3038
Renewable Natural Gas	-32	32	2885	3101
Total	**131272**	**-192**	**-16536**	**-17775**

3.4 Summary of Findings

In a business-as-usual scenario, when only policies that are currently in place are modelled, the model shows that Saanich could expect a 37% reduction in GHG emissions from the building sector by 2030 and a 42% reduction by 2050 below the 2007 baseline. In this scenario, GHG emissions reduction is considerably short of Saanich's 2030 50% reduction target, the 2050 net zero target, as well as missing the Province of BC's 2030 59-64% buildings and communities sectoral target. When the planned Provincial and Federal policies are then included in the model, notably the *Highest Efficiency Equipment Standard*, there is a significant increase in GHG emissions reduction. The model shows that Saanich could expect a 40% reduction in GHG emissions by 2030 and an 89% reduction by 2050. However, even with this increased emission reduction, it is still not enough to meet the targets, and it is apparent that local policies and actions are required.

When all potential local policies being explored by the District of Saanich are layered on the planned Provincial and Federal policies, the model shows that greater GHG emissions reduction is achieved. Saanich could expect a 59% reduction in GHG emissions from the building sector by 2030 and a 99% reduction by 2050, over the 2007 baseline. This level of GHG emissions reduction exceeds Saanich's 2030 50% reduction target and just meets the Province of BC's buildings and communities sector target, set at 59%. The 99% reduction by 2050 shows that these policies put the District of Saanich on track to achieve net zero by 2050.

The policy analysis that was then carried out allows the District of Saanich to understand the relative impacts of different policies and actions on GHG emissions reduction. It is not within the scope of this project to make recommendations as to which actions should and should not be included in the Building Retrofit Strategy, this will be a factor of many criteria, such as cost-effectiveness, required regulatory mechanisms, etc. and not just GHG emissions reduction potential. Even if an action does not achieve substantial direct emission reductions, it may be foundational in supporting market transformation.