CORPORATE ENERGY AND EMISSIONS PLAN

ALBERNI-CLAYOQUOT REGIONAL DISTRICT

JULY 2024

Community Energy Association

ALBERNI-CLAYOQUOT REGIONAL DISTRICT

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ACKNOWLEDGEMENTS

The Alberni-Clayoquot Regional District serves the communities of the central and west coast of Vancouver Island that are located in the traditional territories of the Ahousaht First Nation, Ditidaht First Nation, Hesquiaht First Nation, Hupacasath First Nation, Huu-ay-aht First Nations, Tla-o-qui-aht First Nation, Toquaht Nation, Tseshaht First Nation, Uchucklesaht Tribe, and Yuułuʔiłʔatḥ.

We respectfully acknowledge these traditional territories, and we are thankful for the opportunity to live, work, and learn here, with mutual respect (ʔiisaak - greater respect) and appreciation.

The Corporate Energy and Emissions Plan was developed by the Alberni-Clayoquot Regional District in collaboration with the Community Energy Association. The Alberni-Clayoquot Regional District would like to acknowledge the contributions of Regional District staff that were involved in the development of this plan.

EXECUTIVE SUMMARY

Introduction

A key part of a local government's role in dealing with climate action is to reduce emissions caused by its own assets; this helps it meet its requirements as a signatory of the BC Climate Action Charter. This Corporate Energy and Emissions Plan will provide the Board and staff with the background information to reduce emissions and develop strategic priorities for the next five years.

Reducing corporate GHG emissions has the following co-benefits:

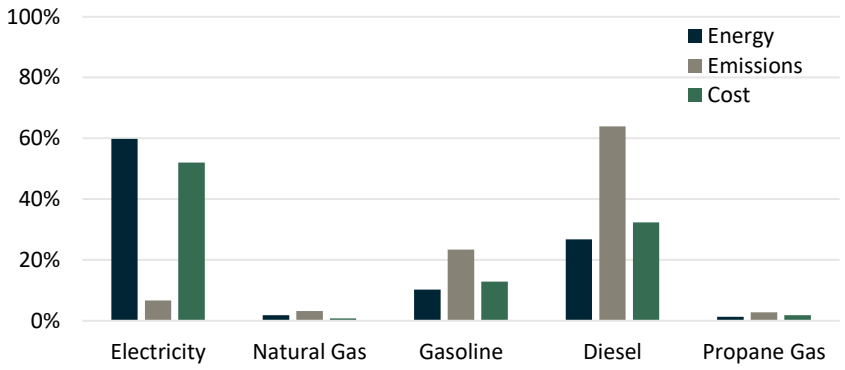
- Reducing municipal energy costs, i.e. providing better value for money to taxpayers
- Providing a more comfortable working environment for staff and a healthier indoor environment for visitors
- Leading by example with its own assets, helping stimulate further GHG emission reductions in the community
- Community economic development by leveraging external funding into projects in the community
- Improved climate change resilience

Current Emissions and Energy Expenditures

In 2022, ACRD's corporate inventory, according to LGCAP, included:

- Energy consumption: 4,859 GJ
- Emissions: 140 tCO_2e
- Energy expenditures: $212,488

Alberni-Clayoquot Regional District's proportion of corporate energy, emissions, and expenditures by fuel type for 2022 are shown on the right.



What We Can Do: Recommended Climate Actions

Based on staff consultation and best practices, actions were identified to be implemented over the next five years. Actions fall under the following five categories:

1. ***New Buildings and Infrastructure:*** Improve energy performance and lower GHG emissions in ***new*** Regional District buildings and infrastructure.
2. ***Existing Buildings and Infrastructure:*** Improve energy performance and lower GHG emissions in ***existing*** Regional District buildings and infrastructure.
3. ***Renewable Energy:*** Increase the use of renewable energy.
4. ***Transportation:*** Improve energy efficiency and reduce GHG emissions in the Regional District's fleet.
5. ***Enabling Actions and Corporate Leadership****:* Institutionalise the plan and demonstrate leadership on waste and water.

A detailed list of actions for implementation in the next five years is featured in Appendix A. The timeframe for implementation, department or position responsible for implementation, and possible partners or funding sources for each action are also noted.

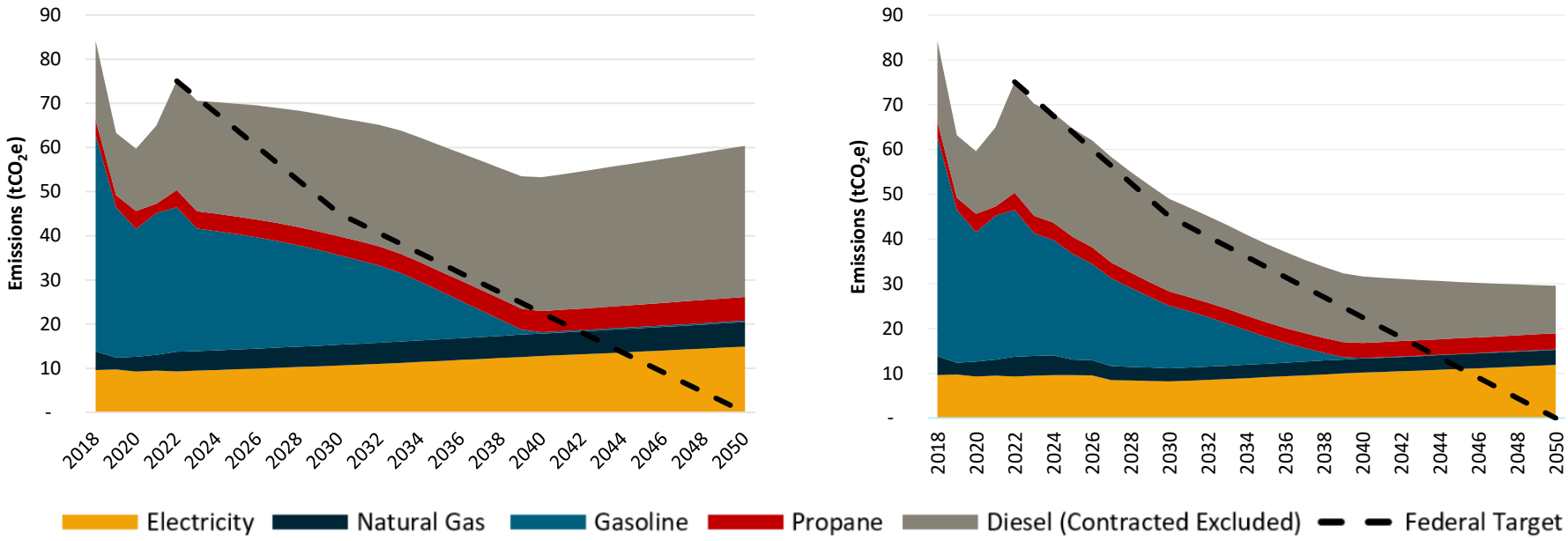
Based on business as usual projections, ACRD direct[1] GHG emissions are forecasted to decrease by 11% in 2030 compared to 2022 levels. However, costs are forecasted to increase by 19% by 2030. Business as usual (BAU) assumes no additional actions by the Regional District but takes into account growing population (and hence additional assets), policies of higher levels of government, and other factors such as a warming climate. More details on business as usual projections are included on page 31 and 32.

By implementing the actions identified in this plan, total GHG emissions for ACRD operations are expected to decrease by 35% in 2030 relative to 2022 levels, while costs are expected to decrease by 13%. Potential emissions reductions are further explained in "What We Can Achieve", beginning on page 37.

[1] Emissions and expenditures from contracted services are excluded from the BAU projections, action modelling, and targets.

The business as usual emissions trajectory for ACRD direct emissions can be seen below in the chart on the left, whereas the chart on the right shows the emissions trajectory if the actions contained in this Plan are implemented. The black dotted lines on the charts show the federal GHG emissions reduction targets for 2030 and 2050. 2022 is an inventory year, whereas 2023 onwards are projections.

Business-as-Usual Emissions and Modelled Emissions from Proposed Climate Actions



The actions that will achieve the largest reductions in GHG emissions and fuel expenditures in 2030 are shown in the tables below.

Action	Annual GHG Savings by 2030
Invest in EVs and EV charging stations	8.0 tCO_2e
Implement building energy audits	1.8 tCO_2e
Fuel efficient driver training & anti-idling policy and develop a low carbon vehicle purchasing policy	1.6 tCO_2e each

Action	Annual Fuel Cost Savings by 2030
Implement solar PV installations	$11.5k
Implement building energy audits	$10.4k
Invest in EVs and EV charging stations	$9.0k

Successful implementation of this Plan depends upon staff capacity and capital. Internal and external funding sources are identified in this plan and include the LGCAP funding allocation for climate action, allocation from operating budget, climate action revolving fund, and FCM's Green Municipal Fund.

It is advisable to renew this plan in five years as most actions will be completed by 2029, there should be better access to products and technologies for reducing emissions, and the legislative and funding framework will have likely evolved. This will allow the Regional District to continue making progress towards federal short- and long-term targets.

One key next step for ACRD is the development of a plan that tackles GHG emissions for the community as a whole. This is a crucial piece in the ACRD's efforts to reduce emissions and is described in Action 5.10 under Enabling Actions and Corporate Leadership.

INTRODUCTION

Our Role in Climate Action, & Benefits

Climate action consists of both reducing emissions, or *mitigation*, and preparing for the impacts of a changing climate, or *adaptation*. This plan focuses on mitigation, as a key part of a community's role in dealing with climate action is to reduce emissions caused by its own assets. This also helps it to meet its requirements as a signatory of the BC Climate Action Charter (CAC).

The BC Climate Action Charter is a voluntary agreement between the Province of BC, the Union of BC Municipalities (UBCM), and each local government signatory. The Charter was launched at the 2007 UBCM Convention. By signing it, local governments acknowledge that they and the Provincial government have an important role in addressing climate change. Local governments make commitments including to measure and report on their corporate emissions, and progress towards becoming carbon neutral in their own operations. The Alberni-Clayoquot Regional District is a signatory to this Charter, along with almost every local government in BC.

Reducing corporate GHG emissions has the following co-benefits:

- Reducing local government energy costs, i.e. providing better value for money to taxpayers
- Providing a more comfortable working environment for staff and a healthier indoor environment for visitors
- Leading by example with its own assets, helping stimulate further GHG emission reductions in the community
- Improved climate change resilience
- Community economic development by leveraging external funding

Types of Inventory

In this report, ACRD's corporate inventory is defined according to the Local Government Climate Action Program (LGCAP), which has the same requirements as the previous Climate Action Revenue Incentive Program (CARIP), and in Appendix D, defined according to the FCM-ICLEI Partners for Climate Protection program (PCP). The inventory is also presented according to ACRD Services. These three methods of corporate inventories are described in more detail below:

1. **Local Government Climate Action Program** reporting is the reporting conducted by local governments in BC each year to receive their Local Government Climate Action Program (LGCAP) funding. It requires local governments to report emissions from their traditional services including:
   - Administration and Governance
   - Drinking, Storm and Waste Water
   - Solid Waste Collection, Transportation and Diversion
   - Roads and Traffic Operations
   - Arts, Recreation and Cultural Services
   - Fire Protection

Note that emissions from solid waste (i.e. the landfill) and landfill operations are not included in LGCAP reporting. Fuel from contracted services and from staff-owned vehicles on mileage for corporate work are however included in fuel inventories[2].

[2] Staff-owned vehicle mileage should be included but is excluded due to lack of tracking and reporting.

2. **FCM-ICLEI's Partners for Climate Protection program** reporting is conducted by local governments if they wish to hit PCP corporate milestone 1. It includes anything that is under "operational control" of the local government. The inventory data needs to be organized into the following five "activity sectors":
    - Buildings (electricity, natural gas data)
    - Streetlights (electricity)
    - Water and Sewer (electricity, natural gas, propane) – *including treatment plants*
    - Vehicle Fleet (gasoline and diesel) – *includes contracted services providing traditional services; includes staff-owned vehicles used for corporate work*
    - Solid Waste

Inventories for PCP must include energy consumed by everything a local government owns (e.g. buildings, fleet) and/or operates including leased buildings and contracted services so long as the Regional District has "full authority to introduce and implement operating policies at the operation". Unlike LGCAP reporting, PCP reporting includes solid waste.

The ACRD has not yet joined PCP. The program is free to join, and this Plan will be sufficient to gain corporate milestones 1-3 once the Plan is adopted by the Board.

3. **ACRD Services** are the operational areas of the Regional District. Presenting the inventory according to these services allows the Regional District to view their entire emissions profile in categories most relevant to their operations. This inventory includes everything in the LGCAP inventory, plus landfill operations and airport vehicles and facilities.

    ACRD Services are outlined in Appendix K.

ALBERNI-CLAYOQUOT REGIONAL DISTRICT – PROGRESS SO FAR

As detailed in the Regional District's annual CARIP reporting and discussed during the Corporate Workshops, Table 1 shows the many energy efficiency and GHG reduction measures already implemented.

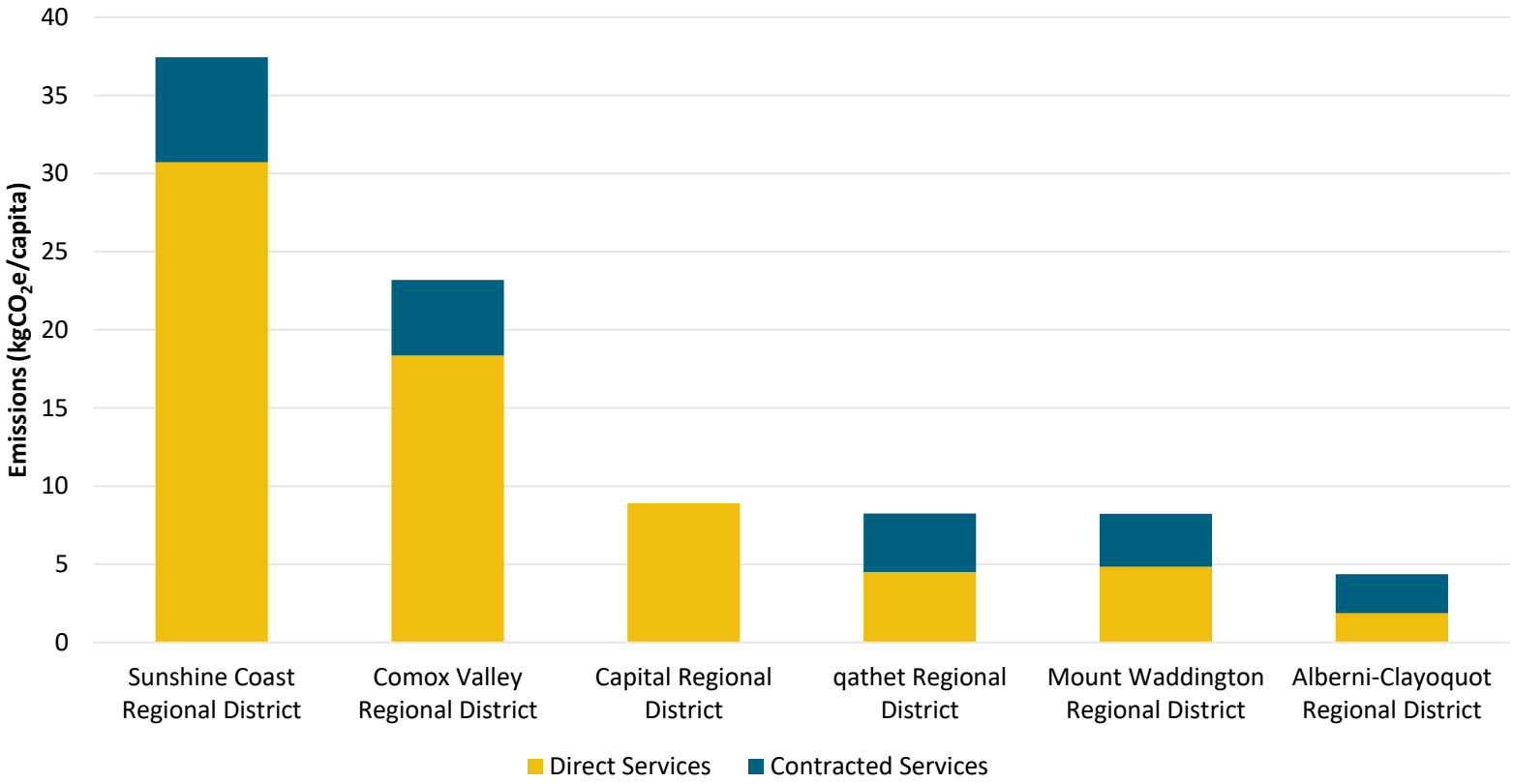
Table 1 – Highlighted Corporate Climate Actions

Buildings/Lighting	• Installed LED lighting, light sensors, and low flow faucets in ACRD facilities • Installed a heat pump at the Tofino airport • Completed an energy review of the ACRD office • Installed electric heating in most ACRD facilities
Transportation	• Installed a bike rack at the ACRD office • Purchased two hybrid vehicles • Completed an EV charging fleet analysis for ACRD facilities • Included emissions reduction in fleet asset management • Converted all Sproat Lake Fire Department power tools to electric
Solid Waste Reduction	• Construction and demolition waste bans at the Alberni Valley Sort 'n Go Centre' • Organics collection and diversion at both landfills
Water / Wastewater	• Installed water meters in Bamfield Water System and Beaver Creek Water System • Installed low-flow plumbing fixtures
Institutionalisation	• Signed the Climate Action Charter • Hired a Sustainability Planner

Figure 1 – ACRD's Hybrid

Figure 2 compares the per capita GHG emissions for the Regional District's corporate operations with other Regional Districts in similar geographic areas of BC. Data is sourced from 2021 LGCAP reporting and uses a consistent methodology. Out of the six communities, ACRD has the lowest per capita emissions (4.4 $kgCO_2e$/capita) and the highest proportion of contracted service emissions (57% of total emissions). Note that this is not a perfect like-for-like comparison, as different Regional Districts may offer different services in their areas.

Figure 2 – A Comparison of Per Capita Corporate Emissions, 2021



CORPORATE ENERGY & EMISSIONS PLAN DEVELOPMENT

In 2023, the Alberni-Clayoquot Regional District, in collaboration with CEA, began the process of creating a Corporate Energy and Emissions Plan. The planning process consisted of four main steps, as illustrated in Figure 3. A summary of the staff workshop is in Appendix C.

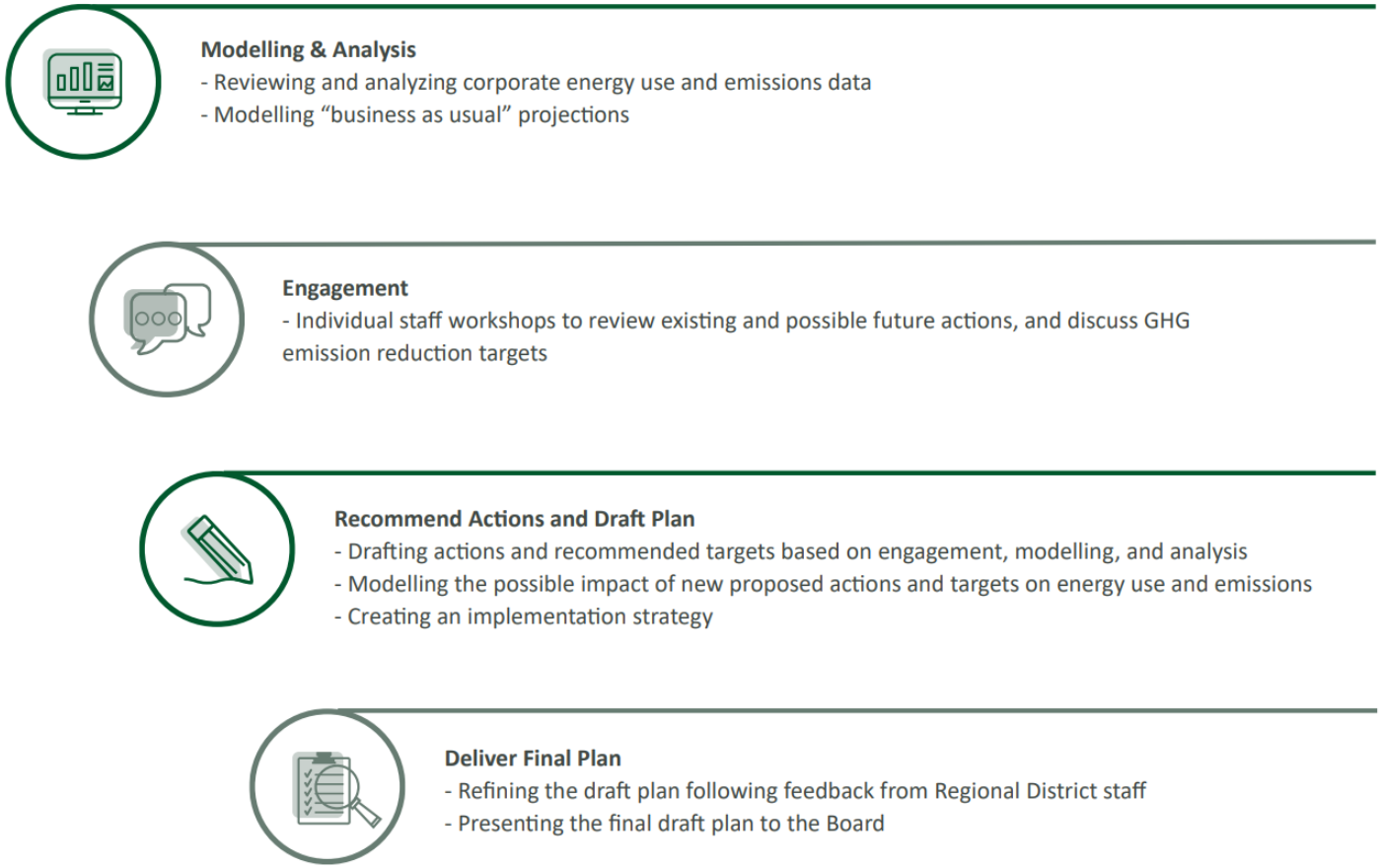


Figure 3 – Development of the Corporate Energy and Emissions Plan

ENERGY & EMISSIONS – WHERE WE ARE NOW

Overview

An inventory is a compiled list of all the energy consumed, the money spent on energy, and the associated greenhouse gas emissions created by the local government in their operations. This may identify the best opportunities for cost and emissions reductions.

This inventory describes the GHG emissions, energy consumption, and annual energy expenditures of all corporate assets. In 2022, Alberni-Clayoquot Regional District's LGCAP inventory included:

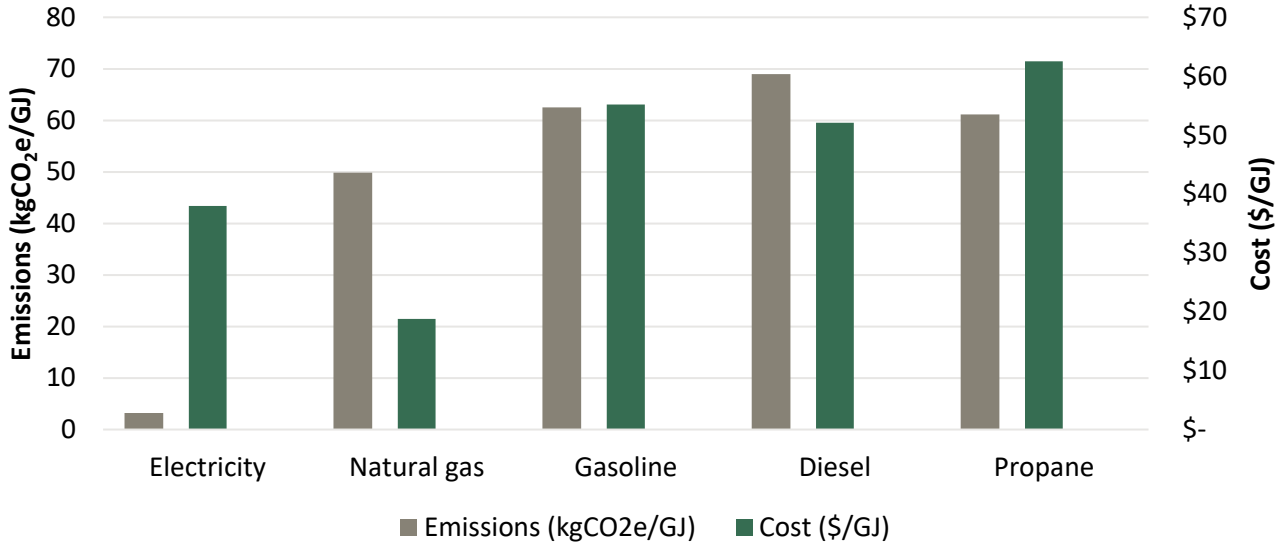
- **Energy consumption: 4,859 GJ**
- **Emissions: 140 tCO_2e**
  - ACRD operations: 75 tCO_2e
  - Contracted services: 65 tCO_2e
- **Energy expenditures: $212,488**

Assumptions made are described in Appendix E. See the info box below for a description of common units to express energy usage and GHG emissions, and what they mean practically.

What is a GJ?	***What is a tonne (tCO_2e) of GHG?***
A gigajoule (one billion joules) is a measure of energy. One GJ is about the same energy as: • *Natural gas for 3-4 days of household use* • *25-30 litres of diesel or gasoline* • *Two 20 lb propane tanks* • *The electricity used by a typical house in 9 days*	*A tonne of greenhouse gases (GHGs) is the amount created when we consume:* • *385 litres of gasoline (about 10 fill-ups)* • *A month of natural gas winter heating* • *Enough electricity for 8.5 average homes for a year (93,700 kWh)*

Figure 4 shows the emissions and cost[3] per gigajoule for each fuel source consumed by Alberni-Clayoquot Regional District in 2022. Electricity has the lowest emissions per unit of energy, but a relatively high cost. Natural gas has the lowest cost per unit of energy, but relatively high emissions. Gasoline, diesel, and propane all have high emissions and costs. The carbon tax will continue to increase prices of natural gas, gasoline, diesel, and propane.

Figure 4 – Emissions and Cost per Gigajoule by Fuel Source, 2022



[3] Energy costs includes all taxes and basic charges.

Breakdown and Trends

LGCAP Inventory

Figure 5 shows the Alberni-Clayoquot Regional District's GHG emissions by LGCAP category. Since 2018, emissions have fluctuated between 128 and 150 tCO_2e, with an overall growth of 10% from 2018 to 2022.

With the exception of 2018, Solid Waste Collection, Transportation and Diversion are typically the largest source of emissions; contracted solid waste collection for the Alberni Valley Sort 'n Go Centre and West Coast Landfill are responsible for most of this category's emissions. Roads and Traffic Operations/Maintenance is another sector that is historically responsible for a large portion of emissions and nearly all of these emissions are due to contracted services.

Fire Protection ranges from one-fifth to one-third of overall emissions, with over 70% of these emissions resulting from fleet vehicles, such as fire trucks and pickup trucks, while the remaining emissions are due to natural gas, propane, and electricity usage in buildings.

Figure 5 – Emissions by LGCAP Classification, 2018-2022

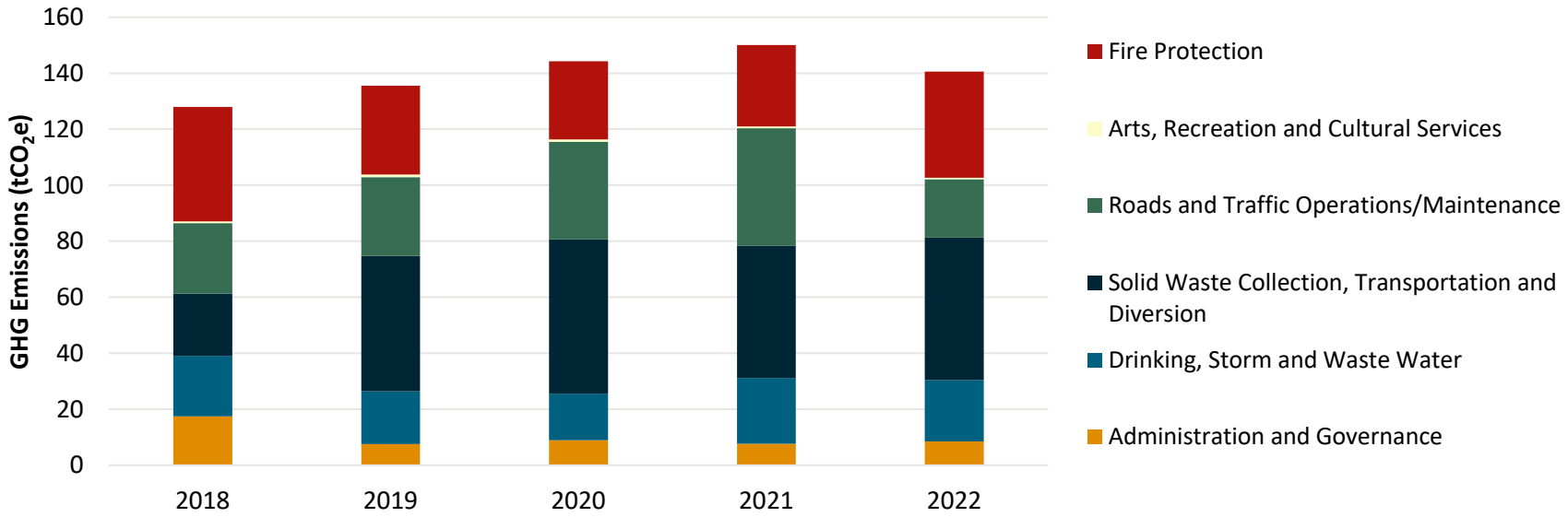


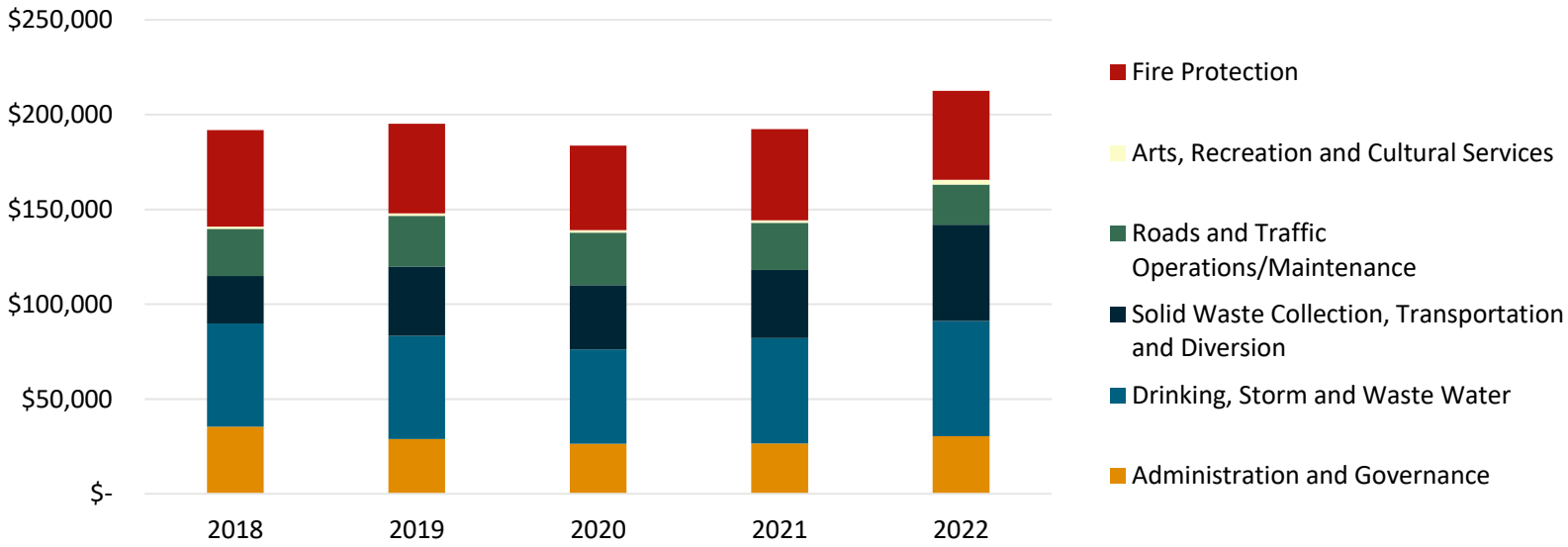
Figure 6 show the Regional District's energy expenditures by LGCAP category. The cost data includes estimated fuel costs from contracted services.

Drinking, Storm, and Waste water[4] are responsible for a majority of the expenditures in each year, demanding around $50-60k per year (27-29% of overall costs). This category includes the electricity usage and transportation related to operation and maintenance of water infrastructure.

Fire Protection is consistently about one-quarter of overall costs. Over half of these expenditures are spent on electricity, around one-third is spent on fleet vehicles, and the remaining amount is spent on natural gas and propane.

Energy costs were lowest in 2020 and highest in 2022. Energy prices are very difficult to predict, but have generally trended upwards in past years, and therefore CEA forecasts a continued rise for most fuels.

Figure 6 – Energy Costs by LGCAP Classification, 2018-2022



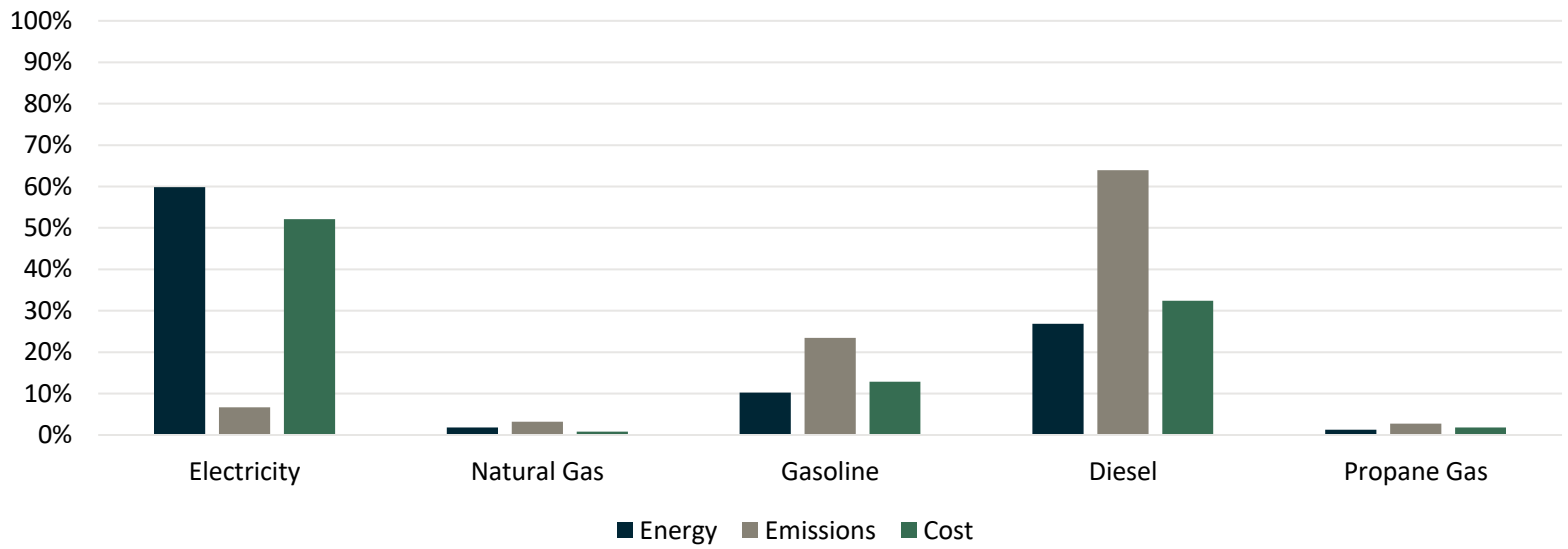
[4] ACRD does not have any storm or waste water infrastructure, only drinking water

Figure 7 shows the percentage of energy consumption, GHG emissions, and energy expenditure that is attributed to each fuel source.

Electricity, of which a majority is used for Drinking, Storm, and Waste water, contributes to 62% of energy demand and 52% of cost. Diesel is responsible for the largest portion of emissions (65%) and 32% of cost; this is mainly due to contracted waste collection for the Alberni Valley Sort 'n Go Centre and West Coast Landfill. The fuel cost is an estimate since it is a contracted service and Alberni-Clayoquot Regional District does not directly pay for the fuel costs.

Among fuel sources, natural gas has high GHG emissions but low cost. This is in stark contrast to electricity which has very low GHG emissions but high cost. Gasoline and diesel have both high GHG emissions and high cost. These comparisons were shown earlier in Figure 4.

Figure 7 – Proportion of Energy, Emissions, and Cost by Fuel Source, 2022

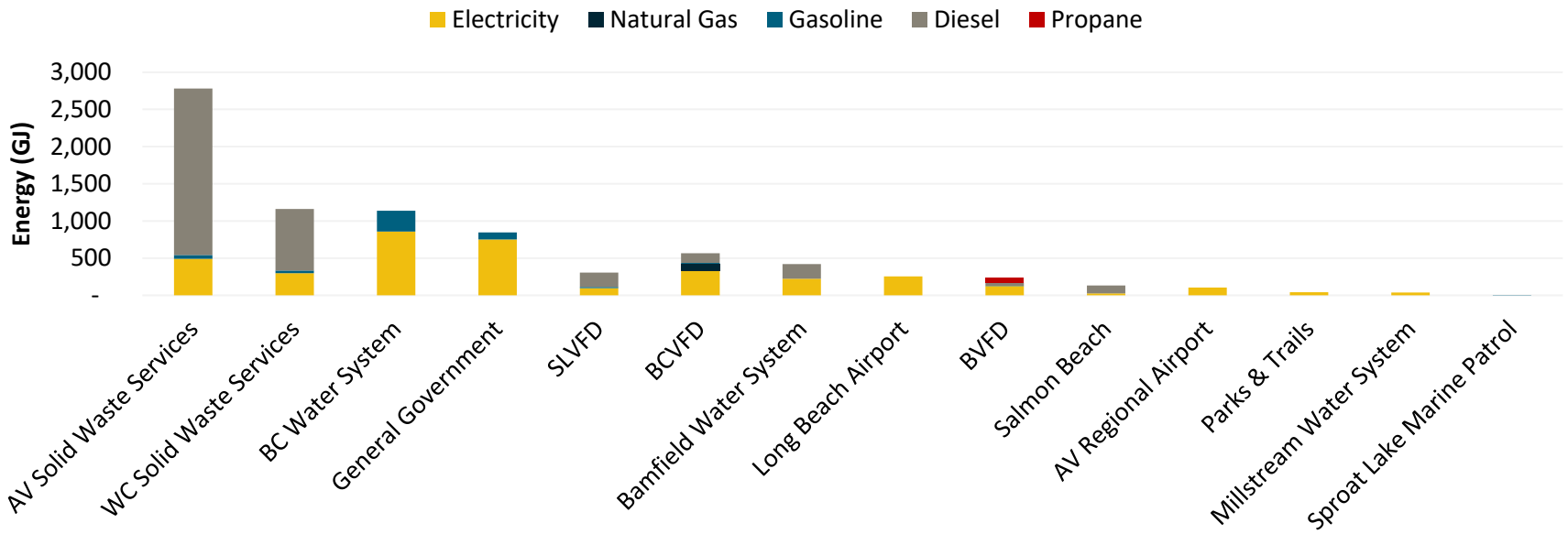


ACRD Services Inventory

This section provides the Regional District's inventory categorized by ACRD services. All ACRD services are included, meaning that airport facilities and waste operations are included, whereas they were excluded from LGCAP reporting; this also explains the differences in the total energy, emissions, and expenditures in comparison to the LGCAP inventory. As shown below, the inclusion of the waste operations at the Alberni Valley Sort 'n Go Centre and West Coast Landfill is significant.

Alberni-Clayoquot Regional District consumed a total of 8,086 GJ among all corporate and contracted operations. Figure 8 shows the energy use breakdown among ACRD Services. Alberni Valley Solid Waste Services comprises the largest portion of ACRD's corporate profile at 2,783 GJ (34%); however, diesel used for contracted services is responsible for over 80% of the energy usage in this category. The next highest energy users are West Coast Solid Waste Services (1,162 GJ, 14%) and Beaver Creek Water System (1,138 GJ, 14%).

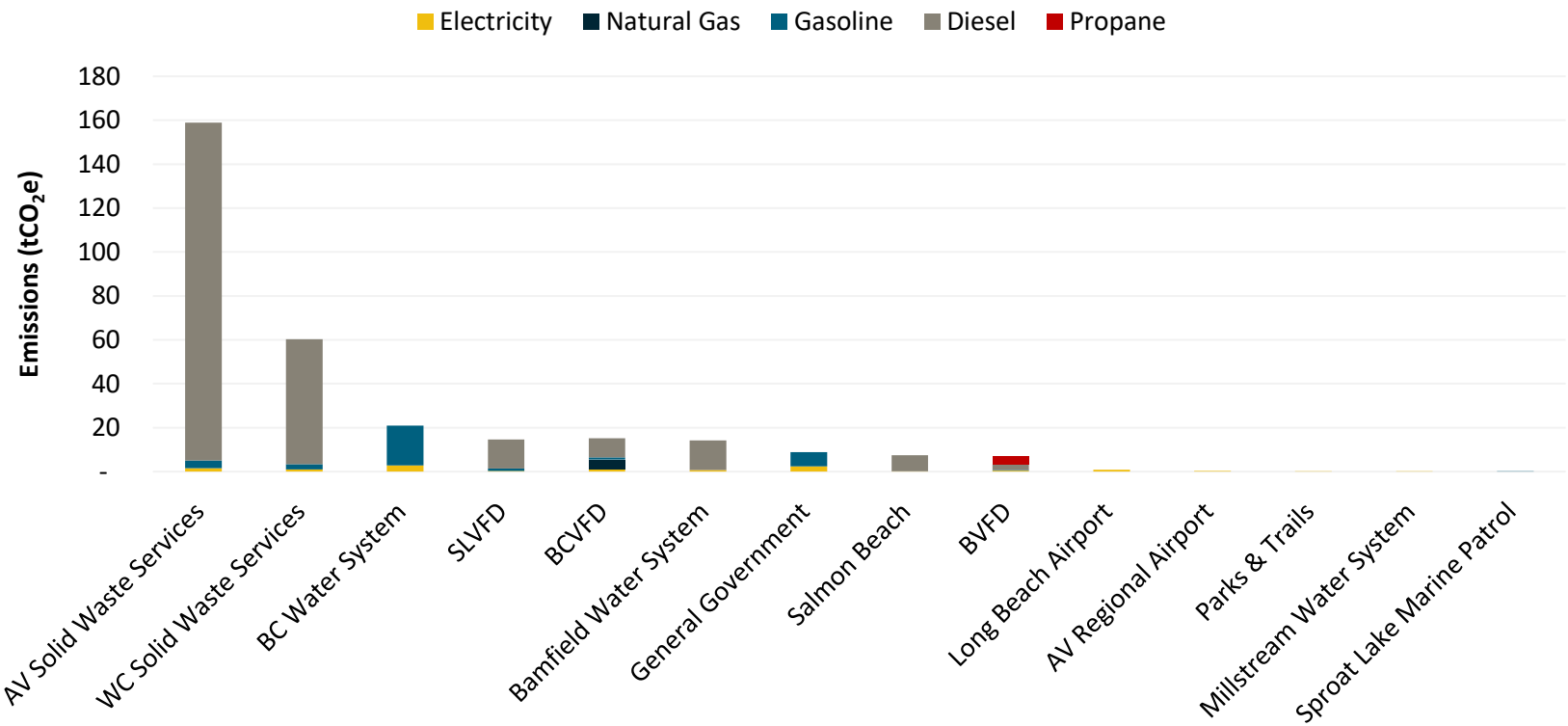
Figure 8 – Energy Usage by ACRD Service and Fuel Type, 2022[5]



[5] AV: Alberni Valley; WC: West Coast; BC: Beaver Creek; SL: Sproat Lake; BVFD: Bamfield Volunteer Fire Department

Figure 9 shows emissions sorted by ACRD service and fuel types. Similar to the energy use, Alberni Valley Solid Waste Services are the largest contributor to ACRD's emissions profile. They are responsible for 159 tCO_2e, of which 97% result from contracted services. The second largest source of emissions, West Coast Solid Waste Services (59 tCO_2e), is also almost entirely due to contracted services (96%). When excluding contracted services, the Beaver Creek Water system is the top emitter (21 tCO_2e).

Figure 9 – Emissions by ACRD Service and Fuel Type, 2022[6]

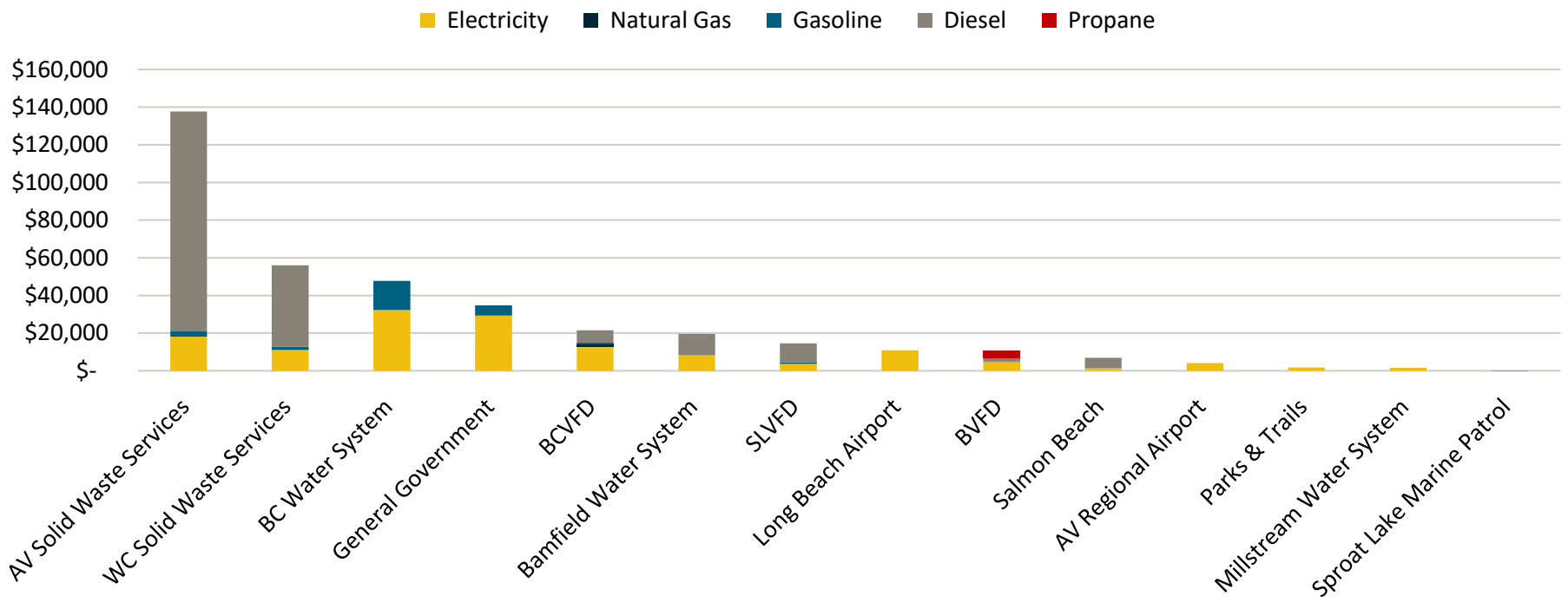


[6] AV: Alberni Valley; WC: West Coast; BC: Beaver Creek; SL: Sproat Lake; BVFD: Bamfield Volunteer Fire Department

Figure 10 shows the fuel expenditures for all Alberni-Clayoquot Regional District services. The Alberni Valley Solid Waste Services is the most expensive ACRD service, costing the Regional District nearly $140,000 annually. 85% of those costs are from diesel consumed by contracted waste collection vehicles or equipment. Contracted fuel usage is also responsible for the majority of expenditures for the West Coast Solid Waste Services, which is the next highest expenditure ($56,000). Many services spend over 50% of fuel costs on electricity, including the Beaver Creek Water System, the General Government, and the Beaver Creek Volunteer Fire Department.

Fuel expenditures from contracted services were estimated as the Regional District doesn't directly pay these costs.

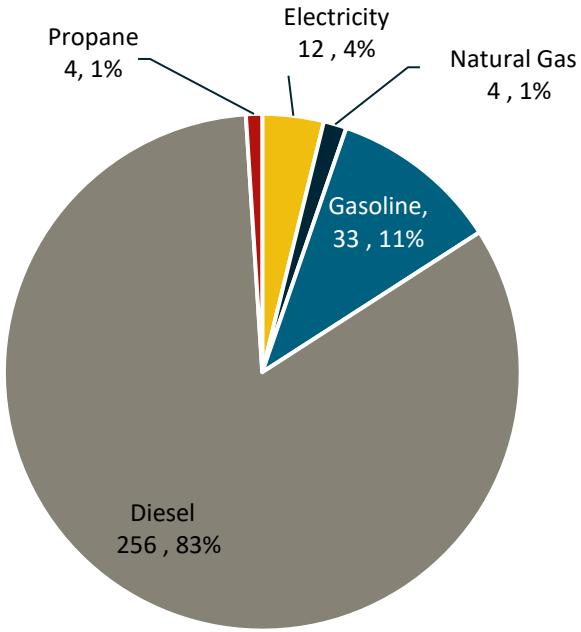
Figure 10 – Energy Expenditures by ACRD Service and Fuel Type, 2022



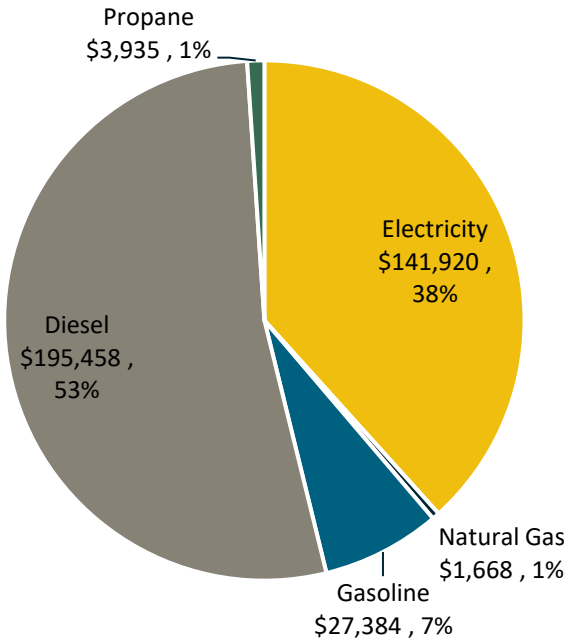
The Regional District should continue to report by ACRD Service to allow for visibility on energy, emissions, and cost by service, especially as individual services grow and new services are created.

As shown in Figure 11, diesel is responsible for the largest portion of emissions (256 tCO_2e) and expenditures ($195,500). Of these diesel emissions, 90% belong to contracted services. When considering only ACRD operational emissions, gasoline is the largest emitter (33 tCO_2e). Similar to the previous graph, Figure 11 shows that diesel and electricity are the largest fuel expenditures. Electricity is responsible for 38% of all fuel costs and costs the Regional District over $140,000 annually, yet, as a low-carbon energy source, it only contributes to 4% of emissions.

Figure 11 – Emissions and Expenditures by Fuel Source, 2022



Emissions (tCO_2e)



Cost

Due to high electricity consumption in comparison to other carbon-intensive fuels, ACRD pays relatively little amounts of carbon tax. Figure 12 illustrates the amount of carbon tax and fuel costs paid for each fuel type. Carbon tax paid on diesel was the highest, accounting for about $13,000. Overall, the cost of the carbon tax only accounted for 4% of total fuel expenditures paid by the Regional District in 2022.

Figure 12 – Fuel and Carbon Tax Expenditures by Fuel Type, 2022

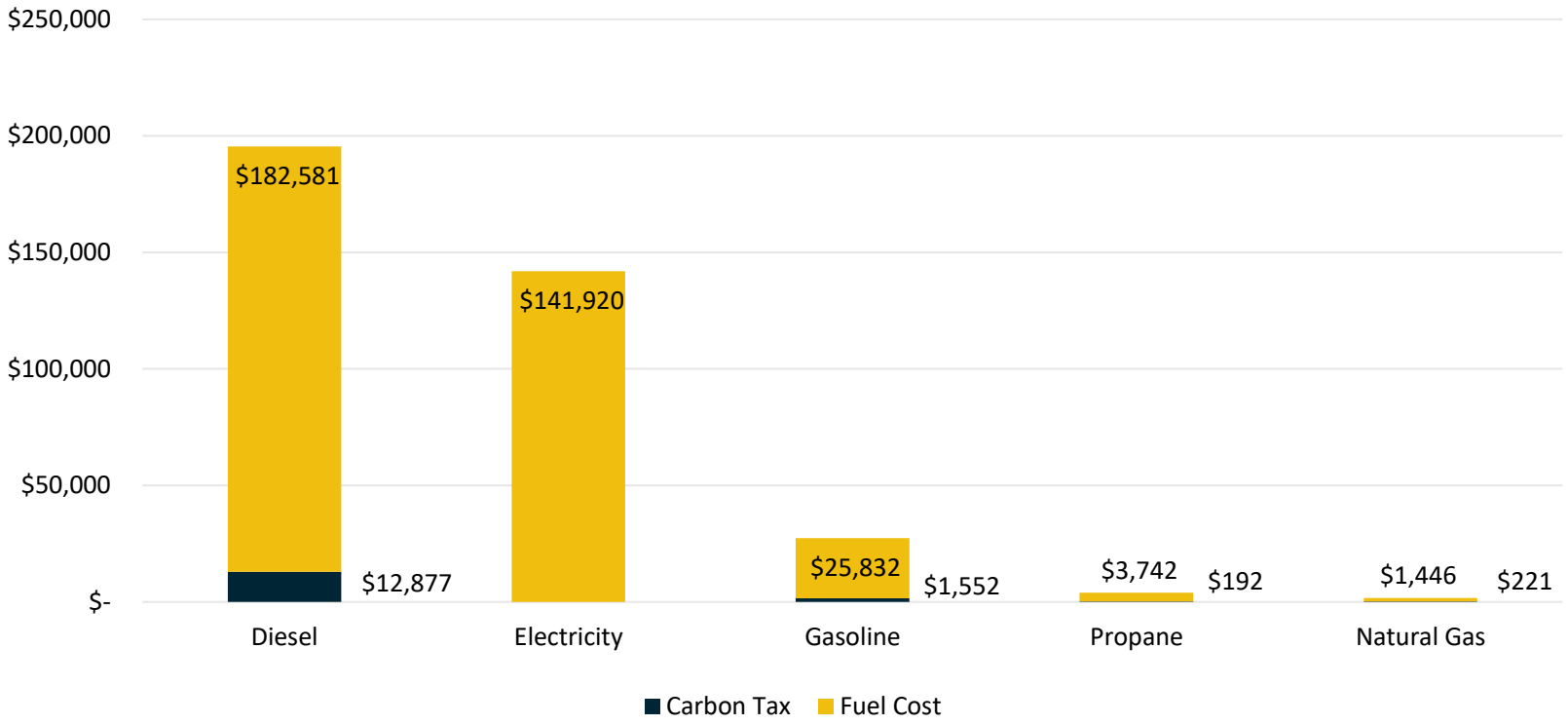


Figure 13 – Top 5 Buildings & Infrastructure for Energy and Expenditures, 2022

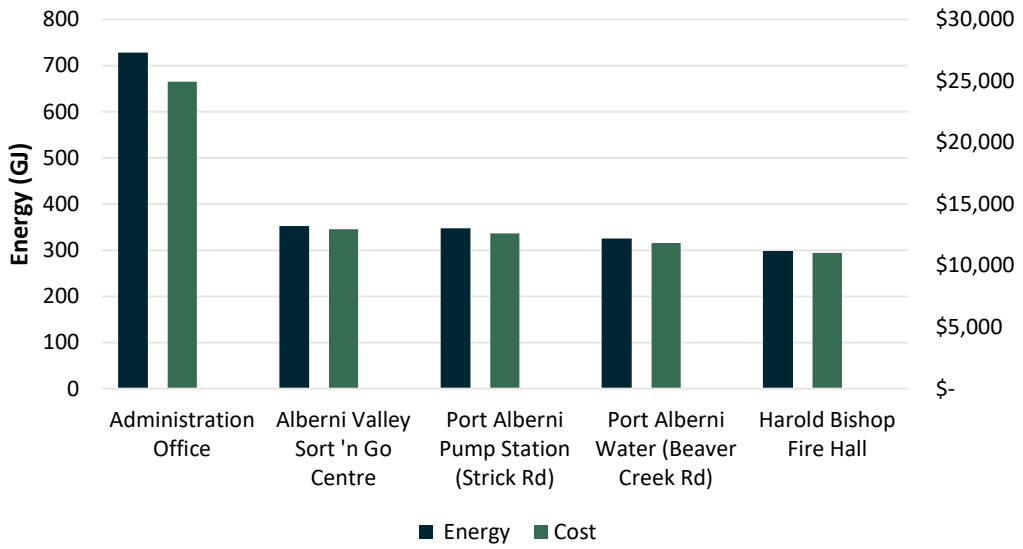


Figure 14 – Top 5 Buildings & Infrastructure for Emissions, 2022

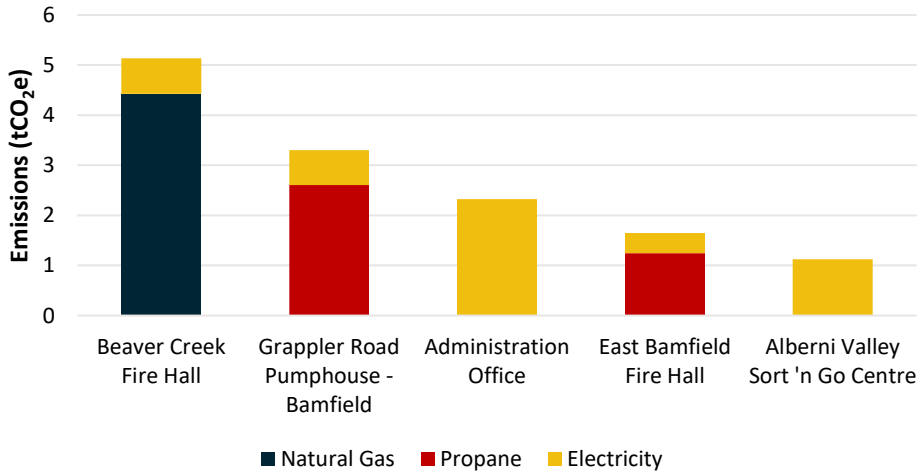


Figure *13* shows the top five buildings and infrastructure in terms of energy consumption and energy costs. These top five have no natural gas or propane usage; the energy and costs presented in the chart are all electricity. The Administration Office is the most expensive, responsible for nearly $25,000 annually and is also the third highest emitter (2.3 tCO_2e).

Figure 14 shows the top five buildings and infrastructure in terms of emissions. The only three ACRD buildings that are heated with fossil fuels (natural gas and propane) are in the top five emitters: Beaver Creek Fire Hall (5.1 tCO_2e), Grappler Road Pumphouse (3.3 tCO_2e), and East Bamfield Fire Hall (1.6 tCO_2e). While they are the highest emitters, they only cost the Regional District a combined $5,602 annually.

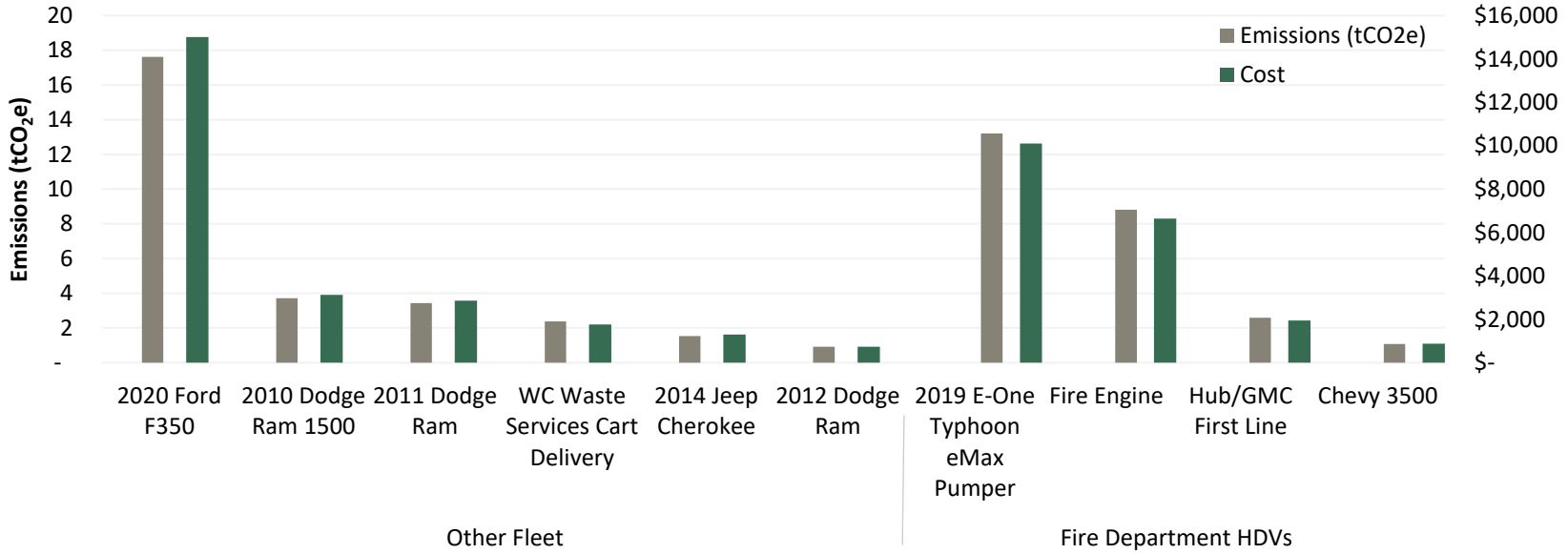
These buildings and infrastructure should be the Regional District's replacement priorities in order to maximise GHG emission and cost reductions.

The top ten fleet emissions and expenditures are shown in Figure 15. Only Alberni-Clayoquot Regional District's vehicles are included; any vehicles used for contracted services are excluded. The graph is sorted into Fire Department heavy-duty vehicles (HDVs), which includes fire trucks and other HDVs, and Other Fleet because there are currently limited opportunities for emission reduction in the Fire Department's HDVs.

The 2020 Ford F350, which belongs to the Beaver Creek Water System, is the highest emitting vehicle (17.6 tCO_2e) and has the highest costs ($15,000). The 2019 E-One Typhoon eMax Pumper, used by the Sproat Lake Fire Department, is the second highest emitting vehicle (13.2 tCO_2e) and second highest cost ($10,100). These two vehicles, along with the other top eight vehicles, are some of the most used vehicles in ACRD's fleet, therefore demanding the most fuel and producing the most emissions.

When searching for reduction opportunities, these assets should be replacement priorities in order to maximise GHG emission and cost reductions. It is important to note that vehicles have significantly higher emissions than buildings; the highest emitting vehicle emits four times as many emissions as compared to the highest emitting building.

Figure 15 – Top 10 Fleet Emissions and Expenditures, 2022



Contracted Services

In 2022, Alberni-Clayoquot Regional District had six contractors that met the requirements for LGCAP reporting. To be included, contracts must be over $25,000, must deliver traditional government services, and must produce emissions from mobile sources (such as vehicles or equipment). ACRD has an additional contractor, Berry & Vale, that was excluded from the LGCAP inventory because landfill operations are stated to be out of scope by LGCAP. However, emissions from Berry & Vale have been included in the ACRD Services Inventory and the chart below, as they are a significant source of emissions.

Figure 16 shows that Berry & Vale were responsible for a combined 72% of total contractor emissions as a result of landfill operations at the Alberni Valley Sort 'n Go Centre' and West Coast Landfill. These emissions include the emissions from machinery and vehicles used to manage landfill operations but don't include the emissions from landfill decomposition; these values can be found in Appendix D under the PCP inventory.

Table 2 shows the ACRD service category for each contractor.

Figure 16 – Emissions (tCO_2e) by Contracted Service, 2022

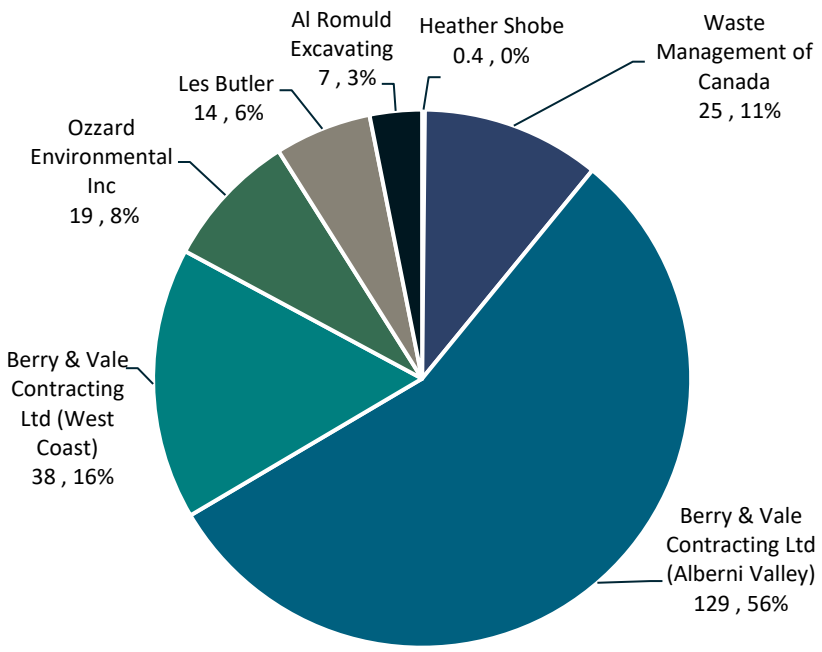


Table 2 – Contracted Services by ACRD Service Area

Contractor	ACRD Service Area	Included in LGCAP?
Heather Shobe	General Government	Yes
Waste Management of Canada	Alberni Valley Solid Waste Services	Yes
Berry & Vale Contracting Ltd	Alberni Valley Solid Waste Services	No
Berry & Vale Contracting Ltd	West Coast Solid Waste Services	No
Ozzard Environmental Inc.	West Coast Solid Waste Services	Yes
Les Butler	Bamfield Water System	Yes
Al Romuld Excavating	Salmon Beach	Yes

Corporate vs. Community Inventories

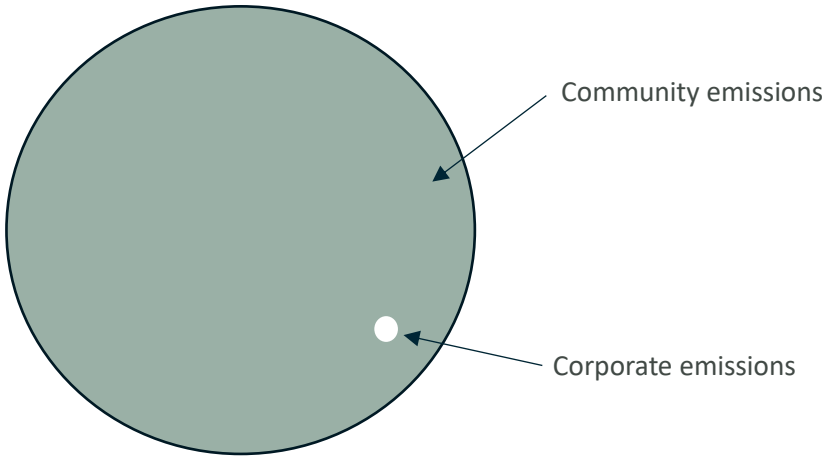
In 2021, the Alberni-Clayoquot Regional District's community GHG emissions were 230,215 tCO_2e. Corporate GHG emissions in that year were less than 1% of the community total.

Community

- Community-wide energy use
- Uses local government levels of infrastructure, policy/regulation and outreach/engagement to impact community energy and emissions
- Focuses on transportation, buildings and waste

Corporate

- Municipal facilities and operations
- Detailed energy information
- More emphasis on immediate actions
- Corporate actions can anchor community-wide projects



Business As Usual Projections

Business As Usual (BAU) projections for the Regional District's inventory are shown in this section. The graphs and targets in this section are focused on Alberni-Clayoquot Regional District's LGCAP direct emissions only, meaning that emissions from contracted services, airports, and waste operations are excluded. Contracted services were excluded as ACRD holds less influence over these emissions in comparison to their own assets. Targets and projections for entire LGCAP emissions are included in Appendix F.

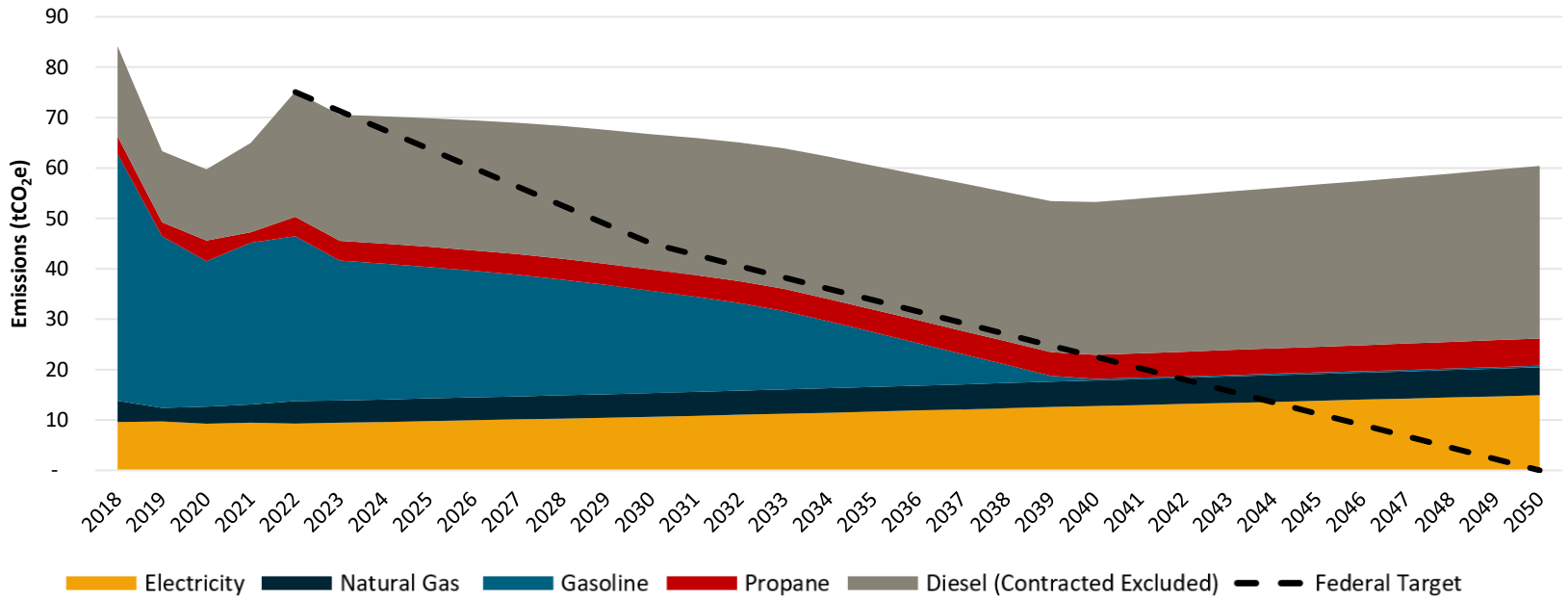
What does Business as Usual mean?

Business as Usual, or BAU, is a way of describing what is estimated to happen if the Regional District does not try to reduce emissions going forward. A number of factors are taken into account, similar to a Community Energy and Emissions Plan. Population growth and the subsequent growth in corporate assets is a very important consideration. As the number of people increase in a community, more corporate assets are needed to serve them. Other things that are taken into account include:

- Changing climate patterns, as warmer winters and hotter summers change the way that energy is consumed in corporate buildings.
- Impacts of policies already adopted by higher levels of government, such as:
    - Renewable and low carbon fuel standards
    - Vehicle emissions standards
    - That progressive policies on electric vehicles will have an impact on the Regional District's purchases for gasoline vehicles, in particular the Zero Emissions Vehicles mandate.
    - The greening of the BC Building Code (progressive steps towards net zero energy ready buildings by 2032)

If Alberni-Clayoquot Regional District implements no special efficiency or conservation activities, and assuming that future changes are proportional with population increase, then the Regional District's direct emissions are forecast to decrease by 11% in 2030 and 19% in 2050 compared to 2022 levels as shown in Figure 17. This reduction is not enough to meet the federal targets[7]: a 40% reduction below the 2022 baseline by 2030 and net-zero by 2050.

Figure 17 – Business-As-Usual Emissions Forecast to 2050, by Fuel Source



It is difficult to predict these future increases, but it is clear that an increasing population will provide upward pressure, while policies from higher levels of government will provide downward pressure on GHG emissions. It would therefore be prudent for the Regional District to also conduct its own measures (i.e. implement the actions detailed in this Plan) to manage its energy consumption, GHG emissions, and energy expenditures.

[7] https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050.html

WHAT WE CAN DO: RECOMMENDED CLIMATE ACTIONS

Based on staff consultation and best practices, actions were identified to be implemented over the next five years. Actions fall under the following five categories.

1. ***New Buildings and Infrastructure:*** Improve energy performance and lower GHG emissions in ***new*** Regional District buildings and infrastructure
2. ***Existing Buildings and Infrastructure****:* Improve energy performance and lower GHG emissions in ***existing*** Regional District buildings and infrastructure
3. ***Renewable Energy****:* Increase the use of renewable energy
4. ***Transportation:*** Improve energy efficiency and reduce GHG emissions in the Regional District's fleet
5. ***Enabling Actions and Corporate Leadership****:* Institutionalise the plan and demonstrate leadership on waste and water

Table 3 shows the breakdown of actions by category and the timeline for each action. Actions may carry over into future terms.

Legend

Short term: 1-3 years, medium term: 3-5 years, long term: 5+ years

Actions that depend on a previous action are highlighted with a "D" followed by the action number it depends on, e.g. D1.1.

Table 3 – Climate Actions Summary

ACTIONS LIST		Completed	Short Term 1-3 years	Medium Term 3-5 years	Long Term 5+ years
Existing Buildings and Infrastructure					
1.1	Conduct building energy audits		X		
1.2	Implement building energy retrofits recommended by building energy audits (D1.1)		X		
1.3	Conduct energy focused operational review of infrastructure			X	
1.4	Implement measures from operational review of infrastructure (D1.3)			X	
1.5	Incorporate energy management into annual building maintenance procedures		X		
New Buildings and Infrastructure					
2.1	Commit to building energy efficient facilities (including mandatory Step Code implementation)		X		
2.2	Commit to building energy efficient infrastructure (e.g. updating subdivision servicing bylaw)		X		
2.3	Commit to optimizing siting and orientation of new buildings		X		
Renewable Energy					
3.1	Install electric air source heat pumps (D1.1)		X		
3.2	Implement solar photovoltaic installations				X
Transportation					

ACTIONS LIST		Completed	Short Term 1-3 years	Medium Term 3-5 years	Long Term 5+ years
4.1	Right-size vehicles for assigned tasks		X		
4.2	Develop a low carbon vehicle purchasing policy		X		
4.3	Invest in EVs and EV Charging Stations (where available and practical)		X		
4.4	Assess renewable fuels for corporate fleet				X
4.5	Fuel efficient driver training & anti-idling policy		X		
4.6	Energy-focused fleet maintenance (e.g. tire pressure, fuel & air system)		X		
4.7	Implement an employee Transportation Demand Management program			X	
4.8	Include emission targets in contracted services requirements (e.g. waste collection)		X		
Enabling Actions and Corporate Leadership					
5.1	Have dedicated staff person or department for plan implementation	X			
5.2	Hire a staff member focused on climate action (e.g. special projects coordinator)	X			
5.3	Allocate funds for plan implementation (e.g. LGCAP grant, budget allocation, revolving fund)		X		
5.4	Develop KPIs, monitor and track for progress		X		
5.5	Manage waste creation & water consumption			X	

ACTIONS LIST		Completed	Short Term 1-3 years	Medium Term 3-5 years	Long Term 5+ years
5.6	Join Partners for Climate Protection program		X		
5.7	Examine local carbon offset projects for remaining emissions (or consider offset purchase)			X	
5.8	Annual reporting on GHGs		X		
5.9	Climate action education and awareness for staff and elected officials		X		
5.10	Initiate development of a Community Energy and Emissions Plan		X		

Further details on actions, including projected implementation timelines, are detailed in Appendix A.

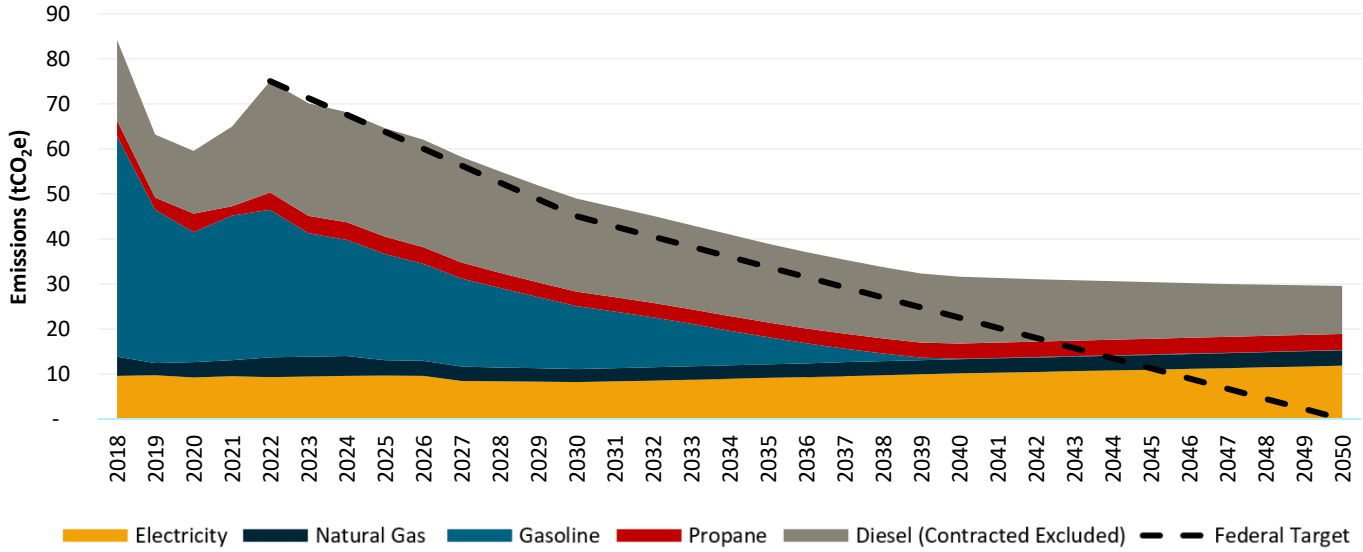
WHAT WE CAN ACHIEVE

Modelling Climate Actions

Implementation of all actions was modelled to estimate the potential GHG emission reductions and energy expenditure savings. More detail on the modelling is in Appendix E.

As shown in Figure 18, upon full implementation, direct GHG emissions (contracted services excluded) are expected to decrease relative to 2022 by 35% in 2030 and 60% by 2050. GHG emissions are expected to plateau from 2040 unless further actions are implemented. It is important that this Corporate Energy and Emissions Plan be updated again in about five years to identify new implementation actions to keep the Regional District's emissions trending downwards. In five years, there should be better access to technologies for reducing emissions and the legislative and funding framework will likely have evolved.

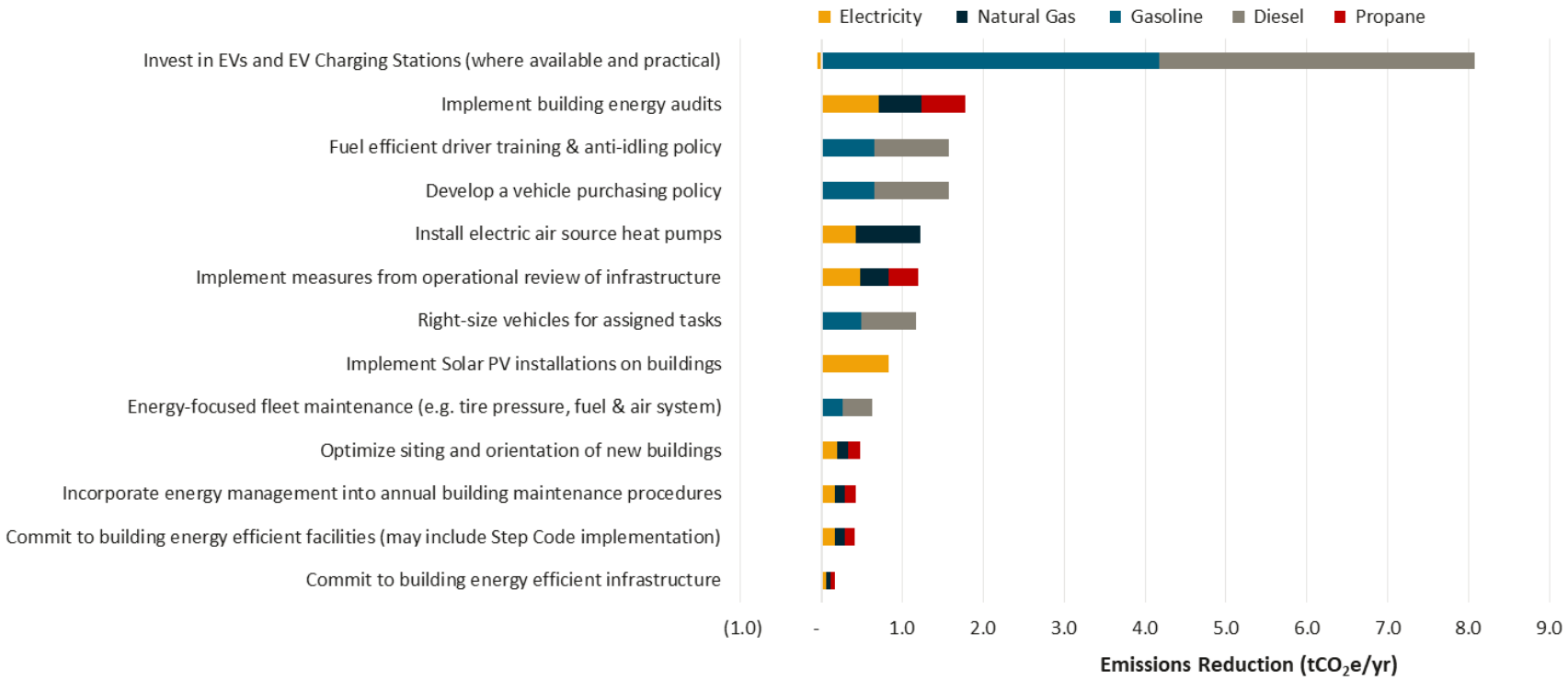
Figure 18 – Modelled Emissions from Proposed Climate Actions



As depicted in Figure 19, the top actions that will achieve the largest reductions in GHG emissions in 2030, in order of largest GHG reductions first, are:

- Invest in electric vehicles (EVs) and EV charging stations
- Implement building energy audits
- Fuel efficient driver training & anti-idling policy and develop a vehicle purchasing policy

Figure 19 – Emissions Reduction For each Proposed Action, 2030[8]



[8] The X-axis begins at (1.0) because investing in EVs and EV charging stations will create a small increase in electricity emissions.

Three out of four of the top actions fall under the transportation sector, rather than the building sector, as many of the Regional District's buildings are heated with electricity and therefore have low emissions and most of the ACRD fleet is not yet made up of EVs. Investing in EVs and EV charging stations will reduce the Regional District's consumption of gasoline and diesel and therefore result in reduced GHG emissions from fleet vehicles. The emissions impacts from this action were estimated based on the recommendations in the Leading Ahead Fleet Charging Analysis, which is included in Appendix L.

Implementing building energy audits will consist of measures to improve energy efficiency, such as air sealing and insulation upgrades, and may lead to the installation of electric air source heat pumps, as displayed by the fifth action in the chart above. Thirdly, fuel efficient driver training and developing low carbon vehicle purchasing and anti-idling policies are low cost and low effort actions that will result in emission and cost savings in the Regional District's fleet.

Figure 20 highlights the potential annual GHG savings resulting from full implementation of the plan. Targeting gasoline use in the fleet provides the largest opportunity for GHG reduction, followed closely by diesel.

Figure 20 – Full Plan Implementation GHG Savings

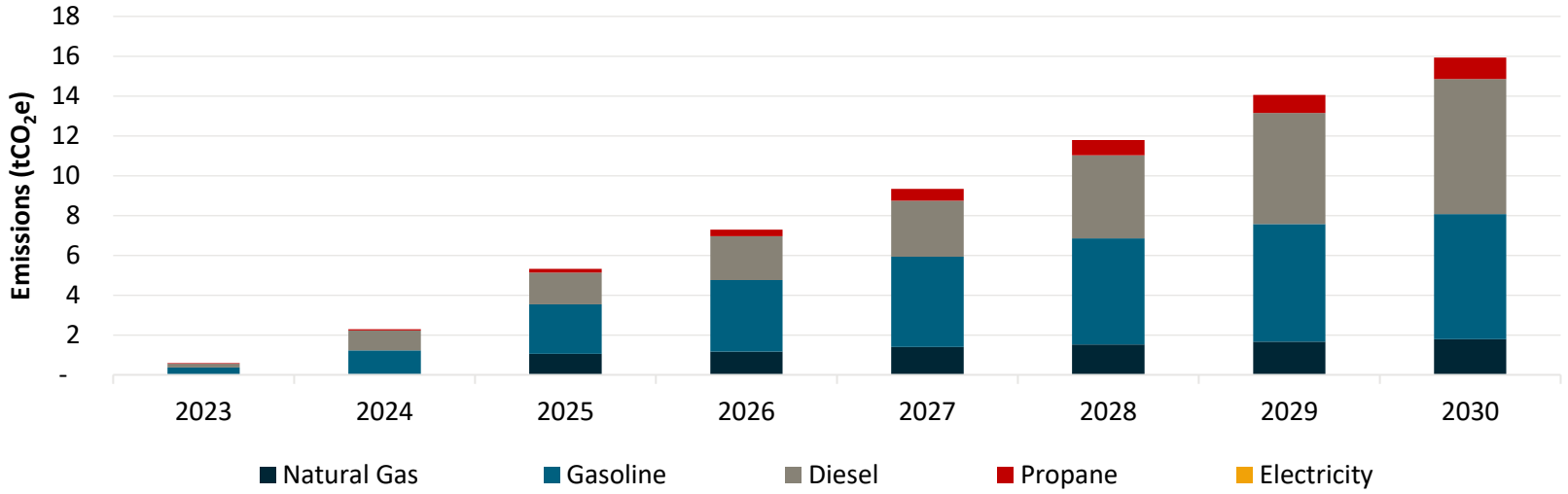
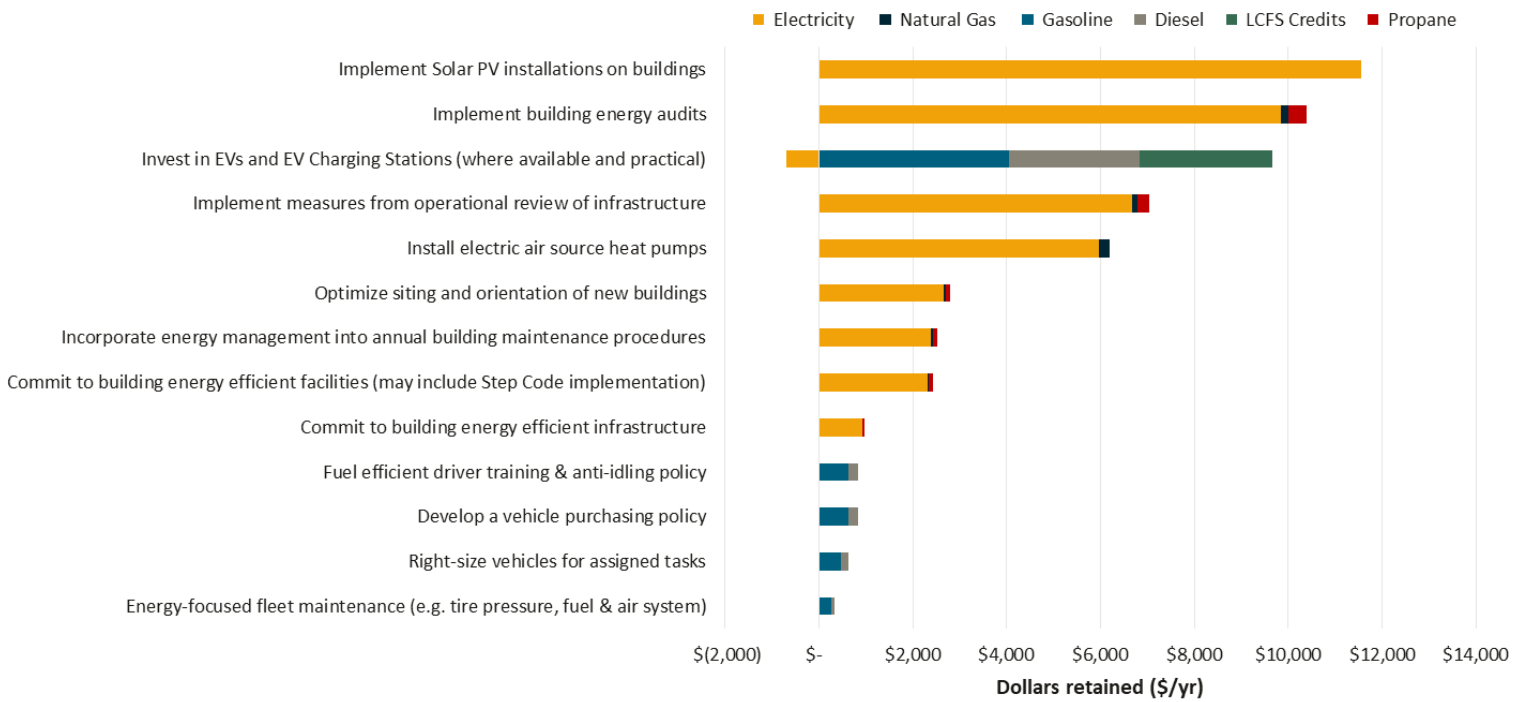


Figure 21 shows the estimated cost savings from each proposed action. These estimates do not reflect the capital cost or payback of each action; more work will be needed to determine this prior to implementing these actions.

Implementing solar PV installations will result in the highest cost savings, followed by implementing building energy audits.

Investing in EVs and EV charging stations, which includes the reporting and selling of Low Carbon Fuel Standard (LCFS) credits, is the third highest cost saving actions, aligning with the highest emission reduction action illustrated in Figure 19. There will be an increase in the consumption of electricity as a result of this shift. However, EVs are four times more efficient than traditional internal combustion engine (ICE) vehicles; therefore the electricity increase will be small and significant cost savings on gasoline and diesel will be realised. These fuel costs savings will also likely result in lower EV lifecycle expenses, in spite of a higher upfront cost.

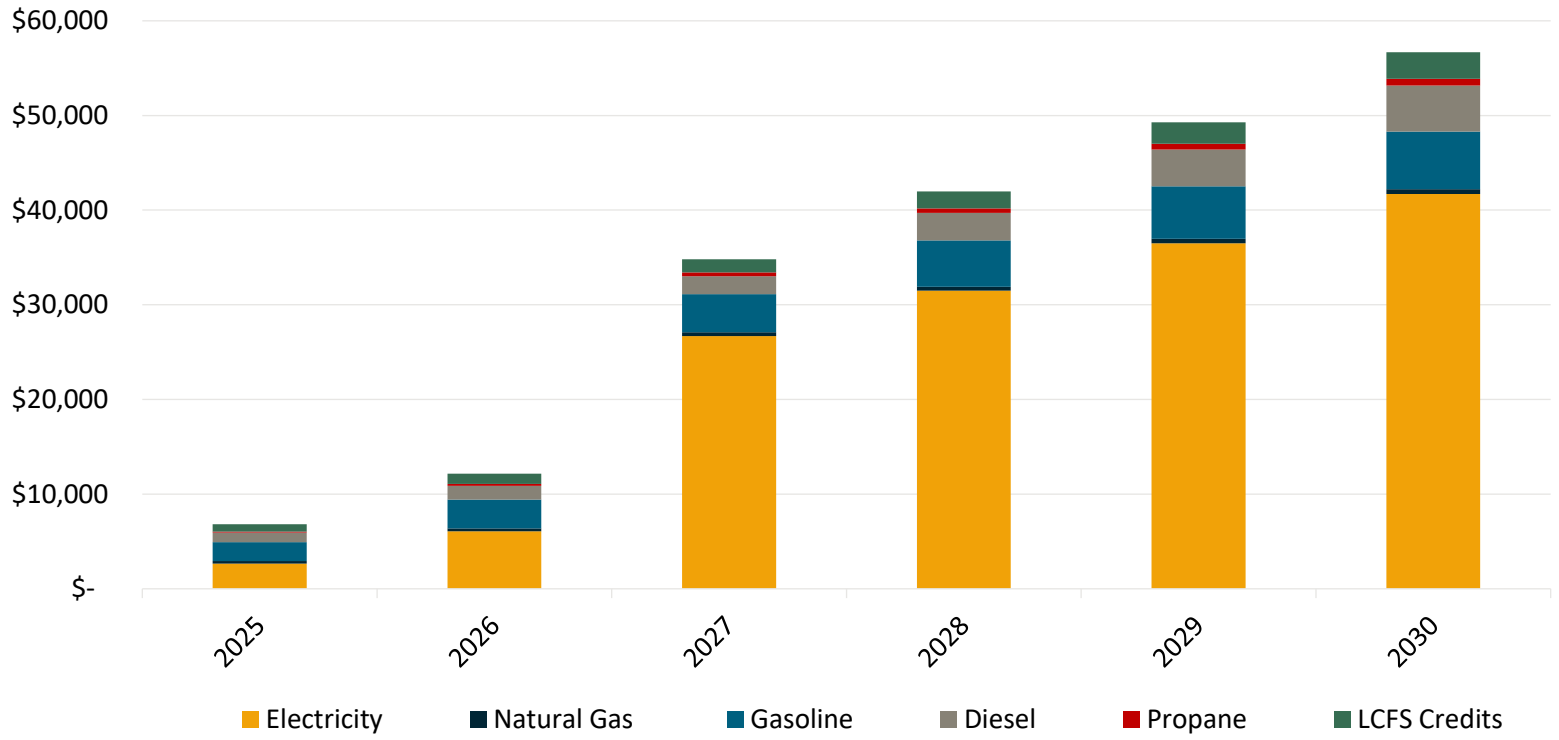
Figure 21 – Cost Reduction For each Proposed Action, 2030



Low Carbon Fuel Standard (LCFS) Credits can be claimed as part of the BC Low Carbon Fuel Standard when electricity is used to charge EVs. These credits are bought and sold on a credit market and can significantly improve the business case for EVs. To claim this credit, the amount of electricity must be quantifiable, meaning that a networked charger connected to a cloud network service (e.g. Flo, ChargePoint) with metering to track usage is required.

Figure 22 shows the annual energy cost savings that could be realised upon full implementation of the plan. Actions will be implemented over time, as per Table 3, and therefore savings will increase over time. There is potential for substantial cost savings on electricity, about three-quarters of total cost savings. The majority of these cost reductions come from solar PV installations, energy efficiency upgrades on buildings and infrastructure, and installation of electric air source heat pumps.

Figure 22 – Projected Annual Cost Savings from Plan Implementation



Overall, the Plan is expected to save 19 tCO_2e and $56,700 annually by 2030 in corporate GHG emissions and energy costs.

IMPLEMENTATION FOR SUCCESS

Several key factors are important for the successful implementation of energy and emission reduction plans based on research conducted by CEA, QUEST, and Smart Prosperity.[9] Among others, they include establishing broad support for implementation, building staff and financial capacity for implementation, and institutionalizing the plan in order to withstand political and staff turnover.

The Alberni-Clayoquot Regional District has political and staff support for climate action, as well as a position partially-focused on climate action. The Regional District does not, however, have a policy on funding GHG emissions reductions.

Funding sources that communities typically use for climate action are shown below. External funding sources should be pursued where available to accelerate action. The internal funding sources that the Regional District sets aside can be used to leverage external funding to great effect.

Internal Funding Sources

- LGCAP rebate allocated for climate action
- Climate action revolving fund
- Internal price of carbon (example: Regional District of Kootenay Boundary set $25 per tCO_2e that goes towards a reserve fund for climate action)
- Low Carbon Fuel Standard (LCFS) credits
- General revenue (e.g. Tax Requisition)
- Recycling and solid waste user fees
- Building permit fees and other service fees charged by Development Services
- Water utility fees
- Provincial grants

What is a Climate Action Revolving Fund?

Climate action revolving funds invest in energy efficiency projects to reduce energy consumption and hence energy expenditures. Energy cost savings are then reinvested in future projects. They are called “revolving funds” because all or a portion of the savings from previous projects are used to fund new projects, and fund “revolves” in this way. Two local governments in BC have implemented such a fund, Summerland and Vernon. BC Crown Corporations have also implemented these, e.g. Health Authorities. Although conceptually intuitive, they can be difficult to implement in practice.

[9] Community Energy Implementation Framework, https://questcanada.org/getting-to-implementation-in-canada/

Funding Opportunities for Decarbonizing Buildings

Funding	Target	Eligibility	Amount	ACRD Opportunity
FCM GMF Study and Capital Project: Retrofit pathway for municipal buildings	A study and capital project to reduce GHG emissions in municipal buildings over time.	Any existing municipal building. Aim to reduce emissions from the municipal building by at least 50% within 10 years and achieve best practice energy targets within 20 years.	Study: Grant for up to 50%[10] of eligible costs. Up to a maximum of $65,000 for a single building, up to $200,000 for multiple buildings. Capital Project: Maximum $10 million. Up to 20% as a grant and the remainder as a loan. Combined loan and grant for up to 80% of eligible project costs.	Beaver Creek Fire Hall ACRD Office Bamfield Fire Hall Sproat Lake Fire Hall #3 Grappler Road Pumphouse
FCM GMF Study and Capital Project: Construction of new sustainable municipal and community buildings	A study and capital project for a new, low-carbon municipally owned building.	Includes retrofits of municipal buildings and new builds of municipal and community buildings. Municipal buildings should meet best practice energy targets and achieve zero operational GHGs.	Study: Grant for up to 50%[4] of eligible costs. Up to $200,000. Capital Project: Maximum $10 million. Up to 15% as a grant and the remainder as a loan. Combined loan and grant for up to 80% of eligible project costs.	New Airport Terminal New Bamfield West Fire Hall

[10] Regional governments where the average population of the member municipalities is 10,000 or under may qualify for up to 80%.

BC Hydro Business Energy-Saving Incentives	Funding for energy-efficient equipment upgrades	Lighting, HVAC, refrigeration, and mechanical technologies	About 25% of the upfront costs (on average) through energy-saving incentives.	All ACRD Buildings
FortisBC Commercial Energy Assessment Program	Energy assessment walkthrough of commercial buildings to identify energy conservation measures.	A commercial FortisBC natural gas and/or electricity customer The owner or leaseholder of a medium-sized business or small industrial/manufacturing facility.	Free	Beaver Creek Fire Hall

Funding Opportunities for Decarbonizing Corporate Fleets

Funding	Target	Eligibility	Amount
FCM GMF Study and Capital Project: Municipal Fleet Electrification	Study and capital project to transition the municipal fleet to zero-emission vehicles.	The study must include: an assessment of the entire fleet, a fleet transition plan, an optimized scenario (right-sizing), an assessment of the supply of low-carbon (if applicable), and an equity assessment. The project should replace one or more existing vehicles with zero-emission vehicles.	Study: up to 200k, 50% of costs Capital: grant up to 15% of the loan; grant & loan up to $10 million, up to 80% of eligible costs.
Commercial Vehicle Pilot Program	Funding for on and off-road zero emission vehicles and supporting infrastructure.	On-road weight class 3 and 4 must deploy a minimum of six ZEVs. Weight class 5 and 6 must deploy a minimum of three ZEVs. Weight class 7 and 8 and off-road vehicle types have no minimum vehicle deployment number. Electric charging and hydrogen refueling infrastructure.	Up to $10 million, 33% of eligible project costs.
Specialty Use Vehicle Incentive	Rebates on zero-emission motorcycles, low-speed vehicles, on road Medium- and Heavy-Duty vehicles, airport and port specialty vehicles and utility vehicles.	Eligible vehicles: battery electric, hydrogen, or plug-in hybrid (MHDV and specialty vehicles only). Vehicles must be new.	Airport and port specialty vehicles: $50,000-150,000 depending on vehicle. MHDV: Up to $150,000 or 33% of the purchase price, whichever is lower. Ranges from $1700-5000 for other vehicle types.

BC Hydro Incentives: Electric Fleet Planning & Infrastructure	Funding for professional planning and electrical infrastructure.	Must identify and lease or purchase at least six zero-emission vehicles within three years of submitting the infrastructure invoices.	Fleet Plan: Fleets less than 150 vehicles: A rebate of 50% of planning costs (excluding GST) up to a maximum of $10,000. Infrastructure: Up to 50% of infrastructure costs, not including charging equipment.
CleanBC Go Electric Fleet Charging Program	Financial assistance to design, procure, and install charging infrastructure, to be used by the fleet.	Open to B.C. registered companies, non-profit organizations and public entities.	75% of total costs, up to $2,000, capped at $50,000 per applicant per year.
Federal ZEV Infrastructure Program	Funding for charging or hydrogen refueling opportunities in public places, at workplaces, or for vehicle fleets.	For EV charging infrastructure projects must include: A minimum of one (1) charger of 200 kW and above; or a minimum of two (2) fast chargers of 50 kW and above; or a minimum of twenty (20) chargers of all charging levels	Up to 50% of total project costs, to a maximum of: Level 2: $5,000 per connector Fast Charger: $15,000-$100,000 per connector

Municipal Finance Authority - Implications of borrowing money from the Federation of Canadian Municipalities

Grants offered by the Federation of Canadian Municipalities (FCM) for plans or studies are untethered. All grants being offered by FCM for capital projects are only offered on the condition that money is borrowed from FCM, and this has implications for BC local governments as they are required to only borrow money from the Municipal Finance Authority (MFA). However, FCM funds can flow through the MFA and there have been instances of this in BC.

The MFA seeks to support local governments in accessing the lowest possible cost of capital, meaning that local governments can borrow from FCM if the cost of borrowing is preferable to the cost of borrowing from the MFA. A lower cost of borrowing may be accomplished by FCM when a grant is bundled with a loan. Local governments should also consider the reporting requirements associated with FCM funding versus the MFA, which has next to no reporting.

Water Distribution Systems Funding

Community Works Fund allocates funding to all local governments in BC based on a per capita formula that includes a funding floor. It can be used towards eligible costs of infrastructure that supports drinking water conservation, collection, treatment and distribution systems.

BC Water Metering Pilot Programs were announced with the 2024 BC budget. The budget includes $50 million for water metering pilot programs in 21 communities throughout B.C. that will inform the feasibility of establishing a universal water-metering program with the aim of better conserving water, identifying leaks, and educating users about their actual water use. Watch for future program application intakes.

Airport Funding

BC Air Access Program (BCAAP) provides funding to airports for infrastructure improvements, including those that reduce emissions. Some projects funded in the past include battery powered baggage vehicles, electric charging stations, and energy efficiency improvements to terminal buildings. The next intake will be November 1st, 2024.

Airports Capital Assistance Program (ACAP) funds rehabilitation projects for local and regional airports.

Additional Funding

FCM Municipal Asset Management Program offers funding, training and resources to help strengthen asset management practices.

UBCM Asset Management Planning Program offers funding for asset management training, planning, and development.

Infrastructure Planning Grant Program offers up to $10k to help local governments develop or improve plans such as asset management, integrated stormwater management, liquid waste management, and water master plans.

Canada Community-Building Fund, formerly the federal Gas Tax fund, is funding provided to provinces and territories to distribute to their municipalities to support local infrastructure priorities.

Federal government programs such as the **Low Carbon Economy Fund** and **Energy Innovation Program**.

To support implementation, the Regional District should consider:

- Discussing climate action implications in all reports to the Board.
- Dedicating funds to climate action annually as part of the operating budget.
- Incorporating climate action into job descriptions of other Regional District staff. Climate action is the responsibility of all departments, and there is a greater chance of success if responsibility is formally shared.
- Investing in education and professional development for all Regional District staff on climate change, climate mitigation, and climate adaptation.
- Embedding climate action into the budgeting process.
- Joining CEA's Peer Networks[11] to learn and share knowledge with other local government staff.
- Monitoring indicators that are easy to track to help ensure that progress is being made.
- Hosting regular meetings to discuss implementation with internal and/or external stakeholders.
- Reporting on indicators as part of an annual report to the Board.
- Achieving PCP corporate milestones 1-3 and progress through milestones 4-5.
- Incorporating this Plan into the Regional District's Strategic Plan and other plans.
- Developing a plan to reduce GHG emissions across the entire ACRD community, including those member municipalities and First Nations who wish to collaborate.
- Renewing this plan in five years, in 2029, or sooner as objectives are achieved. Incorporate climate adaptation and resilience actions based on the findings from the Regional District's Hazard and Risk Assessment.

Implementation support services offered by CEA are described in Appendix B.

[11] https://www.communityenergy.ca/peer-networks/

MONITORING AND EVALUATION

Monitoring and evaluating the implementation of the plan is critical for its success. Key Performance Indicators (KPIs) enable communities to measure the outcomes of a plan's implementation. When KPIs are monitored regularly, communities can determine how to best allocate resources to support implementation, and the level of success of different actions.

Suggested indicators are shown in the template in Table 4. Two types of indicators are recommended. Primary indicators measure corporate GHG emissions, energy consumption and energy expenditure, while secondary indicators can quantify the indirect success of various actions.

The primary indicators of energy consumption, emissions, and energy expenditures can be easily and accurately tracked for corporate operations. Whilst these are the determinants of success, secondary indicators can still play a useful role in monitoring progress on climate action. Annual progress reporting should be planned by the Regional District.

For the primary indicators, ACRD will use their tracking spreadsheet to record the emissions, energy, and expenditures for each asset. Each asset will be tracked by the total value and as a function of building size, vehicle kilometers, or equipment hours.

Table 4 – Primary and Secondary Indicators for Monitoring and Evaluation

INDICATOR	2024	2025	2026	2027	2028
Primary					
Corporate GHG emissions (tonnes CO_2e)					
Corporate energy consumption (GJ)					
Corporate energy expenditure ($)					
Secondary - New Buildings and Infrastructure					
Number and percentage of new buildings or infrastructure projects constructed to higher energy efficiency					
Secondary - Existing Buildings and Infrastructure					
Number and percentage of energy assessments conducted on corporate buildings					
Number and percentage of energy efficiency upgrades installed on corporate buildings					
Number and percentage of air source heat pumps installed on corporate buildings					

Secondary - Renewable Energy					
Installed capacity of solar PV (kW)					
Secondary - Transportation					
Number and percentage of fleet vehicles that are electric, hybrid, or use other alternative fuels					
Number and percentage of employees that have completed fuel efficient driver training					
Secondary - Enabling Actions and Corporate Leadership					
Volume of waste at specific corporate buildings (cubic yards)					
Expenditures by Climate Action Revolving Fund (should one be created) ($)					
Total value of incentives received (e.g. grants) for Plan implementation ($)					
Current PCP Milestone (1 to 5)					
Number and percentage of employees that have received education on climate action and awareness					
Secondary – Climate Adaptation					
Water consumption at specific ACRD facilities (litres)					
Days of extreme heat in specific ACRD facilities (requires temperature monitoring)					
Days of poor indoor air quality in specific ACRD facilities (requires air quality monitoring)					
Number and percentage of ACRD facilities in areas at risk of overland flooding, sea level rise or storm surges, and/or wildfires					
Number and percentage of ACRD Asset Management Plans with climate change and adaptation considerations					

CONCLUSION

Alberni-Clayoquot Regional District has already begun building support for climate action within their corporate operations. The Regional District must keep that momentum by implementing this Corporate Energy and Emissions Plan, beginning with the actions outlined under short term: complete energy audits for buildings and infrastructure, install electric air source heat pumps, implement fleet policies such as right-sizing vehicles and fuel efficient driver training, invest in electric vehicles, and expand corporate leadership through actions such as education, allocating funds, and monitoring progress.

Modelling completed shows that shifting to electric vehicles and completing energy retrofits will result in the greatest emissions reductions and provide significant cost savings for the Regional District, while the inventory highlights that working with contractors to reduce their fleet emissions is also extremely important. Prioritizing these actions will help the Regional District reduce corporate emissions and move towards alignment with the federal GHG reduction targets of net-zero emissions by 2050. Certain sectors, particularly medium and heavy duty vehicles, are more difficult to decarbonize and emerging technologies should be monitored for potential future solutions.

This Plan will create multiple co-benefits, with investments in low carbon buildings and retrofits reducing local government energy expenditures, providing a more comfortable, safe working environment for staff, and making buildings more resilient to climate change impacts. Meanwhile, efforts to increase efficiency and electrify fleet vehicles will result in lower fuel and life cycle vehicle costs, as well as reduced air and noise pollution.

The Plan is achievable, with clear prioritization and next steps for more detailed project planning related to buildings, infrastructure, and fleet vehicles. Building on Alberni-Clayoquot Regional District's foundations for climate action, this continued work will establish local leadership on emissions reductions. Through the leveraging of external funding opportunities and use of LGCAP and internal funding sources, these investments will stimulate local economic development in the buildings retrofits and green technology sectors, paving the way for broader community GHG reduction efforts.

ABBREVIATIONS

ACRD	Alberni-Clayoquot Regional District
BAU	Business as Usual
CAC	Climate Action Charter
CARIP	Climate Action Revenue Incentive Program (administered through the Province of BC)
CEA	Community Energy Association
CO_2e	Carbon Dioxide equivalent
EUI	Energy Use Intensity
EV	Electric Vehicle
FCM	Federation of Canadian Municipalities
GHG	Greenhouse Gas (there are several different anthropogenic GHGs and they have different relative impacts. When tonnes of GHGs are stated in the document the standard practice of stating this in equivalent of tonnes of carbon dioxide is followed.)
GJ	Gigajoules (one of the standard measures of energy)
GMF	Green Municipal Fund
HDD	Heating Degree Day
HVAC	Heating Ventilation and Air Conditioning
ICE	Internal Combustion Engine
IPCC	Intergovernmental Panel on Climate Change (an intergovernmental body of the United Nations dedicated to providing the world with an objective science-based view of climate change, its possible impacts, risks, and response options)
kg	Kilogram
KPI	Key Performance Indicator
kWh	kilowatt hours (standard measure of energy, typically used with electricity)

LCFS	Low Carbon Fuel Standard
LGCAP	Local Government Climate Action Program
LED	Light Emitting Diode
MFA	Municipal Finance Authority
MHDV	Medium and Heavy Duty Vehicles
PCP	FCM-ICLEI's Partners for Climate Protection program
PV	Photovoltaics (solar panels that generate electricity)
RCP	Representative Concentration Pathway (four RCPs were adopted by the IPCC as scenarios for the 2014 Fifth Assessment Report, depending on how much GHGs are emitted in future years)

APPENDIX A. CLIMATE ACTIONS IN DETAIL

This section provides details on each action proposed in the Plan. The textbox below explains how the values were calculated and defines each term and colour code used in the action tables.

How are action impact numbers calculated?

Action impact numbers are calculated through a number of assumptions and educated estimates based on CEA's experience. The impacts of individual actions on energy consumption are calculated for the year 2030. From this, GHG impacts and economic impacts are calculated using GHG intensity values and energy costs.

Actions may have further reaching impacts than the values stated here. Specifically, they demonstrate leadership and therefore may lead to GHG reductions and energy cost savings in the community.

What do the terms and colour coding mean in the action tables?

This section provides details on each action proposed in the Plan. The textbox below explains how the values were calculated and defines each term and colour code used in the action tables.

Table 5, the terms refer to the following:

- Timing: Short Term = 1-3 years, medium Term = 3-5 years, long Term = 5+ years
- Effort = staff time
- Costs = municipal costs
- GHG & economic impacts = GHG emission savings & financial savings in the year 2030
- Adaptation / resilience linkages = capacity for increased efficiency and enhanced outcomes through linkages to climate adaptation / resilience. An example of a high resilience linkage is energy independence and an example of a mild linkage is air quality.

And where there are no numbers, there is colour coding to help communicate expected impacts and implications:

- **Green = high adaptation / resilience linkages, low effort, costs estimated to be $0 - $500.**
- **Blue = medium for all attributes. Costs estimated to be in $500-5,000 range.**
- **Red = no adaptation / resilience linkages, high effort, costs estimated to be $5,000 or more.**

Table 5 – Climate Actions in Detail

Existing Buildings & Infrastructure

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
1.1: Conduct building energy audits	**Short Term**	**n/a**	**n/a**	**High**	**Medium**	**Low**	**FortisBC, FCM, Province of BC**	**Property Maintenance Coordinator, Asset Management & Grants Coordinator**

The Regional District will conduct energy audits of its buildings, beginning with those that consume the most energy and have the highest emissions. As the audits are completed, the Regional District will then prioritize improvements based on audit results.

The Regional District may choose to prioritize projects based on energy cost savings to reduce annual costs or GHG emissions savings to help meet GHG reduction targets. The former is most likely to come from reduced electricity consumption whereas the latter is most likely to come from reduced natural gas and propane consumption.

Enhanced understanding of which buildings to prioritize for energy audits can be enabled by:

- The use of Energy Management Information System software to track energy consumption and further criteria, such as energy use intensity (EUI) per building, identify anomalies in energy use, as well as track progress after energy conservation measures or retrofits.
- Participation in benchmarking programs (e.g. Building Benchmarking BC), to compare your buildings against similar buildings throughout the Province and identify those that perform lower than average for further assessment.

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
1.2: Implement energy retrofits recommended by building energy audits	**Short Term**	**1.8 tCO_2e**	**$10.4k**	**High**	**High**	**High**	**FortisBC, FCM, BC Hydro**	**Property Maintenance Coordinator**
Upon completion of action 1.1, energy retrofits recommended by the energy audit reports should be implemented. A prioritization process will identify which projects to be completed first, based on energy cost savings or GHG emissions savings. Typically, energy retrofits that reduce electricity consumption will result in energy cost savings and energy retrofits that reduce natural gas and propane consumption will result in GHG emissions savings. A project prioritization matrix can be found in Appendix G.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
1.3: Conduct energy-focused operational review of infrastructure	**Medium Term**	**n/a**	**n/a**	**High**	**Medium**	**Low**	**FCM/UBCM Asset Management**	**Operations Manager**
The Regional District will conduct an energy-focused operational review of its infrastructure, which includes drinking, storm and waste water systems. It may be possible to identify areas of energy efficiency improvements, which would be planned and implemented after the review.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
1.4: Implement measures from operational review of infrastructure	**Medium Term**	**0.5 tCO_2e**	**$6.7k**	**High**	**High**	**Medium**	**BC Hydro, FCM**	**Operations Manager**
The energy-focused operational review of infrastructure (specifically water) will have identified areas of potential energy savings in the form of electricity. Due to the relatively high cost of electricity (compared with natural gas), there is the potential for significant energy cost savings.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
1.5: Incorporate energy management into annual building maintenance procedures	**Short Term**	**0.4 CO_2e**	**$2.5k**	**Medium**	**Low**	**Low**	**n/a**	**Property Maintenance Coordinator**

Annual maintenance and safety inspections provide a convenient opportunity to incorporate energy management objectives. Specific actions include:

- Check programming of thermostats and lighting controls
- Check and replace weather stripping on doors and windows as necessary
- Monitor energy consumption to identify abnormal energy use. Consider use of Energy Management Information System software to automatically generate regular (e.g. monthly) reports and identify anomalies in energy use.
- Assess condition and maintenance dates of HVAC and hot water equipment

Two sample checklists are provided in Appendix H.

New Buildings and Infrastructure

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
2.1 Commit to building energy efficient facilities (including mandatory Step Code implementation)	**Short Term**	**0.4 tCO_2e**	**$2.4k**	**High**	**Low**	**Medium**	**FCM**	**All**

The Regional District should commit to build new buildings that are energy efficient and have low GHG emissions. Appendix J contains "Guiding Principles for Climate Ready Municipal Buildings." The benefits of doing so are:

- Reducing risk by ensuring that the Regional District owns assets that are "future proofed," i.e. that will have low energy costs, low GHG emissions (and hence low carbon tax payments / low offset requirements), and will be resilient to a changing climate (e.g. hotter and smokier summers).
- Reducing the need for buildings to be retrofit later.
- Ensuring that the Regional District owns and operates high quality, low maintenance assets.
- Leading by example in the community on energy efficient building practices and ensuring that energy efficient best practices are disseminated throughout the community.

The proposed new West Coast airport terminal is an opportunity to build a net-zero Regional District facility.

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
2.2 Commit to building energy efficient infrastructure (e.g. updating subdivision servicing bylaw)	**Short Term**	**0.2 tCO_2e**	**$1.0k**	**High**	**Low**	**Medium**	**n/a**	**General Manager of Community Services**

The Regional District should commit to building the most energy efficient and low emission infrastructure that it reasonably can. There are multiple benefits to doing this:

- Reducing risk by ensuring that the Regional District owns assets that are "future proofed," i.e. that will have low energy costs, low GHG emissions (and hence low carbon tax payments / low offset requirements), and will be resilient to a changing climate (e.g., hotter and smokier summers).
- Reducing the need for infrastructure to be retrofitted later.
- Ensuring that the Regional District owns and operates high quality, low maintenance assets.
- Leading by example in the community by demonstrating best practices.

Appendix J contains a sample policy for "Climate Ready Infrastructure."

Action	Timing	GHG Impacts	Economic Impacts	Adaptation/ Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
2.3: Commit to optimizing siting and orientation of new buildings	**Short Term**	**0.5 tCO_2e**	**$2.8k**	**High**	**Low**	**Low**	**n/a**	**All, Project Manager**

The Regional District will commit to optimizing the siting and orientation of new buildings where possible. This includes optimizing orientation to benefit from passive solar gain and siting a building adjacent to a waste heat source to allow heat recovery (if available). This action has the following benefits:

- Reducing risk by ensuring that the Regional District owns assets that are "future proofed." i.e. that will have low energy costs, low GHG emissions (and hence low carbon tax payments / low offset requirements), and will be resilient to a changing climate (e.g. hotter and smokier summers).
- Reducing the need for buildings to be retrofitted later.
- Ensuring that the Regional District owns and operates high quality, low maintenance assets.
- Leading by example in the community on building best practices.

Many of these benefits are similar to 2.1 but can in some cases be realised for a lower cost and effort. For example, proper orientation of a building can increase passive heat gain at cooler times of the year, while installing passive solar design features will also reduce summer heat gain.

Renewable Energy

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
3.1: Install electric air source heat pumps	**Short Term**	**0.4 tCO_2e**	**$6.2k**	**High**	**Medium**	**High**	**BC Hydro, FCM**	**Property Maintenance Coordinator**

Building energy audits as described in action 1.1 may identify opportunities to retrofit low-carbon heating systems such as electric air source heat pumps. Similarly, electric air source heat pumps should be considered for all new corporate buildings. This action will lead to GHG emissions savings when switching from fossil fuel heating, such as natural gas and propane, to air-source heat pumps and cost savings when switching from electric heating to air-source heat pumps.

This action will tie-in with asset management and building maintenance/inspection programs at the Regional District.

ACRD facilities to consider for this action include Beaver Creek Fire Hall, East Bamfield Fire Hall, Grappler Road Pumphouse, Administration office, Harold Bishop Fire Hall, and other facilities with high energy demands.

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
3.2: Install solar PV	**Long Term**	**0.8 tCO_2e**	**$11.5k**	**High**	**Medium**	**High**	**FCM**	**Community Services (Parks, Operations, Airport, Landfill)**

The Regional District will consider the potential for solar PV installation on all new corporate buildings and look for potential existing buildings. Solar PV is often more cost effective when installed on new buildings or when roof replacement is necessary on an existing building, as is on the Beaver Creek Fire Hall. This action has the following benefits:

- Reducing risk by ensuring that the Regional District owns assets that are "future proofed." i.e. will be resilient to a changing climate (e.g. hotter and smokier summers) and pairing battery storage with solar PV will also increase resiliency in the event of a power outage.
- Reducing the need for buildings to be retrofitted later.
- Ensuring that the Regional District owns and operates high quality, low maintenance assets.
- Leading by example in the community on building best practices.

At minimum, when a building is re-roofed, it should be made solar-ready. This is low cost but can significantly reduce the cost of a solar installation.

Transportation

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
4.1: Right-size vehicles for assigned tasks	**Short Term**	**1.2 tCO_2e**	**$0.6k**	**Low**	**Low**	**Low**	**FCM**	**All**
A municipal fleet contains a wide array of vehicle types and sizes. Vehicle fuel economy (litres/100km) varies widely between vehicle types. An appropriately sized vehicle should be used for each task to reduce fuel consumption. The Regional District should create a vehicle use policy and institutionalise it.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
4.2: Develop a low carbon vehicle purchasing policy	**Short Term**	**1.6 tCO_2e**	**$0.8k**	**Low**	**Low**	**Low**	**n/a**	**Sustainability Planner, Finance Dept**
A vehicle purchasing policy should be created and implemented. The policy should ensure that new vehicles are evaluated based on: • Anticipated usage of vehicles (e.g. engine size, vehicle weight, load capacity, passenger capacity, and routes / operational terrain) • Life cycle considerations (e.g. life cycle emissions, residual costs / values of vehicle being replaced, capital costs, maintenance costs, fuel costs including fuel being used, resale values) The objective is to ensure that all vehicles have the lowest GHGs / are the most energy efficient, that still meet minimum service requirements with some contingency. Zero / low carbon vehicles would be considered as part of this. A template is provided in Appendix J.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
4.3: Invest in EVs and EV Charging Stations (where available and practical)	**Short Term**	**8.0 tCO_2e**	**$9.0k**	**Low**	**Medium**	**High**	**CEA,FCM, FortisBC, Go Electric Fleets**	**Finance, Sustainability Planner**
When light-duty vehicles are due for replacement, the Regional District will consider purchasing an EV rather than a traditional ICE vehicle. The Regional District will consider the full life-cycle costs including fuel and maintenance when comparing the two vehicle types for purchase. The Regional District will install EV charging stations as recommended in the Leading Ahead Fleet Charging Analysis. The Regional District will report and sell Low Carbon Fuel Standard (LCFS) credits earned from EV charging.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
4.4: Assess renewable fuels for corporate fleet	**Long Term**	**n/a**	**n/a**	**Low**	**Medium**	**Medium**	**FCM**	**Finance, Corporate Services, Procurement Coordinator**
The Regional District will assess the potential of renewable fuels such as biodiesel and ethanol for its corporate fleet. The Regional District will request a quote for renewable fuels when tendering for fuel contracts annually.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
4.5: Fuel efficient driver training & anti-idling policy	**Short Term**	**1.6 tCO_2e**	**$0.8k**	**Low**	**Low**	**Low**	**n/a**	**Corporate Services**
The most cost-effective way to reduce fleet emissions is through operator behaviour. The costs to implement an efficient vehicle use program will likely be more than offset by the direct savings on fuel purchases. The Regional District will include this action as part of yearly training, or staff training plans. It will be included as part of new employee training. Training will be tracked in the employee's personal folder. The Regional District could monitor the effectiveness of the training by tracking fuel efficiency for each vehicle; this can be done by tracking kilometers travelled and litres of fuel consumed. An anti-idling policy will continue to be implemented by the Regional District.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
4.6: Energy-focused fleet maintenance	**Short Term**	**0.6 tCO_2e**	**$0.3k**	**Low**	**Low**	**Low**	**n/a**	**All**
Routine checks of vehicle systems (e.g. tire pressures, engine tuning), is a very low cost way to improve on emissions and reduce costs. This could be combined with regular safety inspections of vehicles (e.g. brakes).								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
4.7: Implement an employee Transportation Demand Management program	**Medium Term**	**n/a**	**n/a**	**Low**	**Low**	**Low**	**n/a**	**Green Team**
This action encourages staff to reduce single occupancy vehicle commuting and work-related travel by promoting walking, cycling, and carpooling, and providing workplace amenities (i.e. bike storage, showers) and supports (i.e. emergency ride home program). Furthermore, travel needs can be reduced through attending off-site meetings virtually.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation/ Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
4.8 Include emission targets in contracted services requirements	**Short Term**	**n/a**	**n/a**	**Low**	**Low**	**n/a**	**n/a**	**Procurement Coordinator, Community Services**
Include emission targets and/or low-carbon fuel requirements for contracted services, such as waste collection. Require contractors to provide fuel consumption data to help the Regional District track emissions and monitor process; example contract language for this requirement is provided in Appendix I.								

Enabling Actions and Corporate Leadership

Action	Timing	GHG Impacts	Economic Impacts	Adaptation/ Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.1: Have dedicated staff person or department for plan implementation	**Completed**	**n/a**	**n/a**	**High**	**Medium**	**Medium**	**n/a**	**Sustainability Planner, Corporate Services**
A Corporate Energy and Emissions Plan details actions that can be taken to reduce energy and emissions. The plan itself does not result in savings - it is the implementation of the actions listed in the plan that does. Limited staff capacity can be a barrier to successful implementation of the plan. Having a dedicated staff person or department is critical for successful plan implementation.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation/ Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.2: Hire a staff member focused on climate action	**Completed**	**n/a**	**n/a**	**High**	**Medium**	**High**	**n/a**	**Finance, Leadership Team**
A staff member in this position will be responsible for overseeing the implementation of this Plan, as well as other GHG reduction initiatives and special projects.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.3: Allocate funds for plan implementation	**Short Term**	**n/a**	**n/a**	**High**	**Low**	**Low**	**n/a**	**ACRD Board**
There are a variety of mechanisms through which funds could be allocated to corporate climate action. LGCAP funds are one example. A revolving fund can be created whereby cost savings resulting from energy savings from project implementation go back into the climate action fund. Another option is an annual allocation of funds from the budget.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.4: Develop KPIs, monitor and track for progress	**Short Term**	**n/a**	**n/a**	**High**	**Low**	**Low**	**n/a**	**Departmental General Managers**
It is important to track energy consumption, energy expenditure and GHG emissions year over year to evaluate overall progress. However, some secondary indicators may also be helpful to monitor progress. A full list of primary and secondary performance indicators is provided in Table 4.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.5: Manage waste creation & water consumption	**Medium Term**	**n/a**	**n/a**	**High**	**Medium**	**Low**	**n/a**	**All**

Actions should be taken to reduce waste creation and water consumption at the corporate level. Demonstrating leadership at the corporate level may help to guide reductions at the community level. Examples include:

- Zero-waste target for corporate operations
- Best practices in water efficient landscaping
- Policies that discourage printing
- Planning purchases to minimize deliveries
- Implementing a Green Purchasing Policy – an example policy is included in Appendix J.

Reduction in water consumption and waste creation will have minimal impact on corporate GHGs and energy expenditures but will reduce upstream emissions and other environmental impacts.

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.6: Join Partners for Climate Protection (PCP)	**Short Term**	**n/a**	**n/a**	**Low**	**Low**	**Low**	**CEA, FCM**	**ACRD Board**

PCP is a network of Canadian municipal governments that have committed to reducing GHGs and to acting on climate change. The program empowers municipalities to take action against climate change through a five-milestone process that guides members in creating GHG inventories, setting GHG reduction targets, developing local action plans, implementing actions to reduce emissions, and monitoring and reporting on results. It is free to join.

The Regional District should join this and start working through the milestones. This Plan will be sufficient for corporate milestones #1-3; however achieving milestone #2 will be a decision of the Board.

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.7: Examine local carbon offset projects for remaining emissions (or consider offset purchase)	**Medium Term**	**n/a**	**n/a**	**High**	**Medium/High**	**Medium**	**n/a**	**Finance**

To achieve carbon neutrality, local governments must find a way to make up for, or balance, their ongoing corporate emissions. The Green Communities Carbon Neutral Framework provides guidance on how municipalities can become carbon neutral in their corporate operations. Three options exist:

1. Investing in a Green Communities Committee (GCC) supported project allows local governments to invest locally while also ensuring that projects are credible and result in measurable GHG reductions.
2. Investing in alternate GHG reduction projects within the community that are outside the corporate emissions boundary, but do not fall under the definition of option 1.
3. Purchasing offsets from a credible provider is a simple and cost-effective way for local governments to offset their corporate emissions.

More information about becoming carbon neutral can be found in this report:

https://toolkit.bc.ca/wp-content/uploads/2022/05/BecomingCarbonNeutralGuideV3.pdf

One opportunity in ACRD to offset emissions is through a local reduction project at one or both of the landfills operated by ACRD.

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.8: Annual reporting on GHGs	**Short Term**	**n/a**	**n/a**	**Low**	**Medium**	**Low**	**n/a**	**Finance**

Utilize the new GHG tracking spreadsheet to track annual emissions from buildings, transportation, and contracted services, as already required for LGCAP. Continue to report emissions by ACRD Service to monitor and report on changes in emissions, especially as individual services grow and new services are created.

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.9: Climate action education and awareness for staff and elected officials	**Short Term**	**n/a**	**n/a**	**Low**	**Medium**	**Low**	**n/a**	**Green Team, Sustainability Planner, Asset Management Coordinator**
Invest in education and professional development for all Regional District staff and elected officials around climate change, action, mitigation, and adaptation.								

Action	Timing	GHG Impacts	Economic Impacts	Adaptation / Resilience Linkages	Incremental Effort	Incremental Cost	Possible Partner/ Funder	Staff Responsibility
5.9: Initiate development of a Community Energy & Emissions Plan	**Short Term**	**n/a**	**n/a**	**High**	**Medium**	**High**	**n/a**	**Sustainability Planner**
Develop a plan to reduce emissions in the community. Consider partnering with local governments and First Nations within the Regional District.								

APPENDIX B. CORPORATE IMPLEMENTATION SUPPORT

CEA offers a range of implementation supports that can help Alberni-Clayoquot Regional District complete the actions proposed in this Corporate Energy and Emissions Plan. Current implementation offers include support for transportation, buildings, renewable energy, and staff and elected official education.

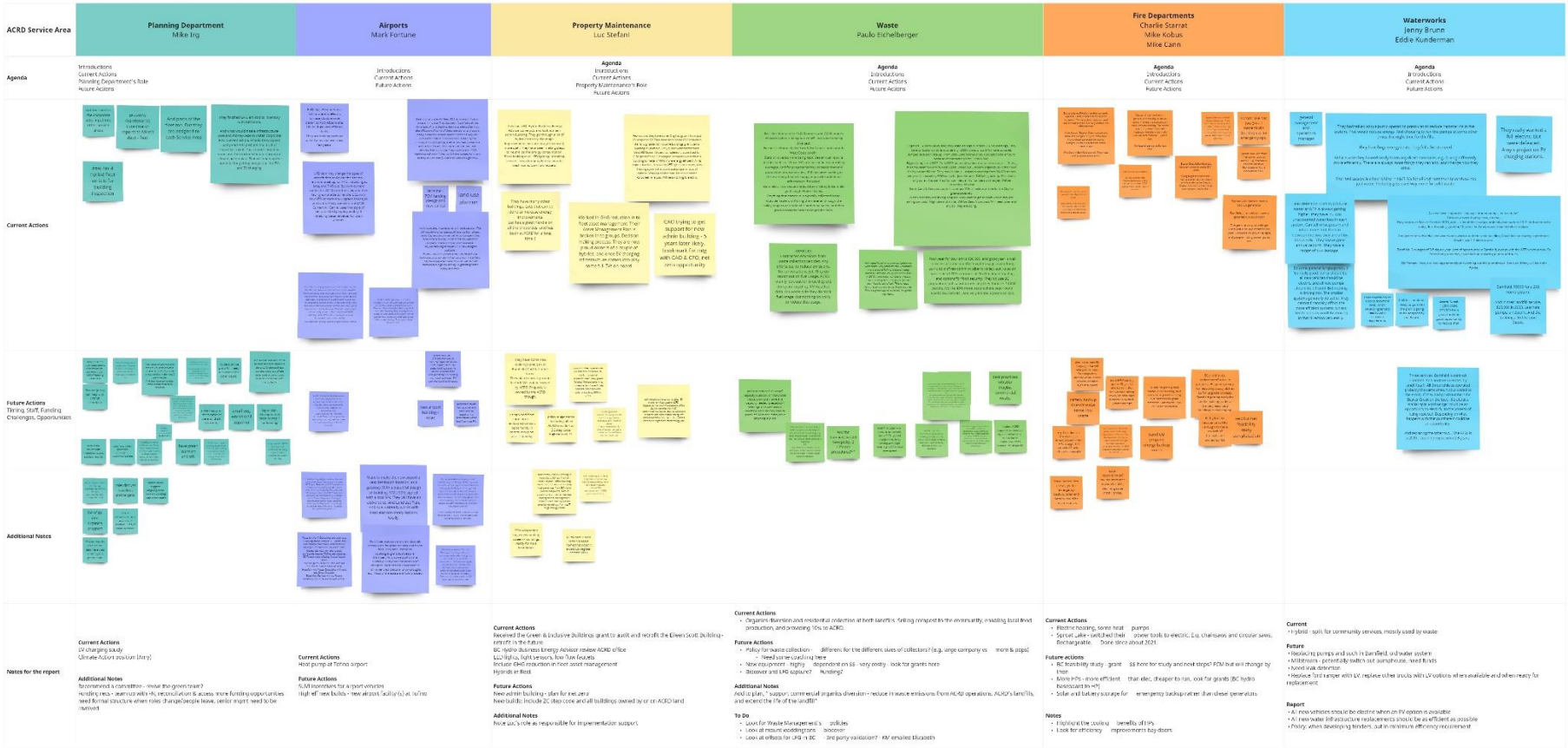
CEA also offers corporate energy management services, to support communities to access programs and incentives for facilities and infrastructure energy assessments; strategic prioritization of projects; and assistance with implementation, such as grant applications and RFP processes. Match funding may be available, please contact CEA for more information.

Table 6 – Corporate Implementation Support

Corporate Energy and Emissions Plan Action(s)	CEA Implementation Support
Existing Buildings	
1.1: Conduct building energy audits	Coordination of audits Incentive application process Project prioritization supports
1.2: Implement energy retrofits recommended by building energy audits	Coordination of detailed studies and implementation incentives Grant writing services Procurement and RFP support
1.5 Incorporate energy management into annual building maintenance procedures	Implementation of Energy Management Information Systems Strategic Energy Management Plans Policy development
Renewable Energy	
3.1: Install electric air source heat pumps	Coordination of detailed studies and implementation incentives

Corporate Energy and Emissions Plan Action(s)	CEA Implementation Support
3.2: Install solar PV on corporate buildings	Renewable energy business case studies (e.g. solar) Grant and incentive applications Procurement and RFP support
Transportation	
4.3: Invest in EVs and EV Charging Stations	E-Mobility Education and Awareness Low-Carbon Fleet Assessments EV Charging Implementation Low Carbon Fuel Standard (LCFS) Credits for EV charging
Enabling Actions and Corporate Leadership	
5.9 Climate action education and awareness for staff and elected officials	Energy efficiency and low carbon technologies education for facilities and fleet staff Climate action education and awareness for staff/elected officials Energy savings campaigns

APPENDIX C. WORKSHOPS SUMMARY



ACTION AREA	ACTIONS

BUILDINGS	• Air Source Heat Pumps
	  • Replace natural gas, propane, and electric baseboards
	  • increased efficiency, lower electricity bills, provide cooling
	• Policy for new builds: zero carbon, high energy efficiency
	  • Explore net zero opportunities (e.g. airport building)
	• Policy for new infrastructure: highly energy efficient (lights, water)

TRANSPORTATION	• Policy for new vehicles: electric when an electric option is available
	  • Upgrades for light duty trucks in various depts (e.g. waterworks)
	  • Upgrades for specialty vehicles (e.g. airport vehicles)

CONTRACTED SERVICES	• Explore contract opportunities with waste collection
	  • E.g. require large contractors to decrease fuel emissions each year
	  • Largest source of emissions

WASTE	• Support commercial organics diversion • Explore biocovers, landfill gas capture • Pending offset opportunities
ORGANIZATIONAL	• Revive the Green Team • Create formal structure so climate planning is embedding in all departments and remains embedded when roles change/people leave
FUNDING	• Pursue FCM, BC Hydro, Fortis BC funding wherever possible • Funding opportunities to be included in the report • Team up with First Nations where possible: reconciliation and greater funding opportunities
KEY TAKEAWAYS	• Support current department goals wherever possible

APPENDIX D. PCP INFORMATION AND INVENTORY

PCP Information

The FCM-ICLEI Partners for Climate Protection (PCP) is a free network of Canadian municipal governments that have committed to reducing GHG emissions and to acting on climate change. Since the program's inception in 1994, over 500 municipalities have joined PCP, making a public commitment to reduce GHG emissions. PCP membership covers all provinces and territories and accounts for more than 70 percent of the Canadian population.

The PCP program is managed and delivered by FCM and ICLEI Canada. They form the PCP Secretariat, which provides administrative and technical support, develops tools and resources, and delivers capacity building activities to support members in reducing local GHG emissions. The Secretariat also provides national recognition for member achievements.

The program empowers municipalities to take action against climate change through a five-milestone process, as shown in Figure 23.

- Alberni-Clayoquot Regional District is currently not a PCP member. This report can be used to gain corporate milestones 1-3, by submitting the inventory, projections, targets, and action plan to PCP.
- For Milestone 4, the Regional District will need to implement actions in this Corporate Plan and submit these reports to FCM-ICLEI.
- For Milestone 5, the Regional District will need to create a document with an updated corporate inventory and recorded impacts of individual actions that have been conducted.

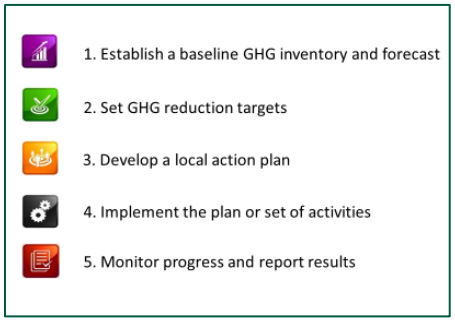


Figure 23 – PCP Program Milestones

Inventory

The following table breaks down the Regional District's GHG emissions by the PCP categories for 2022.

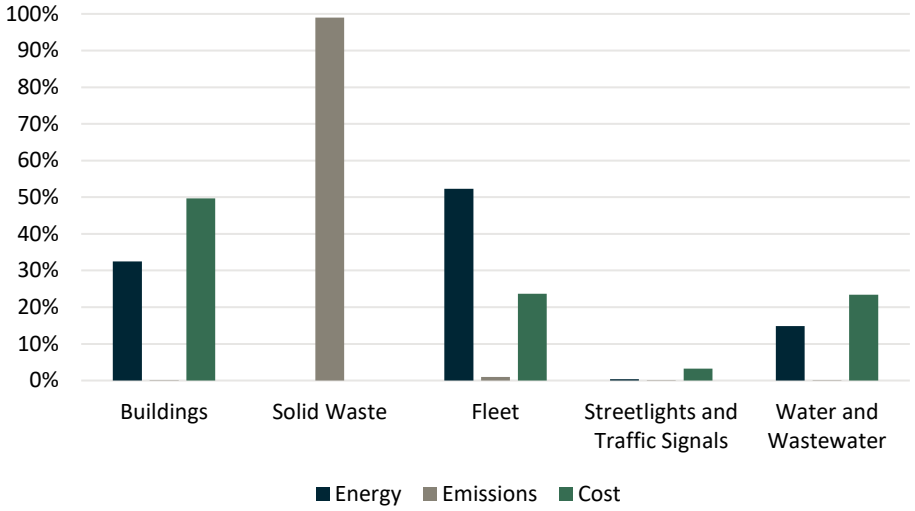
Table 7 – PCP Inventory Emissions, 2022

PCP Category	Emissions (tCO_2e)
Buildings	16
Corporate Solid Waste	30,500
Fleet	289
Streetlights and Traffic Signals	0
Water and Wastewater	4
Total	**30,809**

Figure 24 shows the percentage of energy consumption, GHG emissions, and energy expenditures that can be attributed to each PCP classification and each fuel source. Fleet and buildings are responsible for a large portion of the energy consumptions (85% combined). Half of the energy expenditures belong to buildings; these expenditures are almost entirely due to electricity consumption. Solid waste has no energy or cost associated with it since it uses no fuel source, but it does have GHG emissions associated with it due to decomposition in the landfill and is responsible for nearly all of the Regional District's emissions (99%).

As shown in the second graph, electricity is responsible for nearly three-quarters of expenditures, and electricity and diesel each contribute to 43% of the energy demand.

Figure 24 – *PCP Inventory: Energy, Emissions and Cost by Classification and by Fuel Source, 2022*



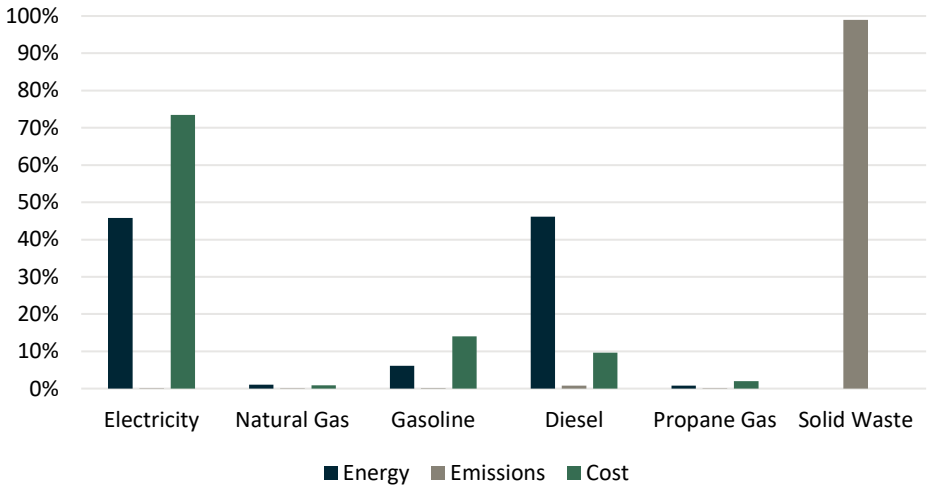
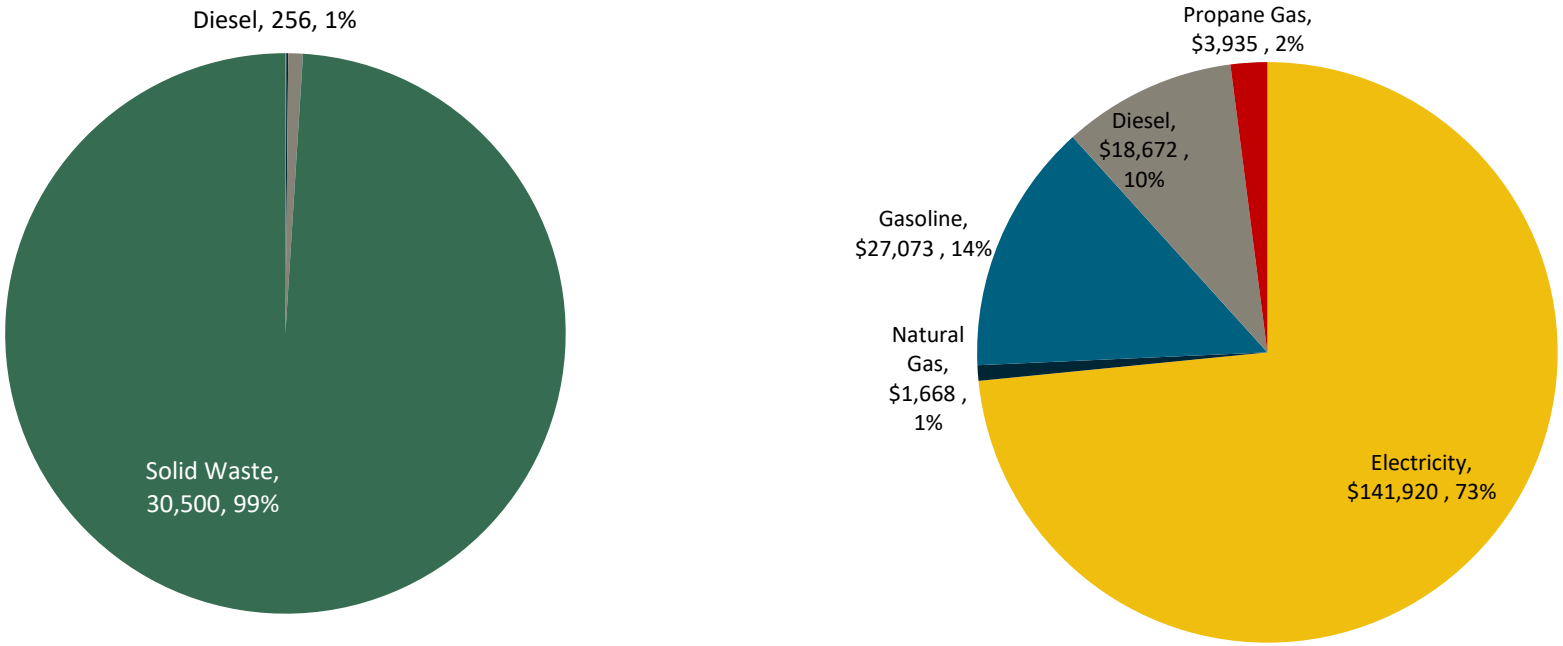


Figure 25 shows the GHG emissions and energy cost by fuel source in 2022. Natural gas, electricity, gasoline, and propane are excluded from the emissions chart as they are responsible for less than 1% of emissions combined.

Figure 25 – PCP Inventory: Emissions (tCO_2e) and Cost by Fuel Source, 2022



APPENDIX E. INVENTORY AND MODELLING ASSUMPTIONS

This appendix contains details on the corporate energy & emissions inventory and projections for the Alberni-Clayoquot Regional District.

Inventories

Building and transportation inventories were created using energy and cost data provided by the Regional District. Based on the data compiled, full inventory years for energy consumption, emissions, and expenditures are 2018-2022.

- 2018 and 2019 fleet data was provided as total cost; energy and emissions were estimated based on average fuel prices.
- All transportation years had some data tracking issues.
- Mileage from staff-owned vehicles used for Regional District operations is not tracked consistently and therefore excluded.
- Emissions and expenditures from contracted services were estimated based on either litres of fuel provided directly from the contractor, the amount spent on fuel and vehicle type, or using a combination of the provincial tool[12] and the total contract amount.

Landfill emissions (PCP inventory only) were sourced from the Alberni Valley Sort 'n Go Centre' and West Coast Landfill annual reports[13]. These emissions are only included in the PCP inventory, not the LGCAP inventory.

Emissions factors for inventory years are shown in Table 8 are sourced from the Province of BC[14]. The electricity emissions factors include net electricty imports[15].

Table 8 – Emissions Factors

GHG/GJ	2018	2019	2020	2021	2022
Electricity	0.003	0.003	0.003	0.003	0.003
Natural gas	0.050	0.050	0.050	0.050	0.050
Gasoline	0.068	0.066	0.064	0.063	0.063
Diesel	0.071	0.070	0.069	0.069	0.069
Propane	0.061	0.061	0.061	0.061	0.061

[12] https://www2.gov.bc.ca/assets/gov/environment/climate-change/lg/lgcap/2023/contracted-services-emissions-calculator.xlsx

[13] https://www.acrd.bc.ca/landfill-annual-reports

[14] https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf

[15] https://www2.gov.bc.ca/gov/content/environment/climate-change/industry/reporting/quantify/electricity

Projections

CEA's Corporate model was used both to calculate the BAU trajectory and to estimate the potential GHG reductions that could be achieved. Developed in 2019, the model builds on the Regional District's inventory data using population and assumptions. The model uses formulas both to calculate the BAU trajectory, and to estimate the impacts of each action.

The BAU trajectory was calculated by using available inventory data, and then projecting forwards using a population increase of 1.22% per year (the average annual increase between 2016 and 2021).

From 2023 onwards, all of the data is an estimate as a BAU projection.

For the BAU projection modelling, the assumption is that energy consumption and emissions will increase proportionally with increases to population, although the impact of policies from higher levels of government are also incorporated, and other assumptions. Only policies that have already been adopted and that will have quantifiable impacts are incorporated. Assumptions are:

- The Province's incremental steps to net zero energy ready buildings by 2032.
- Tailpipe emissions standards.
- Renewable & low carbon transportation fuel standards.
- How the impacts of a changing climate will affect building energy consumption, as outlined below.
    - Climate change data for the region obtained from ClimateData.ca.
    - Projected global emissions to 2030 currently places the world in the range for the IPCC's Fifth Assessment Report's Representative Concentration Pathway (RCP) 6.0 scenario.
    - RCP 6.0 scenario not available on ClimateData.ca, therefore RCP 4.5 (high impact scenario) used as a conservative proxy.
    - Decreases in commercial / institutional natural gas consumption assumed to be proportional to decreases in HDDs and the proportions of natural gas consumed for space heating for the sector, and that proportion obtained from the Navigant 2017 Conservation Potential Review for FortisBC Gas.
    - Decreases in commercial / institutional electricity consumption assumed to be proportional to decreases in HDDs and the proportions of electricity consumed for space heating for the sector. This proportion obtained from the Navigant 2016 Conservation Potential Review for FortisBC Electric.

Annual variability affecting projections

Although CEA's model assumes that projections will be linear, there will be annual variability, primarily due to climatic variations (particularly on building energy consumption). These variations mean that it may often be necessary to collect several years of data before one can see the success or lack thereof in implementation of an action.

Action impacts

To take into account the impact of implementing a climate action plan, the modelling tool estimates the impacts of actions compared to the BAU trajectory. It calculates the individual and combined impact of actions.

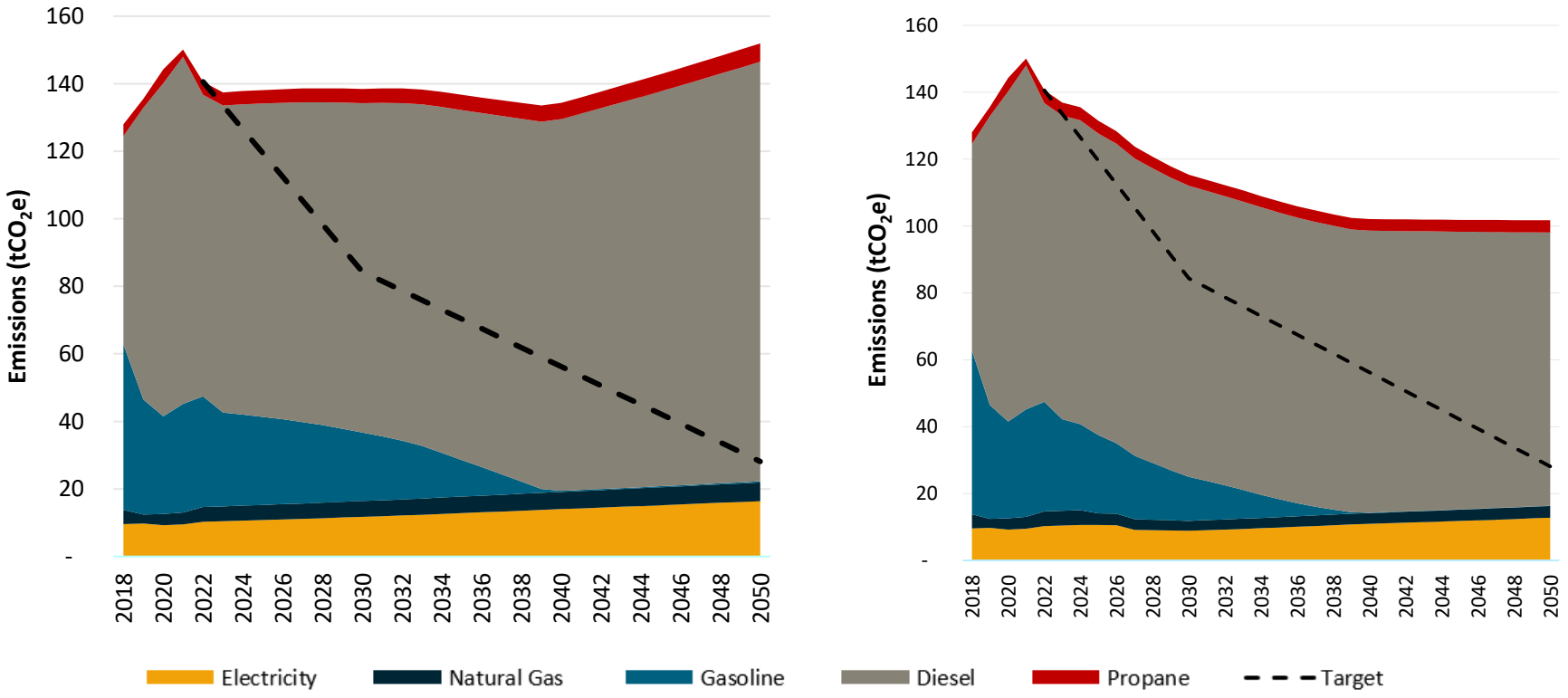
The impacts of individual actions depend on the assumptions made. CEA made educated estimates of the impacts that other actions can have.

Details on the impacts of individual actions on GHG emissions are described in the main body of this report, in Figure 19.

APPENDIX F. ADDITIONAL MODELLING DATA

This section provides the BAU and Plan emissions with contracted services included. The graph on the right shows a majority of the diesel emissions remaining after full implementation, highlighting the limited influence that Alberni-Clayoquot Regional District has on contracted services.

Figure 26 – BAU and Plan Emissions, Contracted Services Included



APPENDIX G. SAMPLE PROJECT SCORING MATRIX

This section provides a sample project scoring matrix that can be used to prioritize funding allocation.

Project #	Date Reviewed

Reviewed By: _____

I. Project Overview	
Project Title	**Analysed By:**
	Name:
	Dept:
Project Lead:	**Supporting Staff (if applicable):**
Name:	**Name(s):**
Dept:	**Dept(s):**

II. Project Metrics		
	Annual Average	**Life of Project**
Emissions Avoided (tCO_2e)		
Financial Savings ($)		
Simple Payback (yrs) after external funds:	**Annual ROI (%) after external funds:**	**Cost per tCO_2e avoided ($):**

Project References / Success Examples:

Category	Point Value	Poor 0.0	Fair 0.25	Acceptable 0.5	Good 0.75	Excellent 1.0	Total
Potential to Reduce GHG Emissions (50)							
Total GHG Reductions per $ (Community funds only, after external funds)	20						
Annual GHG Reductions	10						
Lifespan of Project	10						
Replicability of Project within community	10						
Ease of Implementation / Business Case (30)							
Ease of implementation (staff time)	10						
Business case (simple payback or ROI)	10						
External funding sources likelihood	10						

Other Considerations (20)							
Impacts to Health and Safety	5						
Project Visibility/Innovation	5						
Benefits to Community	5						
Other Resources Conserved	5						
Total Points Available	**100**	**Total Points This Application**					

Other Key Criteria:

- Staff capacity
  - Project leads and project supports should each determine their capacity to take on projects.
  - Limit projects they take on to their capacity.
  - Select most effective projects first, to maximise effectiveness of staff capacity.

- Regional District funds – budgeting
  - Departments should each determine the ability of their funds to pay for projects.
  - Limit projects based on available funds.
  - Select most effective projects first, to maximise effectiveness of departmental funds.

APPENDIX H. SAMPLE BUILDING MAINTENANCE CHECKLISTS

Sample 1

Building System Optimization – Simple Energy Efficiency Retrofit Measures

Space Heating and Cooling

☐ Building envelope sealing – caulk and draught proof around windows and doors, and other gaps on exterior walls.

Lighting, Appliances and Equipment

☐ Replace any remaining incandescent bulbs with LEDs.

☐ Improve safety and energy efficiency by converting Exit signs to LED. For Exit signs use LED products that maintain their brightness.

☐ Put vending machines on a vending miser – a device with a motion sensor so that it only switches on when people are present.

☐ Plug certain appliances into intelligent power bars with master/slave functions or motion sensors. These can be used for TVs, bench tools, compressors, task lighting, auxiliary heating, printers, coffee makers, microwaves, beverage coolers, or similar devices. (Appliances that need a controlled shutdown sequence, e.g. computers or many ink-jet printers, should not be plugged into such a power bar.)

☐ Unplug or remove unused or rarely used equipment (equipment that is not “on” may still use electricity).

Water – hot and cold

☐ Install aerators on taps in bathrooms and kitchens.

☐ Install low flow shower heads.

☐ Install timers, motion detectors, or flushes to save water with urinals.

☐ Install insulation on hot water pipes where accessible.

☐ Insulate domestic hot water tanks installed before 2005 (if they are not due for replacement).

☐ Turn down domestic hot water tank to lowest acceptable setting, e.g. 55°C (131 F).

Occupant engagement

Design and implement behaviour change campaigns. First, assess what the major barriers are to energy saving actions and what would motivate staff to take action (i.e. via a brief survey or focus group with staff). Next, support staff to reduce these barriers and encourage specific behaviours.

☐ Dedicate a staff member on energy efficiency for each building, tasked with ensuring lights and equipment are off at the end of each day, and thermostats are correctly set.

Reminders and prompts, located near the site of the desired behaviour can be effective, e.g.:

- ☐ Reminder stickers on or beside light switches with a message to switch off lights.
- ☐ Remind people to switch off equipment when not in use, including computers, monitors, printers, and photocopiers (via small stickers directly on or beside switches). Speak with IT staff about having default settings outside of office hours.

☐ Encourage staff to use extra layers, blankets, or seat heaters in winter to avoid the use of space heaters.

☐ Where there are programmable thermostats, explain how to use these without permanently overriding the settings (install lockable boxes around them if necessary).

☐ Encourage people to use window blinds to save energy and increase comfort i.e. blocking sunlight in summer to decease cooling needs, or for added insulation in winter.

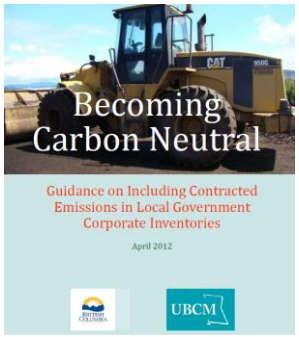
☐ Encourage employees to participate in residential energy efficiency programs. If energy efficiency practices are adopted at home, they are more likely to be adopted in the workplace.

Sample 2

MONITORING	
Each billing period	Ensure the energy consumption for bills of each facility is monitored by the local government as each bill arrives (recording of energy consumption needs to be conducted for the Local Government Climate Action Program public reporting anyway). Monitor the consumption for any obvious changes, comparing it especially with billing periods with similar weather, e.g. the same billing period in previous years. Large changes in consumption should be investigated as well as the appearance of any special charges, e.g. demand charges or power factor charges.
SPACE HEATING / COOLING	
Monthly	Check settings of Building Automation Systems / thermostats.
Monthly	Inspect, clean, and change HVAC air filters (according to equipment specifications).
Twice a year	Ensure building temperatures are adequate for building occupants.
Annually	Check weather stripping and caulking around doors and windows. Fix any problems.
Annually	Check HVAC equipment for any obvious signs of problems, e.g. vents/blowers not operating correctly.
Annually	Clean evaporator and condenser air conditioning coils – dirty coils can increase energy costs and reduce equipment life.
Annually	Check air conditioner refrigerant levels – too much or too little refrigerant can increase energy costs and reduce equipment life.
LIGHTING, APPLIANCES, EQUIPMENT	
Twice a year	Ensure lights are still working. Ensure no incandescent lightbulbs are installed.
Twice a year	Ensure light sensors are working correctly, e.g. motion sensors for interior lights, and photosensors for exterior lights.
Twice a year	Ensure intelligent power bars and vending misers, where they are being used, are working correctly.
WATER – HOT & COLD	
Annually	Ensure low flow devices working correctly, e.g. timers for urinals.
Annually	Check hot water temperature. If water is too hot or cold, adjust the tank's settings.

OCCUPANT ENGAGEMENT	
Monthly	Check-in with dedicated staff member on energy efficiency for that building.
Twice a year	Ensure signs to encourage energy efficient behaviour (like switching off lights) are still in place.
Twice a year	Ensure posters and digital reminders are encouraging occupant participation in residential energy efficiency programs are still in the facility and current. (If energy efficient practices are adopted at home, they are more likely to be adopted by occupants in the workplace.)
SKILLS	
Annually, or every 2 years	Consider going on an energy efficiency course or sending a member of staff on one. Training and workshops may be available through FortisBC or through professional associations.
SERVICE CONTRACTS	
At contract renewal	Ensure service contracts (where applicable) support energy efficient operations. Energy efficiency can be written into contract terms during renewal.

APPENDIX I. SERVICE CONTRACT LANGUAGE



As part of LGCAP reporting, local governments are required to include emissions from contracted services. The contract language below can help local governments collect the necessary fuel data from contractors.

Source: *Becoming Carbon Neutral: Guidance on Including Contracted Emissions in Local Government Corporate Inventories, April 2012* found at www.toolkit.bc.ca

Sample Contract Language:

Fuel Consumption Data

Requirement for Fuel Consumption Data Provision

Commencing on [start date] the [name of local government] will require [name of contractor] to communicate the quantity of fuel used to operate vehicles, equipment and machinery as part of the delivery of the services described in this contract on a [frequency of reporting] basis. Fuel consumption associated with the provision of these services must be provided to the [name of local government] within thirty (30) days of the following dates: [dates on which fuel consumption data will be required by the local government].

Data provided should include the following information:

- Number of vehicles, by vehicle class, used to deliver the contracted service (heavy duty, light duty, off road);
- Type of fuel consumed by each vehicle class (e.g. diesel/gasoline/natural gas/ethanol blend/biodiesel blend); and
- Litres of fossil fuels consumed in relation to the service delivered under the contract in each vehicle class, up to the dates specified above.

APPENDIX J. SAMPLE POLICIES

See next page.

ALBERNI-CLAYOQUOT REGIONAL DISTRICT

Title:	Green Fleet Policy Template	
Departments:		
ACRD Board Policy ☐	Date Adopted:	
Administrative Policy ☐	Effective Date:	

PURPOSE:

1. To formalize and clarify fleet replacement policies and practices and to support climate action policies to reduce GHG emissions and related pollutants by acquiring the most appropriate vehicle and equipment, minimizing fuel consumption, improving driver satisfaction and equipment life and reducing operating costs.

SCOPE:

2. The Local Government shall utilize a green vehicle purchasing strategy in the replacement of vehicles.
3. The Local Government utilizes a fleet of vehicles to support both general operations and service delivery.
4. The Local Government will ensure that vehicles under its control are acquired, assigned, utilized, replaced and maintained in the most efficient and effective manner possible.

POLICY:

5. RESOLUTION: THAT the Green Fleet Policy for the replacement and maintenance vehicles utilized by the Local Government be adopted.

6. GREEN FLEET VEHICLE POLICY: As per the Local Government's goal to achieve carbon neutrality in part by reducing corporate greenhouse gas emissions from fleet vehicles, the Local Government is committed to:
   - Reducing GHG emissions;
   - Reducing emissions of other pollutants;
   - Reducing vehicle idling;
   - Reducing single occupancy trips;
   - Purchasing more efficient vehicles and fuels;
   - Right-sizing vehicles;
   - Considering life cycle costs of fleet vehicle operations when purchasing vehicles;
   - Maximizing vehicle efficiency.

SAMPLE

7. DEFINITIONS

a. Local Government vehicle - means any licensed motor vehicle owned, rented, borrowed, or leased by the Local Government and used primarily to transport people or property over roads, highways or Local Government property. Rental vehicles are considered Local Government vehicles when rented by a duly authorized employee and while used for official Local Government business.

b. Operator - means any authorized Local Government employee, or other individual approved by the Chief Administrative Officer (CAO), who is in control of a Local Government vehicle and who possesses a valid driver's license for the type of vehicle operated.

c. Fleet manager - means the individual designated by the CAO to manage the Local Government vehicles.

d. Specialty use vehicle - means Local Government fleet vehicles especially equipped for specific function or purpose.

8. RESPONSIBILITY FOR IMPLEMENTATION: There will be one fleet manager, appointed by the CAO, who will be responsible for overall fleet management. They will work with department managers to meet their department's fleet vehicle needs within approved financial plans.

SAMPLE

PROCEDURES:

9. Vehicle Attributes: Local Government vehicles shall have the following minimum attributes:

- Be right-sized for its intended purpose(s).
- The ability to safely and securely haul materials and equipment required for intended purpose.
- Air conditioning and all wheel drive/four wheel drive features.
- Acceptable fuel mileage for the anticipated use. The use of electric vehicles, plug-in hybrids, hybrids, vehicles that use other zero / low GHG fuels, and fuel efficient vehicles, with the intent of reducing the Local Government's carbon footprint, are required wherever operational requirements allow.
- Acceptable crash/safety ratings.

10. Right-Sizing Purchasing: Local Government vehicles should be purchased according to the average or usual anticipated use of the vehicle. Occasional vehicle needs that exceed the capacity of the vehicle purchased should be met through vehicle sharing or renting. The following use requirements should be considered when purchasing a vehicle:

- Engine size;
- Vehicle weight;
- Average carrying capacity;
- Average passenger capacity;
- Average terrain.

11. Life Cycle Cost: Life cycle costs should be considered for all vehicle purchases. Life cycle costs should include: capital costs, maintenance costs, fuel costs and resale costs.

12. Fuel Choice: The lowest GHG emission fuel possible should be purchased for all vehicles in the fleet. Consideration of fuels should include:

- Purchasing vehicles that run on zero / low GHG fuels, e.g. electricity, hydrogen, biodiesel, bioethanol, natural gas. The focus should be on electric, plug-in hybrid, and hydrogen vehicles.
- Purchasing low emission fuel for fleet vehicles that cannot be electric or plug-in electric (i.e. renewable natural gas, gasoline with a high percentage of bioethanol and diesel with a high percentage of biodiesel);
- Purchasing vehicles with an acceptable fuel consumption mileage for the anticipated use. The use of electric vehicles, hybrids and fuel efficient vehicles, with the intent of reducing the Local Government's carbon footprint, is required wherever operational requirements allow.

13. Operating: Fleet vehicles shall be operated with the following considerations:

- Idling shall be reduced among all fleet vehicles and the following guidelines shall be followed by all fleet vehicle operators:
  - Reduce warm-up idling (no more than 30 seconds as long as windows are clear);
  - Vehicles are to be turned off when stopped for more than 10 seconds except in the following circumstances: in traffic; in the course of performing a specific duty that requires the vehicle be left running; if the outside temperature is below -10°C; or if doing so would compromise human safety or the mechanical integrity of the vehicle.
- Vehicle sharing shall be encouraged. Single occupancy vehicle trips will be minimized. Vehicles should be shared between departments to ensure maximum efficiency for vehicle use.
  - Driver education and driving procedures to increase the efficiency of vehicle operations, including anti-idling, should be included in driver training programs for Local Government staff.

SAMPLE

14. Vehicle Maintenance and Monitoring: Fleet vehicles shall be operated with the following considerations:

- All Local Government vehicles shall be kept in good mechanical condition and shall be inspected at required intervals.
- Maintenance on fleet vehicles should continue to ensure that preventative maintenance continues to maximize the efficiency of all vehicle operations.
- All vehicles shall be monitored to track fuel consumption, fuel costs, mileage and maintenance costs.

15. Vehicle Replacement and Acquisition:

- In general Local Government vehicles will be considered for replacement when they have at least 5 years of service and 150,000 kilometres. Vehicles may be retained beyond this point if they are in good working order and are meeting the needs of the Local Government. Alternatively, vehicles that have excessive maintenance, carbon emissions, other air pollutant emissions, or operating costs may be replaced sooner.
- All vehicle replacements are to be identified in the approved Financial Plan.
- All Local Government vehicles shall be purchased in accordance with the Local Government purchasing policy.
- All vehicles shall be acquired in a manner consistent with budgetary intent.

16. Consider joining programs to assist with reducing fleet GHG emissions

SAMPLE

ALBERNI-CLAYOQUOT REGIONAL DISTRICT

Title:	**Green Purchasing Policy Template**	
Departments:		
ACRD Board Policy ☐	**Date Adopted:**	
Administrative Policy ☐	**Effective Date:**	

PURPOSE:

1. To support Local Government corporate initiatives with respect to sustainability and environmental stewardship, including the Local Government's corporate GHG reduction targets.

SCOPE:

2. The Green Purchasing Policy requires that energy considerations and life cycle costing inform product selection and purchasing decisions and encourages green procurement. Products are chosen based on best overall value, not just the lowest price.

POLICY:

3. RESOLUTION**:** THAT the Green Purchasing Policy to require energy considerations of product selection, life cycle costing in operational decision making and encourage green procurement be adopted.

4. GREEN PURCHASING POLICY

   a) The Local Government will buy in the open market and will seek the best value and service for its purchasing dollars. The placement of orders and awarding of contracts will be based on best value to the Local Government.

   b) Purchasing decisions are to be based on the life cycle cost of the acquisition rather than just the initial purchase price. Life cycle costs include operation, repair, staff, and disposition costs as well as the invoice price.

   c) In order to minimize the Local Government's environmental impact and carbon footprint, staff will review their requirements to ensure that specifications are amended to provide for use of goods and services with lower environmental impact and specifically to follow the steps to sustainable purchasing, life cycle costing and energy efficient equipment purchasing.

SAMPLE

PROCEDURES:

5. STEPS TO SUSTAINABLE PURCHASING

In considering future purchases, the Local Government will follow the steps to sustainable purchasing in product selection and decision-making:

a) Rethink purchase – is it necessary?

b) Rent, lease or buy it second hand.

c) Choose a durable or longer-life product and compare cost to disposable product.

d) Choose products or services designed to address specific environmental or social concerns.

e) Choose suppliers committed to sustainability.

f) Calculate the total cost (i.e., storage, maintenance, need to buy additional equipment, energy use, waste disposal, administration).

g) Reduce the transportation impacts.

h) Choose products with minimal packaging and a minimal post-consumer footprint.

6. LIFE CYCLE COSTING PURCHASING

In considering future purchases, the Local Government will undertake life-cycle costing in determining the full cost of a product or service. Steps in life cycle costing include:

a) Compare the costs of different products and different purchasing choices.

b) List and compare the accessory activities and costs associated with owning a particular product, such as: storage, maintenance, accessory equipment, operating costs, energy and water use, environmental hazards, waste disposal, training and administration.

c) Purchase based on total costs. Total cost = acquisition + use + disposal and post-disposal costs.

7. ENERGY EFFICIENT EQUIPMENT PURCHASING

The Local Government shall purchase energy efficient equipment, supplies and appliances whenever possible. This requires that product specifications be compliant with ENERGY STAR® guidelines and recommendations and/or Natural Resources Canada guidelines and recommendations.

Energy efficient equipment includes but is not limited to: appliances, HVAC equipment, electric motors, office equipment, lighting and signage, transformers, consumer electronics, vending machines, etc.

SAMPLE

The Local Government purchase of energy efficient equipment has the following potential benefits:

- Reduced energy costs and electricity demand;
- Reduced impact on the environment;
- Reduced life cycle cost;
- Extended life and reduced operation and maintenance costs; and
- Manufacturer, government or utility company purchase incentives.

SAMPLE

ALBERNI-CLAYOQUOT REGIONAL DISTRICT

Title:	**Green Event Policy Template**	
Departments:		
ACRD Board Policy ☐	**Date Adopted:**	
Administrative Policy ☐	**Effective Date:**	

PURPOSE:

1. To support climate action policies to reduce GHG emissions, waste, and other environmental impacts by reducing the impacts of Local Government hosted events.

SCOPE:

2. The Green Event Policy requires that GHG emissions and environmental considerations inform how events are conducted, not just the lowest price.

POLICY:

3. RESOLUTION: THAT the Green Event Policy to reduce the environmental impact of events hosted by the Local Government be adopted.
4. GREEN EVENT POLICY: The following are discouraged and encouraged:

Discouraged	Encouraged
Disposable items, including plates, cutlery, cups, single-use water bottles	Reusable dinnerware, and water jugs of local tap water with glasses
Disposable give-away items / prizes	Service-based prizes
Bleached paper napkins	Paper napkins with recycled content
Single-use condiment packets	Reusable containers/squeeze bottles
Garbage-only receptacles	Labeled garbage, recycling, compost receptacles
Food and drink with non-recyclable packaging	Minimal packaging or recyclable packaging
Disposable shipping boxes	Reusable shipping containers
Cellophane wrap and polystyrene	Reusable serving trays/platters
Disposed extra food	Composted or donated
Imported produce	Seasonal, regional produce (where available)
Non-edible garnishes	No garnishes or edible garnishes

Guidelines are meant as guidelines only and all applicable food, health and safety regulations must be met.

SAMPLE

ALBERNI-CLAYOQUOT REGIONAL DISTRICT

Title:	**Guiding Principles for Climate Ready Municipal Buildings**	
Departments:		
ACRD Board Policy ☐	**Date Adopted:**	
Administrative Policy ☐	**Effective Date:**	

SAMPLE

PURPOSE:

1. To ensure that all new Local Government buildings are built to have as low GHG emissions as possible, and are built to be resilient to forthcoming climatic changes. Also to ensure that all existing Local Government buildings have their GHG emissions reduced on an ongoing basis, and are able to be resilient to forthcoming climatic changes.

SCOPE:

2. The Local Government is committed to corporate and community energy and GHG reductions, and to being resilient to climatic changes. Therefore it will establish a procedure to build and operate all Local Government buildings with the lowest GHG emissions possible, and ensure that they will be able to continue to operate effectively when considering predictions of coming climatic changes that will likely take place over their lifespan.

POLICY:

3. RESOLUTION**:** THAT the Policy on Guiding Principles for Climate Ready Municipal Buildings, to evaluate GHG emission reduction and climate adaptation potential in Municipal buildings, be adopted.

4. GUIDING PRINCIPLES FOR CLIMATE READY MUNICIPAL BUILDINGS POLICY:

New Civic Buildings:

a) Aim to construct carbon neutral corporate buildings, e.g. by following Canada Green Building Council's Zero Carbon Building Standard[16].

b) Incorporate high performance attributes into new civic buildings so that they meet the highest level of the BC Energy Step Code and strongest requirements of the Zero Carbon Step Code for its building type. If the building type is not included in the Energy Step Code, choose the appropriate alternative energy standard:

[16] https://www.cagbc.org/our-work/certification/zero-carbon-building-standard/

- Meeting or exceeding ASHRAE 90.1-2022 (for all other building types)
- National Energy Code for Buildings (NECB) 2020
- LEEDv4 or v4.1 Energy Performance requirements

c) Aim to build with materials with low embodied carbon emissions, e.g. favouring sustainably sourced wood, or low GHG concrete over conventional concrete.

d) Consider forthcoming climatic changes that are likely to occur over the lifespan of the asset in its design and construction.

Existing Civic Buildings:

e) Follow sustainable operation and maintenance best practices guidelines for new and existing buildings, which emphasize conservation, optimized building performance, and continued improvement in energy use, water efficiency, and indoor environmental quality.

f) Maximize energy and operational efficiency through the selective re-commissioning of civic facilities on an on-going basis. Re-commissioning is a form of quality assurance testing that is carried out to ensure that building physical plant systems operate as effectively as possible given occupancy patterns and building function.

g) Strive for GHG emission reductions at all existing civic facilities on an ongoing basis through conducting energy assessments and implementing the recommended measures.

h) Strive for continual decreases in corporate building greenhouse gas emissions through the above measures to help meet municipal GHG reduction targets.

i) Strive to ensure that buildings are equipped to be resilient and effective over the course of forthcoming climatic changes that are likely to occur over their remaining lifespan.

SAMPLE

ALBERNI-CLAYOQUOT REGIONAL DISTRICT

Title:	**Guiding Principles for Climate Ready Infrastructure & Assets**	
Departments:		
ACRD Board Policy ☐	**Date Adopted:**	
Administrative Policy ☐	**Effective Date:**	

PURPOSE:

1. To operate and manage Local Government infrastructure assets, including natural ones, in a manner that conserves energy, reduces greenhouse gas emissions, and is resilient to climatic changes.

SCOPE:

2. The Local Government is committed to corporate and community energy and GHG reductions, and to being resilient to climatic changes. Therefore it will establish a procedure to build and operate all Local Government infrastructure assets with the lowest GHGs possible, consider natural assets, and ensure that infrastructure will be able to continue to operate effectively when considering predictions of coming climatic changes that will likely take place over the lifespan of those assets.

POLICY:

3. RESOLUTION**:** THAT the Climate Ready Infrastructure Policy to evaluate GHG emission reduction and climate adaptation potential in the planning of Local Government infrastructure assets be adopted.

4. GUIDING PRINCIPLES FOR CLIMATE READY MUNICIPAL BUILDINGS POLICY: On an ongoing basis, the Local Government shall evaluate opportunities to ensure that infrastructure assets have the lowest GHG emissions possible and are resilient to climatic changes. The Local Government will also evaluate natural assets as part of its infrastructure assets, with the benefits these bring.

SAMPLE

PROCEDURES:

a) Conduct energy studies for existing grey infrastructure assets and implement recommendations to reduce GHG emissions as much as possible;

b) Develop a natural asset inventory and expand the evaluation of nature-based solutions for infrastructure projects, including consideration of co-benefits such as carbon sequestration and wildlife;

c) Build new grey infrastructure assets so that they have zero (or as low as possible) GHG emissions and have as low operational energy costs as possible;

d) Incorporate life-cycle costing into both the infrastructure capital and operational decision-making process;

e) Consider embodied / life-cycle carbon emissions as part of all new infrastructure decision

SAMPLE

APPENDIX K. ACRD SERVICE CATEGORIES

Section Title

Service #	*Service*
General Government	
020	General Government
081	Regional Planning
040	Building Inspection
080	Mgmt of Development - Rural Areas
052	South Long Beach Street Lighting
053	Arvay Rd Lighting
042	Sproat Lake Animal Control
044	Beaver Creek Animal Control
131	Cherry Creek Animal Control
Alberni Valley Solid Waste Services	
060	Alberni Valley & Bamfield Waste Mgmt
West Coast Solid Waste Services	
065	West Coast Waste Mgmt
Salmon Beach	
112	Salmon Beach Garbage
120	Salmon Beach Power Distribution
113	Salmon Beach Recreation
111	Salmon Beach Security
051	Salmon Beach Sewage
114	Salmon Beach Transportation
115	Salmon Beach Water
Bamfield Water System	
126	Bamfield Water System
Millstream Water System	
127	Millstream Water System
Beaver Creek Water System	

125 Beaver Creek Water System

Emergency Planning

043 Alberni Valley Emergency Planning
138 Bamfield Emergency Planning
137 Long Beach Emergency Planning

Bamfield Volunteer Fire Department

030 Bamfield Volunteer Fire Department

Beaver Creek Volunteer Fire Department

032 Beaver Creek Volunteer Fire Department

Sproat Lake Volunteer Fire Department

036 Sproat Lake Volunteer Fire Department

Parks & Trails

087 Regional Parks
055 South Long Beach Bike Path
070 Bamfield Community Park
077 South Long Beach Community Park
075 Sproat Lake Community Park
129 Beaver Creek Community Park
134 Cherry Creek Community Parks

Sproat Lake Marine Patrol

076 Sproat Lake Marine Patrol

Alberni Valley Regional Airport

058 Alberni Valley Regional Airport

Long Beach Airport

059 Long Beach Airport

APPENDIX L. LEADING AHEAD FLEET CHARGING ANALYSIS

See next page.

ACRD FLEET CHARGING ANALYSIS

Prepared for:

Alberni-Clayoquot Regional District

Authored by:

Leading Ahead ENERGY

Submitted to:

Amy Needham
Sustainability Planner

Prepared by:

Trevor Egan
Lead Consultant

About:

LeadingAhead Energy (LAE) provides turnkey solutions for electric vehicle (EV) charging projects using a technology-agnostic approach. LAE is not tied to any single market offering and its sole interest is to advise its clients on the best available market solution for every project.

LAE specializes in the real estate sector advising developers, asset managers and property managers on their EV charging infrastructure. LAE has advised on, and project managed over 300 new and retrofit EV charging projects across North America. The technical learnings from each project have developed the company into a market leading consulting business.

Our clients:

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1 Introduction

1.1 Background

LeadingAhead Energy (LAE) has been appointed by the Alberni-Clayoquot Regional District (ACRD) to advise on the planning and design of electric vehicle (EV) charging infrastructure for fleet vehicle charging across the region.

1.2 Client Objective

The ACRD is looking to convert its 13+ vehicle fleet to EVs as part of a master plan for a de-carbonized future. The ACRD aims to create a plan for the conversion of its vehicles and the required charging infrastructure that will align with the overall development and capital plans for the region.

The goal of this report is to generate a portfolio wide charging strategy for ACRD owned facilities. This strategy will aid in developing a timeline and budget for the implementation of EV chargers and the associated infrastructure as it coincides with the ACRD development and capital plans over the next decade and beyond.

The fleet plan is optimized for the specific needs of the ACRD fleet, maximizes government funding opportunities, factors in revenue generated from carbon credits associated with EV charging, establishes charging solution specifications, and creates a plan to install the EV charging infrastructure cost efficiently.

A separate report will be delivered for each site that outlines how it can be retrofitted to accommodate EV charging to satisfy the goals of electrifying the fleet. In addition, these reports will provide guidance for operational changes and facility upgrades needed for EV charging infrastructure.

1.3 Definitions

Electric Vehicle

A vehicle that uses electricity for propulsion and that can use an external source of electricity to charge the vehicle's batteries. This includes vehicles that rely exclusively on a battery (BEV) and plugin hybrid EVs (PHEVs). It excludes hybrid vehicles that recharge on-board and do not have the ability to plugin to recharge.

Charging Station

A charging station, also called an EV charger or electric vehicle supply equipment (EVSE), is a piece of equipment that supplies electrical power for charging plug-in electric vehicles. EV chargers are often internet connected (smart or networked) allowing them to be networked for functions such as access control, remote support, billing, and load management.

Level of EV Charging

EV chargers come in many formats but are often defined by their output level. The industry divides them into Levels 1, 2 and 3 (DC Fast Charging or DCFC). The table below sets out the range of outputs (charging speeds) associated with each 'Level'.

Level	Voltage	Output	Approx. Charge Time (0-80%)	Suitable Locations
Level 1	110-120V	1.65kW	24-40 hours	Residential
Level 2	208-240V	6.7kW – 19.2kW	4-8 hours	Residential, Commercial & Public
Level 3 / DCFC	480V+	25kW+	15 mins to 2 hours	Public

Open Charge Point Protocol (OCPP)

OCPP is an application protocol for communication between networked EV charging stations and a central management system. OCPP compliant equipment means the charging stations allow any OCPP compliant network operator to run the charging service. This structure enables the owner of the charging stations to change the network operator if they are not satisfied with their service. In a proprietary solution (closed protocol), the site owner is locked-in to the network operator that supplied the charging stations and must purchase and install new charging stations if they want to change the network operator.

2 Fleet Background

2.1 Fleet Summary

The ACRD fleet consists of 13 light duty vehicles currently in use. The vehicles and their parking locations are outlined below.

Vehicle	Location	Yrs to Replacement	Avg Vehicle Kilometers Travelled Per Day
2007 Ford Ranger	Tofino - Long Beach Airport	0	18 KM
2011 Ford F150	Tofino - Long Beach Airport	3	55 KM
2012 Dodge Ram 1500	Beaver Creek Fire Department	4	55 KM
2020 Ford F350	Beaver Creek Water System	12	40 KM
2009 Ford F250	Beaver Creek Water System	1	40 KM
2011 Ford Ranger	Beaver Creek Water System	3	60 KM
2010 Dodge Ram 1500	Admin	2	33 KM
2014 Jeep Cherokee	Admin	6	26 KM
2022 Toyota RAV4	Admin	14	24 KM
2022 Ford Escape	Admin	14	58 KM
2023 Ford F350	Admin	15	N/A
1997 Chevrolet Silverado 2500	Sproat Lake Fire Department	0	12 KM
2024 Chevrolet 3500	Sproat Lake Fire Department	15	60 KM

3 Electrical Design

3.1 Charging Speed

An adequate EV charging speed must account for power that will be consumed (in kWh) from the fleet EVs on-board battery each day and provide enough power to meet the needs of the vehicle for the next day. The charging speed must be fast enough (determined by the power output in kW) to charge the fleet EVs on-board battery for the vehicle's next day requirements during the period between an employee's shift ending and beginning the next day. To determine this charging speed, fleet usage data was analyzed to determine what the daily charging needs would be for each vehicle.

Odometer data was provided by the ACRD to determine an adequate charging speed for fleet vehicles at ACRD owned facilities. The odometer data was a compilation of seven months of driving history (January to August 2023) from which the average daily vehicle kilometers travelled (VKT) was estimated. Since this VKT is only an estimation, a contingency factor of 100% (i.e. 60 KM VKT became 120 KM) was added to account for abnormal usage patterns and increased power consumption at colder temperatures.

The new conservative daily VKT was then multiplied by the fuel consumption rating in kWh/100km of a Ford F-150 Lightning Standard Range vehicle from the *2023 Fuel Consumption Guide*.[1] The Ford F-150 Lightning is currently the top selling electric truck which new market entrants will aim to match in terms of performance. Additionally, the F-150 Lightning is similar to the majority of existing fleet vehicles. The VKT calculation with the F-150 Lightning as a reference point resulted in a maximum daily charging need for an ACRD fleet vehicle of 37kWh or 37% of the F-150 Lightning's battery capacity.

Due to potential changes in usage patterns of the ACRD fleet vehicles in the future and potential increases in battery sizes in new vehicles entering the market, this conservative estimate for the charging needs is recommended for all ACRD fleet vehicles.

[1] NRCan 2023 Fuel Consumption Guide

3.2 Futureproofing

Designing charging infrastructure for a 100% EV fleet from the start will ensure that the electrical infrastructure is sized to meet future demand without risking the original EVSE becoming obsolete or insufficient if additional fleet vehicles are transitioned to EVs. This approach may also have the benefits of economies of scale, lower capital costs, centralized planning that optimizes conduit runs and communications infrastructure, and elimination of iterative design costs.

An EV charging infrastructure design that allows for 100% of the fleet to be charged in the future is based on the principles of making parking stalls 'EV Ready'. 'EV Ready' means that each stall will feature an energized junction box that can connect to an EV charger when a fleet vehicle is electrified. This design achieves all the benefits listed above but shifts the capital cost of the EV charger until the year which an EV is procured for that parking stall.

Implementing 'EV Ready' infrastructure involves sizing upstream electrical infrastructure (i.e. panels, breakers, switches, etc.) for 100% fleet electrification and leaving downstream infrastructure to be installed in batches to distribute the capital costs. Additional downstream infrastructure, such as conduit runs from panels and the charging stations themselves, can also be timed to match the EV procurement years, efficiently spreading out the capital expenditure.

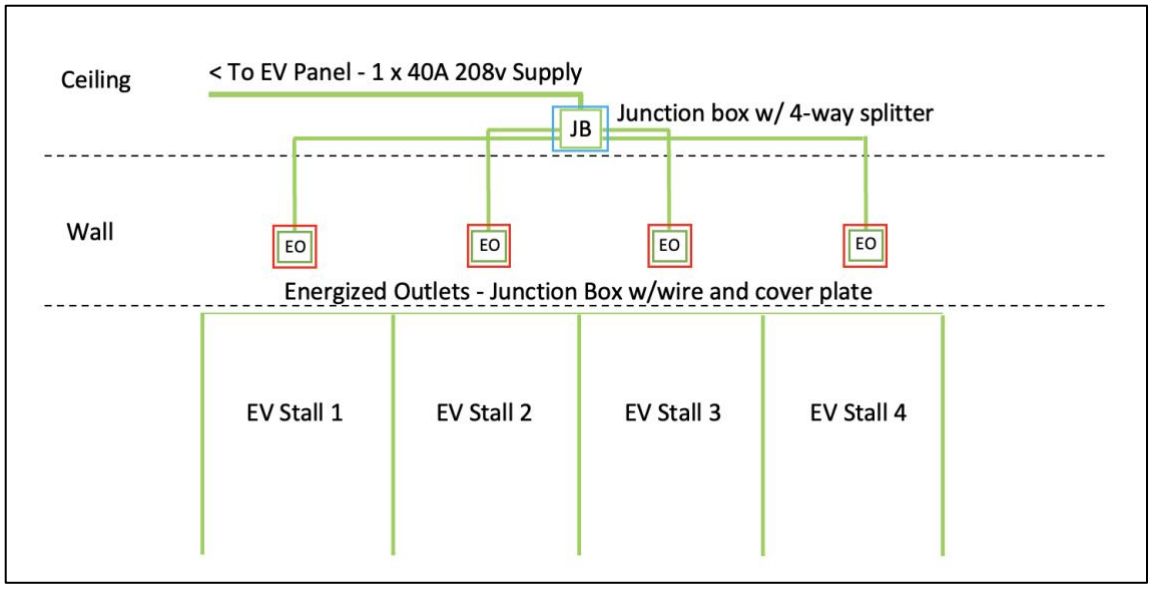
Example of an 'EV ready' stall

3.3 Circuit Sharing

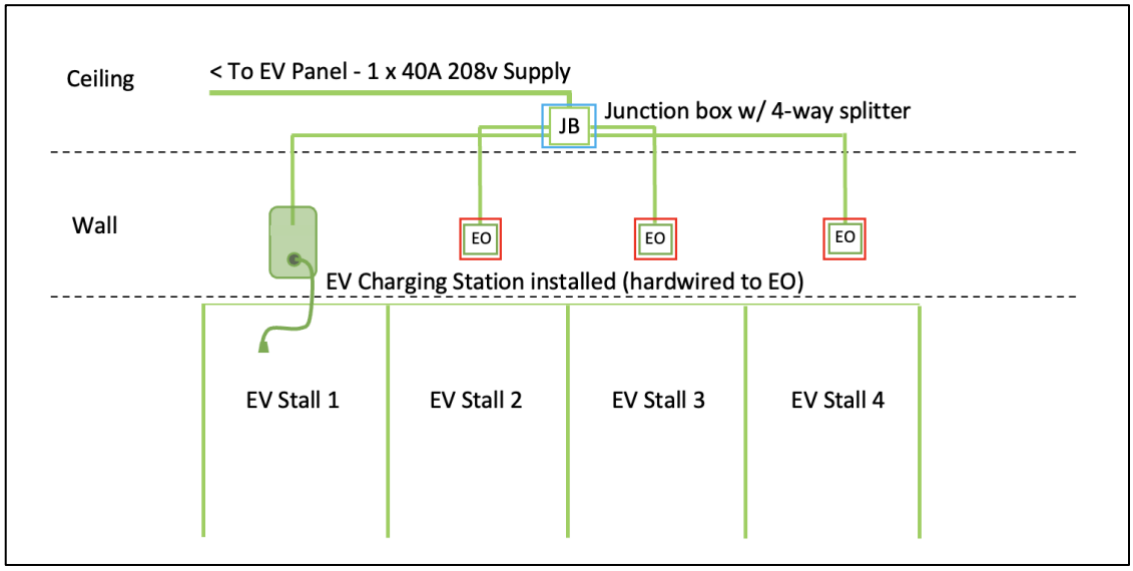
To reduce infrastructure costs and EV charging power demand (in kW) at each site, it is recommended that the ACRD fleet chargers implement a 2:1 circuit sharing design.

Circuit sharing is a function built into networked charging units, allowing them to be programmed so the aggregate load does not exceed the circuit rating (power ceiling). Charging units will communicate with each other to evenly draw load within the prescribed power ceiling. For example, with a 2:1 circuit sharing design, a 40A circuit will deliver 20A to each vehicle if they are both connected to the chargers on the circuit and 40A to a single vehicle if it is the only one connected on the circuit.

Set out below is a 4:1 circuit-sharing design example to explain the concept further.



4:1 40A (32A EV charging rate at 80% of capacity) circuit sharing with energized outlets



EV charging unit installed.

4:1 circuit sharing arrangement – as built example.

Circuit sharing allows each building to be futureproofed for additional EVs entering the fleet. The conservative VKT analysis explained in Section 3.1 revealed that 2:1 circuit sharing will provide more than enough power for the daily needs of electrified fleet vehicles.

If required due to a growing ACRD fleet, 2:1 circuit sharing may also be expanded to 3:1 circuit sharing to accommodate additional vehicles. This could be completed by simply changing the splitter in the junction box from a 2:1 splitter to a 3:1 splitter and feeding another networked EV charger from the new 3:1 splitter.

4 Recommended EV Charging Solution

4.1 Electrical Infrastructure

The electrical infrastructure required for each site is laid out in the site feasibility report for each ACRD owned facility. A summary of the number of chargers and cost can be found in the table below:

Building	# of Chargers	Approximate Cost
Long Beach Airport	2	$12,600
Administration Building	5	$50,000
Alberni Valley Regional Airport	2	$11,600
Sproat Lake Fire Department	2	$26,000 + BC Hydro upgrade costs
Beaver Creek Fire Department*	4	$21,000
Bamfield Fire Department	1	$5,800

*Options for Beaver Creek Waterworks fleet upgrades to EVs and associated charging infrastructure were not included in this report due to both the lack of heavy duty EVs current on the market and the lack of permanent waterworks facility infrastructure that would provide electrical connections and a secure location for the chargers.

Note that these prices are based on quotes from Aines &Tyler Electrical Co Ltd for all aspects of the work. The quotes are subject to equipment / labour costs and will likely increase with time.

4.2 Phasing Design

The EV charging design should make the installation 'EV Ready' as described in Section 3.2 to futureproof the infrastructure. To do this, the scope of the initial installation should include all upstream equipment (i.e. breaker, transformer, conduit, wire runs, and panel) necessary for all fleet vehicles at that site to be electrified. To mitigate the level of upfront capital cost required and to futureproof the site, it is recommended that stall level electrical infrastructure (conduit, junction box, wire) is only installed for EV chargers needed on day one. This approach has the additional benefit of offering maximum flexibility on where to run power to in the future.

After the initial installation, conduit and wiring may be run to additional parking stalls as capital expenditure allows and EV chargers can be installed at ‘EV Ready’ parking stalls based on anticipated EV fleet entry dates. It is recommended to add ‘EV Ready’ parking stalls in large batches to lower the costs of the installation.

4.3 Employee Home Charging

Employees that take fleet vehicles home should have access to EV charging at their residence. An individual can take advantage of rebate programs available for home charging such as those offered by CleanBC and the ACRD could help cover the remaining cost to ensure the vehicle is charged for the following day.

It is recommended that, where required, ACRD provide funding for employees to install smart chargers at their residences so utilization data and cost reimbursement can be managed on the ACRD’s adopted EV network management platform. Installations at an employee’s home should be fed from a NEMA14-50 outlet (or similar) so that if an employee no longer requires the charger it can easily be transferred to another ACRD employee.

5 Government Grants

An outline of the various government grants available for this project.

5.1 Zero Emission Vehicle Infrastructure Program (ZEVIP)

Link to program website

ZEVIP is a $680 million initiative run by Natural Resources Canada (NRCan) ending in 2027 that provides funding towards projects focusing on EV charger deployment in public places, multi-unit residential buildings, workplaces, and for vehicle fleets. ZEVIP will contribute up to fifty percent (50%) of total project costs in rebates up to a maximum of ten million dollars ($10,000,000) per project. Maximums per project apply based on the type of connector deployed, with a maximum of $5,000 per Level 2 connector and a maximum of $100,000 per Level 3 connector.

ZEVIP projects are funded based on a competitive process that opens for Request for Proposals (RFPs) annually. ZEVIP funding is subject to a repayment clause in which, if a site produces a profit, a percentage of the profit must be paid back to NRCan over a 10-year period based on the percentage of project funding received (e.g. if the project is given 30% funding then 30% of the profit each year must be paid back over the 10-year period).

5.2 ZEVIP – Delivery Organizations

Link to program website

ZEVIP funding can also be distributed by third-party delivery organizations that redistribute a portion of ZEVIP funding for smaller, more localized EV infrastructure projects. Similar to ZEVIP funding, delivery organizations will fund up to fifty percent (50%) of total project costs in rebates up to one hundred thousand dollars ($100,000). Green Economy Canada and Toronto Atmospheric Fund are some of the many delivery organization of ZEVIP funding.

Third-party delivery organizations allocate funding based on applications through the organization and are dependent on the funds they have available each year. Unlike larger ZEVIP funding, funds provided through delivery organizations are not subject to a repayment clause.

5.3 CleanBC Go Electric Fleet Program

Link to program website

The CleanBC Go Electric Fleet Program is a rebate program designed to provide financial assistance to customers to design, procure and install charging infrastructure, to be used by the fleet.

The program provides financial assistance through rebates for electrical infrastructure (i.e. engineering, panels, transformers, wiring, and conduit) and charging infrastructure rebates (i.e. purchase of charging station, labour and construction costs for the installation of the charging station, permits, etc.).

The program will reimburse electrical infrastructure up to the lower of 33% of costs or a maximum of $20,000 per site. Charging infrastructure will be reimbursed up to the lower of 50%, $2,000 per charger, or $50,000 per site. Organizations can have separate applications for different sites but can only receive rebates for a maximum of four sites.

To be eligible for the BC Go Electric Fleets Program, fleets must make the West Coast Electric Vehicle pledge at the Express Lane level (committing to at least 10% zero emission vehicles for all new fleet procurements), be a fleet based in British Columbia, and be pre-approved before spending any money on related costs.

6 Carbon Credits

A carbon compliance credit program is a program designed to incentivize businesses and organizations to reduce the carbon emissions of regulated fuels by allowing them to earn credits for every tonne of carbon dioxide equivalent (CO2e) associated with regulated fuels that they reduce or remove from the atmosphere. If an organization exceeds the program limits in carbon emissions associated with regulated fuels they use over the compliance period, the organization will produce carbon compliance debts. If an organization reduces the carbon emissions associated with the regulated fuels they use over the compliance period, the organization will produce carbon compliance credits.

Organizations must have a positive or zero carbon compliance credit balance at the end of each compliance period to avoid program penalties. To achieve this, credits can be bought and sold on the carbon compliance credit market, allowing organizations to offset their own emissions by purchasing credits from others who have reduced their emissions.

This section provides an overview of the relevant carbon compliance programs that the ACRD can use to generate revenue from the charging of fleet EVs.

6.1 British Columbia - Low Carbon Fuel Standard (LCFS)

The LCFS is British Columbia's carbon compliance program. It was implemented in 2009 and began allowing EVs to generate credits starting in 2022. It is mandated by the Renewable and Low Carbon Fuel Requirements Regulation under the current Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act. The program has a goal of reducing carbon intensity (CI) of mandated fuels by 30% of 2010 levels by 2030.

Carbon compliance credits are generated through the program via an annual compliance report that is submitted to the Ministry of Energy, Mines, and Low Carbon Innovation. This reporting is completed through the Transportation Fuels Reporting System (TFRS) and involves compiling, analysing, and reporting the data for all chargers that are being accounted for in the annual report.

Once the reports are filed and approved by the Minister, the credits must then be taken to market to be traded. The trading of these credits is done

via the TFRS system once a trade has been agreed upon by two parties. The ministry reports market data every quarter based on these transactions and based on that data the average value of a carbon compliance credit in Q2 of 2023 was $470. The only restrictions on the pricing are that transfer proposals must include a “fair market price” per the regulations. In 2023, a credit is generated through dispensing 1,128kWh (equivalent of ~12 full charges of an F-150 Lightning) to an EV.

Under the LCFS, an individual has ownership of the carbon credits if they “*supply the fuel through the final supply equipment in British Columbia”* according to 6 (4) (a) in the legislation. In the case of EV charging, this means that the owner of the charging station owns the carbon credits produced by that charging station. It should also be noted that section 6 (4) (c) in the legislation states that someone is eligible to create credits if the person *“is made responsible for the fuel under an allocation agreement.”*

6.2 Clean Fuel Regulation – Federal (CFR)

The CFR is the Canadian Federal Government’s carbon compliance program. The regulation was released in June 2022 and the first compliance period filing deadline occurred on June 31st, 2023. The CFR are mandated by the governance of the Canadian Environmental Protection Act, 1999. The program has a goal of reducing the CI of mandated fuels by 15% of 2016 levels by 2030.

Carbon compliance credits are generated through the program via an annual compliance report that is submitted to Environmental and Climate Change Canada (ECCC). The reporting is completed through the Credit and Tracking System (CATS) and involves compiling, analysing, and reporting the data for all chargers that are being accounted for in the annual report. Once the reports are filed and approved by the Minister, the credits must then be taken to market to be traded. The trading of these credits is done via the CATS system once a trade has been agreed upon by two parties. The credits are subject to a cap of $300 adjusted for inflation and must be sold at a “fair market price” per the regulations.

Under the CFR, a charging host, defined as *“a person who owns or leases a charging station and who has the legal right to have the charging station installed*”, may create carbon credits if they have not been generated by a charging-network operator (section 101 (1) of the legislation). A charging-network operator may create carbon credits for EV charging stations that are intended primarily for use by the occupants of a private dwelling and/or by the public per section 102 (1) of the legislation.

Per the legislation, ACRD fleet vehicles would be defined as a charging host and would be eligible to generate credits. In 2023, EV charging from the British Columbia electrical grid would generate one credit per 1,310kWh dispensed (equivalent of ~14 full charges of an F-150 Lightning).

6.3 Monetizing Carbon Compliance Credits

Monetization of carbon compliance credits can only occur when one organization transacts their carbon compliance credits with an organization with carbon compliance debts. In each carbon compliance credits program, this transaction must be verified through the platform in which the compliance reports are submitted.

Organizations that have carbon compliance debts are organizations that produce, import, and/or sell regulated fuels such as gasoline and diesel fuels. Due to size of these organizations and the amount of carbon compliance debts that they are often subject too, they typically only engage in purchasing a large number of carbon compliance credits. Most of these organizations set a limit on the minimum of credits due to the legal costs associated with transacting the credits which is usually around 1,000 to 5,000 carbon compliance credits.

Most organizations will not meet this minimum requirement and must partner with a carbon compliance credit aggregator who compiles the credits of multiple clients and then sells the credits with an organization with debts. It is common practice in today's market for the carbon compliance aggregator to charge a percentage fee at the time of sale for of the credits based on the number of credits monetized for each client.

6.4 Example Carbon Compliance Credit Revenue

The table below provides a revenue generation forecast from carbon credit monetization for an electrified ACRD fleet from both the LCFS and CFR programs.

The forecast assumes the following:

- 18 kWh dispensed to each fleet vehicle per day based on the analysis outlined in Section 3.1.
- A conservative monetized credit value of $450 per LCFS credit and $200 per CFR credit (based on current market performance).[2]
- Maintenance budget of $300 per charger based on LAE's experience operating these sites.
- Network fees of $240/connector.
- BC Hydro Medium General Service Rate[3] (between 35kW and 150kW of demand):
    - Input energy cost: $0.0981c/kWh
    - Demand charges: $5.48/kW per month.

TOTAL REVENUE	10 yrs	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
# Level 2 chargers		13	13	13	13	13	13	13	13	13	13
Charging speed (kW)		3.328	3.328	3.328	3.328	3.328	3.328	3.328	3.328	3.328	3.328
Consumption per Connection (kWh)		18.00	18.36	18.73	19.10	19.48	19.87	20.27	20.68	21.09	21.51
LCFS Credits Generated		76	77	79	80	82	84	85	87	89	90
CFR Credits Generated		65	66	67	69	70	71	73	74	76	77
LCFS Carbon Credit Revenue		$32,696	$34,684	$36,793	$39,030	$41,403	$43,920	$46,590	$49,423	$52,428	$55,616
CFR Credits Generated		$14,400	$14,400	$14,400	$14,400	$14,625	$14,625	$14,625	$14,850	$15,300	$15,525
Total Revenue	**$579,732**	**$47,096**	**$49,084**	**$51,193**	**$53,430**	**$56,028**	**$58,545**	**$61,215**	**$64,273**	**$67,728**	**$71,141**

COST OF SALES	10 yrs	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Electricity Cost ($)		$8,379	$8,546	$8,717	$8,892	$9,069	$9,251	$9,436	$9,625	$9,817	$10,013
Peak Demand (kW)		43	43	43	43	43	43	43	43	43	43
Peak Demand Charge		$2,845	$2,845	$2,845	$2,845	$2,845	$2,845	$2,845	$2,845	$2,845	$2,845
Total Cost of Sales	**$120,195**	**$11,224**	**$11,391**	**$11,562**	**$11,737**	**$11,914**	**$12,096**	**$12,281**	**$12,470**	**$12,662**	**$12,858**
OPERATING EXPENSES											
Network Operator Fees Avg	$37,459	$3,120	$3,245	$3,375	$3,510	$3,650	$3,796	$3,948	$4,106	$4,270	$4,441
Maintenance	$46,824	$3,900	$4,056	$4,218	$4,387	$4,562	$4,745	$4,935	$5,132	$5,337	$5,551
Total Operating Expenses Sub-Total	**$84,283**	**$7,020**	**$7,301**	**$7,593**	**$7,897**	**$8,212**	**$8,541**	**$8,883**	**$9,238**	**$9,607**	**$9,992**

NET OPERATING INCOME	10 yrs	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
NOI - Carbon Credits	**$375,254**	**$28,852**	**$30,392**	**$32,038**	**$33,797**	**$35,901**	**$37,908**	**$40,052**	**$42,566**	**$45,459**	**$48,291**

[2] LCFS Credit Market Data
[3] General Service Business Rates

This forecast does not include the operational and maintenance cost savings associated with each electrified fleet vehicle. The Canadian Automobile Association found that an EV will typically cost 40-50% less per year for maintenance when compared to an internal combustion engine vehicle.[4]

Regarding the life of a battery, a 2019 study by Geotab found that "the vast majority of batteries will outlast the usable life of the vehicle." However, if the battery does need to be replaced, most automakers have an 8-10 year or 100,000 mile warranty period on batteries in an EV."[5]

[4] Cost of Owning an Electric Vehicle
[5] EV Maintenance, Durability, and Other Costs

7 Fleet Roadmap

7.1 Facility Charging Roadmap

The following is a priority ranking of when LAE believes that the ACRD facilities should be retrofitted with EV charging infrastructure due to the replacement schedule of vehicles and input from department managers regarding facility upgrades and potential to receive a fleet EV.

Rank	Building	Approximate Cost
1	Long Beach Airport	$12,600
2	Administration Building	$50,000
3	Beaver Creek Fire Department	$21,000
4	Sproat Lake Fire Department	$26,000 + BC Hydro upgrade costs
5	Alberni Valley Regional Airport	$11,600
6	Bamfield Fire Department	$5,800

As British Columbia moves towards the goals associated in the *Zero Emission Vehicle Act*, which mandates the sale of 100% EVs in new vehicle sales by 2035,[6] it is anticipated that local dealerships will have many more EVs in stock that can be used to replace fleet vehicles.

Below is the estimated timeline for the EV charging infrastructure upgrades at each facility. Note that this timeline will differ at each facility depending on the required infrastructure for EV charging and whether the ACRD procures all equipment at once.

Element	Estimated Timeline
Engineering and design	1-3 months (may not be required)
Permit acquisition	~2 months (depending on permitting authority)
Equipment procurement	2-3 months
Construction	1-4 months
Inspection	~1 month

[6] Zero Emission Vehicle Act

8 Public Infrastructure & Key Partnerships

8.1 EV Charging Ecosystem

The cost per stall to install EV chargers in an existing multi-unit residential building remains one of the main difficulties for mass EV adoption. A 2021 study for the Clean Air Partnership estimated that EV charger installations in existing high-rise buildings would cost between $6,000-9,000 per parking stall. In contrast, the study estimated that a single-detached house would pay a maximum of $2,100 for an EV charger in a parking stall, but in most cases much lower.[7]

Statistics Canada reported that in 2021 single-detached houses represented 70% of the ACRD. Statistics Canada also notes that 85% of the employed labour force commutes via car, truck, or van in the ACRD.[8] It was also noted by ACRD employees that most commutes in the ACRD are under 15-minutes.

All this information indicates that as EV adoption grows in the ACRD there will not be a large local demand for public 'destination charging' where workers, shoppers, and other 'garage orphans' without access to an EV charger at home look to routinely charge their vehicles.

However, the ACRD is frequently visited by tourists who will likely make use of 'destination charging' as they stop in the ACRD from Vancouver, Victoria, and Nanaimo. There is an opportunity to provide tourists and the small population of the ACRD who will not have access to home EV charging, through public Level 3 DCFCs and Level 2 chargers.

The business case for these public facing EV chargers is created through a combination of the resale rate of energy in $/kWh or $/hour and the revenue generated through monetized carbon compliance credits. Both revenue generating mechanisms are linked to usage and thus higher usage increases the business case for an investment in EV chargers in the ACRD. Due to this, the ACRD should further investigate the potential usage at EV charging infrastructure prior to making an investment.

[7] Clean Air Partnership - GTHA EV Ready Costing Study
[8] Focus on Geography Series, 2021 Census of Population

8.2 Third-Party Charging Services

Public EV charging infrastructure can potentially be added to the ACRD by leasing car ACRD owned parking stalls to an EV charging company who will then install and operate their own equipment. A common market approach by property owners to date has been to lease parking stalls to an EV charging network company who will install and operate their own equipment on a lease type basis. The EV charging network company will pay for their equipment and associated infrastructure and compensate the property owner via a monthly rent for the associated stalls.

However, this is typically only for Level 3 (DCFC) equipment as they provide faster charging speeds and higher turnover, which allows the operator to achieve their required returns. Due to this, the leased parking stalls will generally have to be a highly trafficked public area.

Companies that are actively seeking out lease agreements for their charging equipment include, but are not limited to, BC Hydro, Tesla, Electrify Canada, and Flo.

8.3 First Nations Partnerships

The ACRD is in a unique position in that it neighbours several First Nation treaty territories. There is an opportunity for the ACRD to partner with First Nation groups to provide public EV charging to ACRD residents without access to a home charger and tourists alike.

Due to multiple funding opportunities at both the Provincial and Federal level, Indigenous organizations (i.e. Indigenous communities, Indigenous owned businesses, First Nations, etc.) have a unique opportunity to play a key role in providing the public with EV charging. At the federal level, Indigenous organizations are eligible for up to 75% of project funding. At the provincial level, Indigenous communities (i.e. a First Nation or its wholly owned subsidiaries) are eligible for up to 90% of project funding.

Due to these funding opportunities, it is recommended that the ACRD ask First Nations if they would be interested in partnering to offer public DCFC and/or Level 2 charging for tourists and the population of the ACRD who won’t access to EV charging at home. This could promote local EV adoption, reduce vehicle pollution, and provide jobs in the construction and ongoing maintenance of the ACRD’s EV charging services.

8.4 Car rental organization (YAZ)

Another noteworthy partnership opportunity for EV charging in the ACRD is for the car rental organization at Long Beach Airport (YAZ).

As Hertz, Budget, and other car rental companies continue to add EVs to their rental fleet, there arises a need to provide EV charging at airports and other locations that the vehicles are rented from. Due to the increased operational labour associated with charging these vehicles at public locations, rental car companies are seeking to provide EV charging at the allocated parking stalls of these vehicles.

LAE has worked with airports in which car rental organizations have paid for a portion or the full amount of the EV charging infrastructure. It is recommended that as Budget's lease comes up for renewal at YAZ, that YAZ engages the car rental organization that will be leasing the area about covering the cost of the needed EV charging infrastructure that would be used for their fleet vehicles and potentially the public.

9 Recommendations

It is recommended that the ACRD aligns the roll-out of the electrical infrastructure for EV charging with the overall development and capital plans for the region. The following ranking was provided by LAE due to the replacement schedule of vehicles and comments from department managers while on site.

Rank	Building	Approximate Cost
1	Long Beach Airport	$12,600
2	Administration Building	$50,000
3	Beaver Creek Fire Department	$21,000
4	Sproat Lake Fire Department	$26,000 + BC Hydro upgrade costs
5	Alberni Valley Regional Airport	$11,600
6	Bamfield Fire Department	$5,800

This ranking must be further validated by the ACRD, and a multi-year roll-out plan must be created that includes the procurement of fleet EVs, charging stations, and electrical infrastructure upgrades.

This multi-year roll-out plan should involve applying to the various government rebate programs, leveraging revenue associated with carbon compliance credit creation and monetization, and implementation of the recommendations found in the site feasibility reports for each ACRD facility.

Simultaneously, the ACRD may engage First Nations and car rental organizations to further develop the local EV charging 'ecosystem.'

Appendix A: Level 2 EV Charger Market Analysis

All charging units included in the analysis below have been selected based on the charging units being Level 2 ‘smart’ charging units readily available on the Canadian market.

	Open Charger Point Protocol Compliant					*Closed Protocol*	
Manufacturer	**LiteOn**	**Zerova**	**Autel**	**ABB**	**Joint Tech**	**ChargePoint**	**Flo**
Unit Image							
Model	Intelligent	AX Series	MaxiCharger AC	Terra AC Wallbox	JNT-EVC10	CP6000	Core+ Max
Smart	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OCPP Compliant*	Yes	Yes	Yes	Yes	Yes	**No**	**No**
Approximate Unit Cost	$2,000	$2,350	$2,500	$2,500	$2,000	$11,000	$6,000
Market Position	Residential Workplace	Residential Workplace Public	Workplace Public	Residential Workplace	Residential Workplace	Residential Workplace Public	Residential Workplace Public
Pros	– Economical – Broad capability – Market tested	– Economical – Broad capability – Integrated cable holder	– Integrated cable holder – High amperage output – Large user screen	– Broad capability – Highly robust – Integrated cable holder	– Cost efficient – Screen for user feedback	– Widely market tested – Integrated cable holder	– Highly robust – Market tested – Integrated cable holder
Cons	– Less robust than more expensive alternative.	– New to the Canadian market	– New to the Canadian market	– New to market – No screen	– New to market – Less robust – No cable holder	– Closed protocol – Less robust than alternatives – Expensive	– Closed protocol -- Expensive
Overall Ranking	**Tier 1**	**Tier 1**	**Tier 1**	**Tier 2**	**Tier 3**	**Proprietary 1**	**Proprietary 2**

Note that this list is not comprehensive as the market is rapidly evolving. However, at the time of writing, LeadingAhead Energy recommends the listed solutions in the tiers provided.

* **OCPP Compliant**

An Open Charge Point Protocol (OCPP) compliant charging unit can be integrated with any network operator platform, meaning that the EV charging unit owner can freely select the network operator. A charging unit that is not OCPP compliant has a proprietary communication protocol, meaning that the charging unit will only operate on the vendors’ network and be subject to its fees.

Appendix B: Network Operator Market Analysis

All network operators included in the analysis below have been selected based on minimum capability requirements including: 24h call service, data collection, payment processing, load management, adjustable fee schedule, user account and mobile application.

Network Operator	Swtch	EVConnect	EV Gateway	Hypercharge	Amp Up	ChargeLab	ChargePoint	Flo
Logo	SWTCH	evconnect	EVGATEWAY	H	ampUp	CHARGELAB	chargepoint	flo
Open Charging Point Protocol (OCPP) Compliant	Yes	Yes	Yes	Yes	Yes	Yes	**No**	**No**
24 hrs Service	Yes	Yes	Yes	Yes	Yes	Only with premium rate	Yes	Yes
Cost Per month / port *	$20	$27	$18	$20	$20	$24	$30	$18
Head Office	Ontario	California	California	British Columbia	California	Ontario	California	Quebec
Asset Type Suitability	Residential Workplace Public	Public	Public	Public	Residential Workplace Public	Residential Workplace	Residential Workplace Public	Residential Workplace Public
Pro	– Competitively priced, 24hr service.	– Proven network in the US. – Strong experience on Level 3 chargers.	– Advanced backend.	– B.C. based. – Strong market proven backend platform.	– Multiple service levels.	– Multiple service levels.	– Large network. – Well proven and advanced backend.	– Large network – Economical
Cons	– Only offer one service plan. – No lower or higher level of service.	– New to Canada.	– New to Canada, USA based. – Focused on public charging sites.	– New network launched in 2021. – Limited hardware options currently.	– Focused on destination charging. – New to Canadian market.	– 24hr coverage is extra. – Focused on US market.	– Expensive, limited hardware options. – Hardware does not integrate with other networks.	– Only operate on Flo charging units. – Hardware does not integrate with other networks.
Overall Ranking	**Tier 1**	**Tier 1**	**Tier 2**	**Tier 2**	**Tier 2**	**Tier 2**	**Proprietary 1**	**Proprietary 2**

*Network fee pricing and revenue share levels reflect approximates at the date of the report for useful comparison purposes. Network fees are project specific and pricing changes regularly.