CLIMATE ACTION PLAN

DISTRICT OF TAYLOR

February 4, 2026

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1.0 INTRODUCTION

In Taylor, we aspire to be a community that is a safe, strong, proud and resilient place to live, work and play.

This aspiration is challenged by a changing future climate.

Recognizing the need to act and ensure our long-term viability, wanting to move the dial on climate action and in line with federal, provincial and regional efforts, the District has developed a Climate Action Plan (Plan).

This is not about debating the science of climate change, but rather about our community being proactive to be resilient and strong regardless of what the future brings. It is about the strategic benefit of considering asset management, infrastructure, operational planning and critical community services in the context of that future. As such, this Plan will identify the major sources of our emissions and help us implement tangible actions aimed at reducing corporate and community-wide emissions. It will outline the results of our climate risk assessment and the pathways we can take to reduce our highest climate risks.

We acknowledge that our District is both contributing to climate change and is a key part of the solution. This Plan is meant to be our response to this new normal. It links our previous work that contributes to our community's overall resilience and acts as a roadmap for our climate mitigation and adaptation efforts and our path to realizing the resilient, sustainable vision we have for our District. The Plan is a strategy for safeguarding the things that matter to Taylor - our quiet community feel, our increased connections, our economic development, and our long-term prosperity.

1.1 WHAT IS CLIMATE CHANGE?

1.1.1 WEATHER VS. CLIMATE

Weather refers to atmospheric conditions that occur locally over short periods of time, from minutes to hours or days. Familiar examples include rain, snow, clouds, winds, floods, or thunderstorms. The atmospheric conditions that influence weather are always in flux, which is why the weather is always changing.

Climate, on the other hand, refers to the long-term (usually at least 30 years) regional or even global average of temperature and precipitation over seasons, years, or decades (as shown in **Figure 1**)[1]. This is why it is possible to have an especially cold spell even though, on average, global temperatures are rising. The former is a weather event that takes place over the course of days, while the latter indicates an overall change in climate, which occurs over decades.

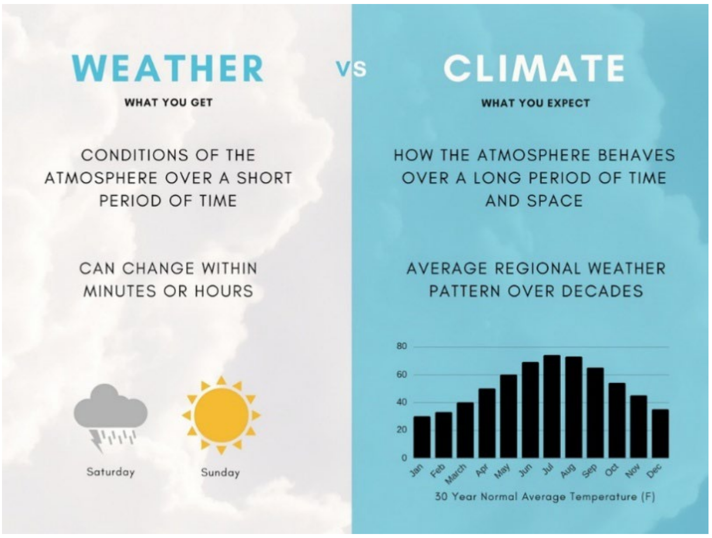


Figure 1: Weather vs Climate

[1] Weather vs. Climate: Understanding the Key Differences - Norcast

1.1.2 CLIMATE CHANGE

Climate change is the long-term shift in global or regional climate patterns. This shift has had a huge effect on people, communities and economies globally, resulting in more frequent and intense extreme weather and rapid melting of glaciers and sea ice, which contribute to rising sea levels and warming oceans.

Throughout Earth's history, the climate has continually changed. When occurring naturally, this is a slow process that has taken place over hundreds and thousands of years. The human-influenced climate change that is happening now is occurring at a much faster rate.

There is a broad scientific consensus that human activities, particularly the burning of fossil fuels, are driving significant changes in the natural environment.[2] Burning fossil fuels releases carbon dioxide (CO2) into the atmosphere; CO2 is one of a group of chemicals known as greenhouse gases (GHGs). GHGs allow heat from the sun to enter the atmosphere but stop it from escaping, like the glass of a greenhouse. The overall effect is that the global temperature rises, leading to a phenomenon known as global warming.[3]

Over the preceding years, the District and our neighbours have seen a steady increase in extreme weather events. In just the last decade, Hudson's Hope, Kelly Lake, Tumbler Ridge, Peavine Lake, Red Creek, Goodlow, Dawson Creek, Moberly Lake, Chetwynd, Fort St. John and our District have seen alerts, warnings and even evacuations for wildfires, floods, heavy rain, extreme heat and extreme cold.

There has been consistent growth in the required number of personnel on our protective services team, and we've seen how, over the last few years, they've been deployed and assisted more and more of our neighbours. We have seen how we're constantly trying to prepare for and adapt to drought. We've recorded the increasing number of service calls to Fire Rescue (a 43% increase since 2021 – 2023 and 2024 were record years for Taylor Fire Rescue) and a greater focus on bylaw enforcement, all of which are indicative of the increasing scale of various climate impacts on our community.

[2] Greater than 99% consensus on human caused climate change in the peer-reviewed scientific literature - IOPscience
[3] Global warming is a type of climate change, and it is already having a measurable effect on the planet in the form of melting Arctic sea ice, retreating glaciers, rising sea levels, increased frequency and intensity of extreme weather events, and a change in animal and plant ranges.

1.2 WHY ARE WE DOING THIS?

- **It's affecting us faster**: Climate change is especially relevant for Northern Canadian communities like us, that are warming at a much more rapid rate than the rest of the country (according to some estimates, 3 times faster than the global average).[4]
- **It builds on work we've already done.** Rather than starting from scratch or reinventing the wheel, it makes more sense to build on our previous work, which both directly and indirectly contributes to the District's overall resilience.
- **It's going to have a wide range of impacts.** Climate change adaptation is becoming a core policy need with implications for our strategic priorities:
  - Fiscal responsibility: strategic investment in adaptation bolsters municipal finance by reducing the extent and cost of emergency relief, long-term health services and repairs/reconstruction.
  - Economic development: A resilient community with climate considerations and business and service continuity built into decision-making promotes economic resilience.
  - Asset maintenance and enhancement: The long-term sustainability of our essential services requires an understanding of how climate change will impact the assets that provide those services.
- **It makes economic sense.** Climate change will result in a wide range of direct and indirect costs, with numerous economic and social implications. According to current estimates, every dollar invested in climate change adaptation actions generates, on average, $5.60 in benefits and can go as high as up to $15.[5]
- **It aligns us with federal, provincial, regional and local initiatives.** These actions fit into the overall federal and provincial goals of reducing GHG emissions and promoting climate adaptation. Canada has enacted the 2030 Emissions Reduction Plan and the National Adaptation Strategy. Provincially, BC has released the Clean Energy Strategy (2021) and the Climate Preparedness and Adaptation Strategy (2022), Zero-Emission Vehicles Act (2019), Climate Change Accountability Act (2007), and Energy Step Code (2017). Regionally, this work contributes to initiatives like the Peace River Regional District's Climate Resiliency Plan (2025) and the Fraser Basin Council's Northeast Climate Resilience network, which supports communities like Fort St. John, Dawson Creek, Tumbler Ridge and Chetwynd. Within the District, the Draft Official Community Plan (2025) has outlined municipal goals towards a greener future.
- **It will unlock additional funding.** Many funding programs require a community-wide climate risk assessment as a precursor to more detailed assessments and capital projects. Having this done already is an advantage when applying for funding, both for additional studies as well as possible capital projects. Taylor, like every other community, has limited time and resources to spend. This project will provide us access to additional funding programs, allowing us to enhance the possible capital we can acquire for resilience work.

[4] Temperature change in Canada - Canada.ca
[5] Damage Control: Reducing the costs of climate impacts in Canada. This $15 figure is broken down as $5 in direct benefits from reduced repair and replacement costs. $10 in indirect benefits such as businesses and service disruptions.

1.3 HOW ARE WE DOING THIS?

Climate mitigation and climate adaptation are the two essential strategies for addressing climate-related challenges.

Mitigation – reducing climate change – involves reducing the flow of heat-trapping greenhouse gases into the atmosphere by reducing sources of these gases (for example, the burning of fossil fuels for electricity, heat, or transport). This includes actions such as transitioning to renewable energy, improving energy efficiency, using alternative fuels, and adopting low-carbon technologies.

In contrast, **adaptation – adapting to life in a changing climate – involves adjusting to actual or expected future climate.** Often, it involves building or retrofitting infrastructure, such as a better stormwater system to manage increased flooding. But adaptation can also include natural solutions, such as restoring wetlands to buffer extreme weather, or behaviour and policy changes, growing new food crops that can better handle warmer seasons and droughts. The goal is to reduce our risks from the harmful effects of climate change. It also includes making the most of any potential beneficial opportunities associated with climate change (for example, longer growing seasons or increased agricultural yields in some regions).

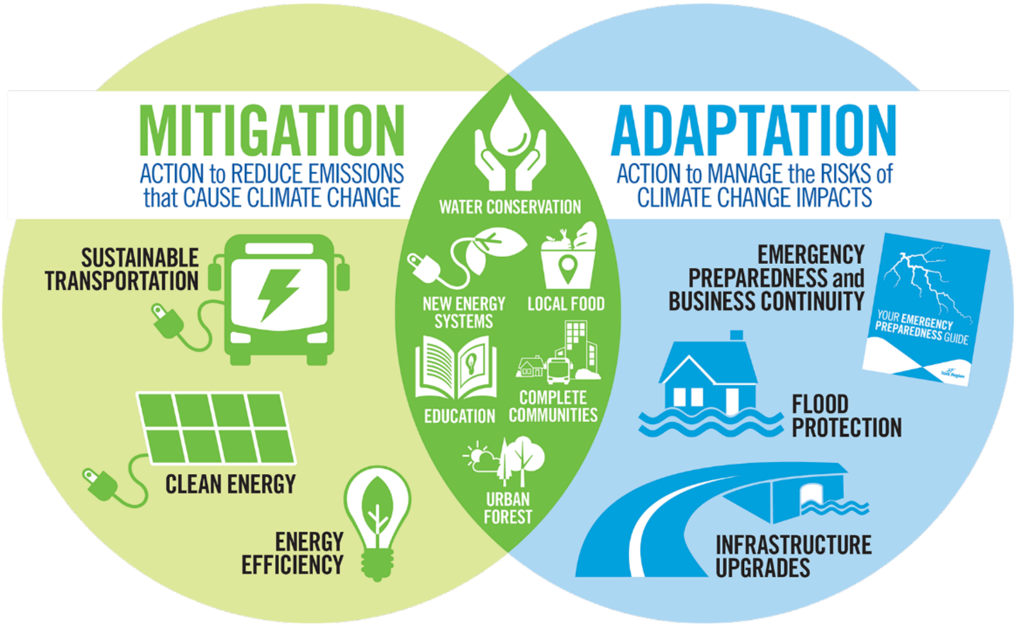


Figure 2: Mitigation and Adaptation

1.3.1 TAYLOR'S CLIMATE ACTION PLAN

Our climate action plan includes both mitigation and adaptation.

The mitigation sections summarize our Corporate and Community Energy and Emissions Plan (CCEP – the full plan is attached as **Appendix A**), which will help the District implement tangible actions aimed at reducing corporate and community-wide emissions. The goal of the CCEP is to then identify a vision, targets, action items, and an implementation strategy for priority items.

The adaptation sections outline the results of our climate risk assessment (the full methodology can be found in **Appendix B**) and adaptation actions we can take to reduce our highest risks. These actions will be integrated into our annual project planning and budgeting process for prioritization and implementation. Together, these mitigation and adaptation strategies define Taylor's **Climate Action Plan**.

2.0 OUR JOURNEY SO FAR

For our Climate Action Plan, we recognize the importance of understanding and emphasizing past work and strategic efforts to promote resiliency and see that these efforts are ongoing and integrated into everything we do. Resiliency is an ongoing process, a journey that is constantly evolving and iterative and is fed by many supporting processes and complementary work. This section details some of the work the District has done in the past decade that supports overall community climate resiliency.

2.1 MITIGATION AND ADAPTATION TIMELINE

We have made progress in the past 15 years since our last Community Energy Plan (CEP). The CEP from 2010 defined the District's role in working towards provincial and community-level climate goals and included a list of actionable items, with a timeline for initiation. The mitigation sections of the current Climate Action Plan summarize the CCEP, which is a successor to the CEP, with updated data and goals for the District. For a full list of the actions from the 2010 CEP, please refer to **Appendix A**.

Legend:
Mitigation
Adaptation

2017

Province Wide Rollout and Enforcement of the BC Energy Step Code

Sets performance requirements for energy efficiency in new buildings across the province.

2018

Asset Management Program (2018-2023)

Inventory and condition assessments for all District asset classes.

Provides the District with a holistic understanding of how District assets are interdependent and how they may be impacted by climate change.

2019

Peace River Regional District Solid Waste Management Plan

Regional 10-year strategy on how to reduce waste disposal rates and enhance recycling and organics processing.

2020

Conducting a Long-Term Water Source Study

Ensure the sustainability of potable water by assessing options for a new long term water source.

2022

Asset Retirement Obligation Program

Improved, more accurate financial reporting and analysis of assets and regulatory compliance.

Enhancing Communal Services

Operations & Maintenance (O&M) budgets increased.

Improvements to Protective Services, training and succession planning.

Emergency Evacuation Plan

Defines key roles, response protocols and instructions for community members on what to do during an emergency event.

2024

Zoning Bylaw No. 887

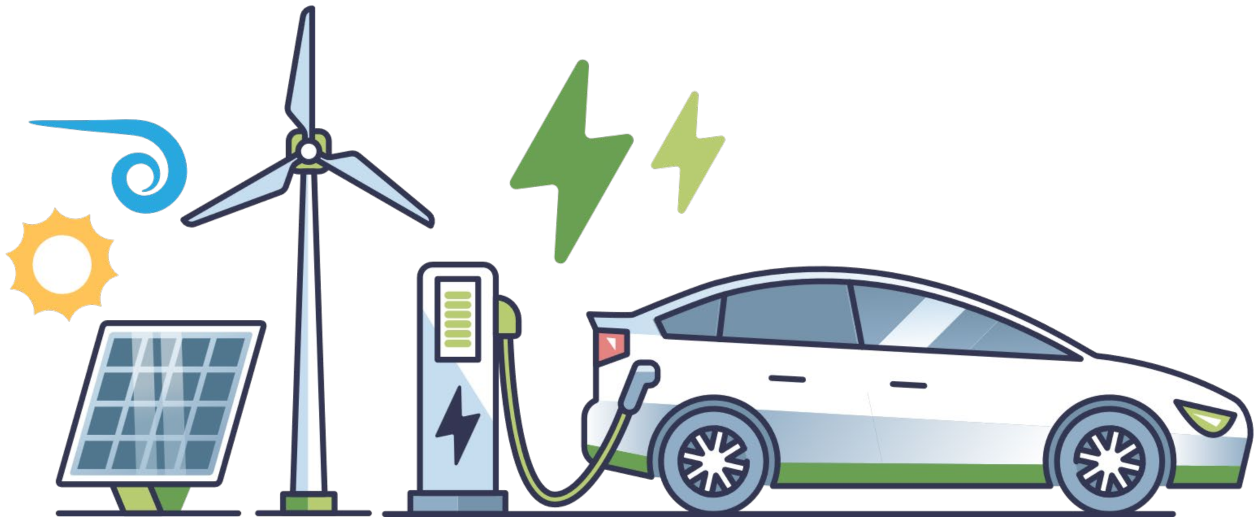
Provides a clear and efficient system of land use regulation within Taylor.

2025

Official Community Plan Update

Guides decisions on land use management and planning - has specific direction for energy and emissions.

Has specific direction on climate change adaptation and resilience.



3.0 ENERGY USE & CLIMATE CONDITIONS

The following sections are divided into mitigation and adaptation subsections. The mitigation subsection will illustrate energy consumption and emissions produced from the corporate, community and residential sections of the District. The adaptation subsection will detail past climate hazards, summarize localized climate projections for the District and provide a summary of staff and partner engagement for the project.

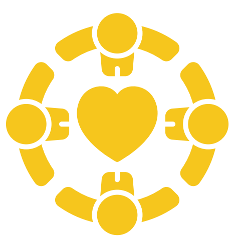
3.1 CURRENT ENERGY USAGE AND EMISSIONS

To establish a comprehensive understanding of the current energy consumption and GHG emissions in the District, energy and emissions baselines were developed for three different sectors. These baselines consider the community and corporate energy and emissions from all reported sources, such as electricity, natural gas, transportation, solid waste, propane, fleet vehicle fuel, fuel oil, and wood.

Energy inventories were also developed that provide data on energy consumption in standard units of measurement based on the fuel source; for example, electricity is reported in kilowatt hours (kWh) and gigajoules (GJ), while fleet vehicle fuel consumption is measured in litres of gasoline and diesel. For detailed emissions and inventory data, please refer to **Appendix A**.

Energy and emissions baselines were developed for three community sectors:

CORPORATE



COMMUNITY

RESIDENTIAL

The findings from these baselines are summarized below.

3.1.1 CORPORATE ENERGY AND EMISSIONS INVENTORY

This inventory consists of energy and emissions related to corporate activities such as community buildings and corporate fleet vehicles. The four fuel types for corporate activities in the District are fleet vehicle fuel (the combination of diesel and gasoline), electricity, propane, and natural gas.

Please note that all energy use units are in GJ and all emission units are tonnes of carbon dioxide equivalent ($tC0_2e$).

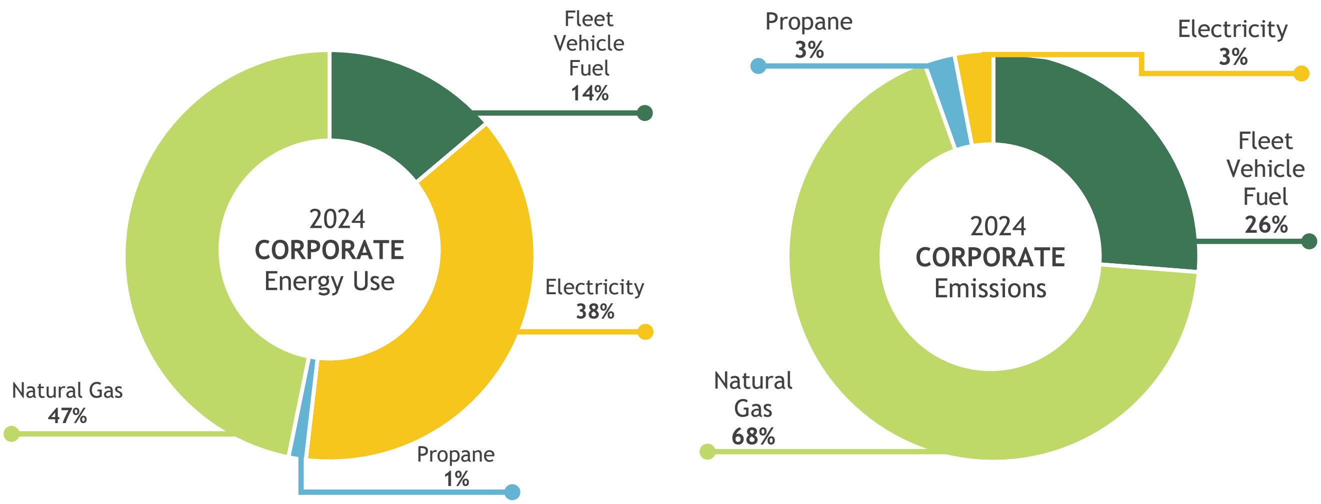


Figure 3: 2024 District Corporate Energy Use (GJ) & Emissions (tC02e)

OBSERVATIONS FROM THE CORPORATE ENERGY AND EMISSIONS INVENTORY INCLUDE:

- Our primary sources of corporate energy in 2024 are natural gas (47%) and electricity (38%). The two lesser-used energy sources are fleet vehicle fuel (14%) and propane (1%).
- The most emissions (2024) result from natural gas usage (68%), followed by fleet vehicle fuel (26%), and the remaining consists of electric and propane (3% each).
- A further breakdown of our emissions was conducted, and emissions were split up further into associated departments. This breakdown shows that the top five sources of corporate emissions for the District are the arena, fleet vehicle fuel, the curling/pool complex, the community hall, and the golf club clubhouse, ordered from first to fifth in total annual emissions. Just the arena and fleet vehicle fuel contribute to over 50% of our corporate emissions.

3.1.2 COMMUNITY ENERGY AND EMISSIONS INVENTORY

Our community energy and emissions inventory consists of energy and emissions related to residential, institutional, commercial, and small/medium industrial activities within the District. The community activities include fuel uses for energy/heating (such as propane, electricity, natural gas, heating oil, and wood) as well as transportation and solid waste production. Please note that the abbreviations ICI and RES below refer to institutional/commercial/industrial and residential, respectively.

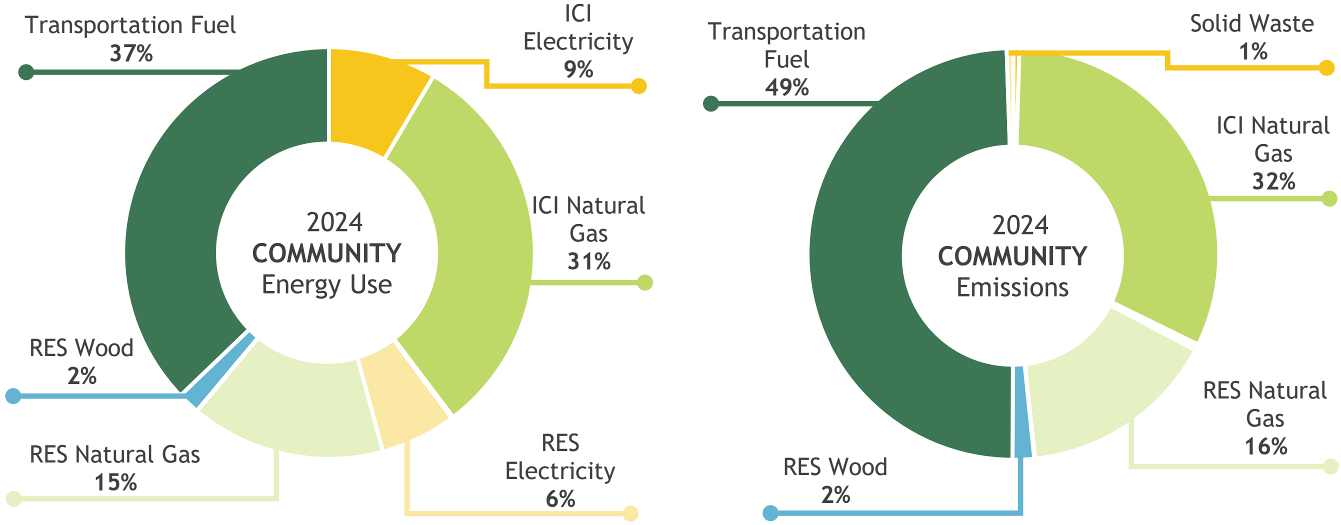


Figure 4: 2024 District Community Energy (GJ) and Emissions (tC02e)

OBSERVATIONS FROM THE COMMUNITY ENERGY AND EMISSIONS INVENTORY INCLUDE:

- The District's primary community energy uses are transportation fuel, both residential (RES) and institutional/commercial/industrial (ICI), natural gas, and both residential and ICI electricity. The lesser-used energy sources are residential wood, propane, and oil.
- Transportation fuel and natural gas from ICI activities make up a significant portion (approximately 68% in 2024) of our total energy use.
- Natural gas and transportation fuels remain the primary sources of emissions, together accounting for 97% of emissions from these two fuel types in 2024. Residential use of wood, oil, and propane remains minimal.

3.1.3 RESIDENTIAL ENERGY AND EMISSIONS INVENTORY

Residential-specific community emissions (including natural gas, electricity, wood, and oil) were investigated separately from transportation and ICI-related natural gas emissions. This was done to provide a more accurate depiction of energy use and emissions that are directly within the control of our residents.

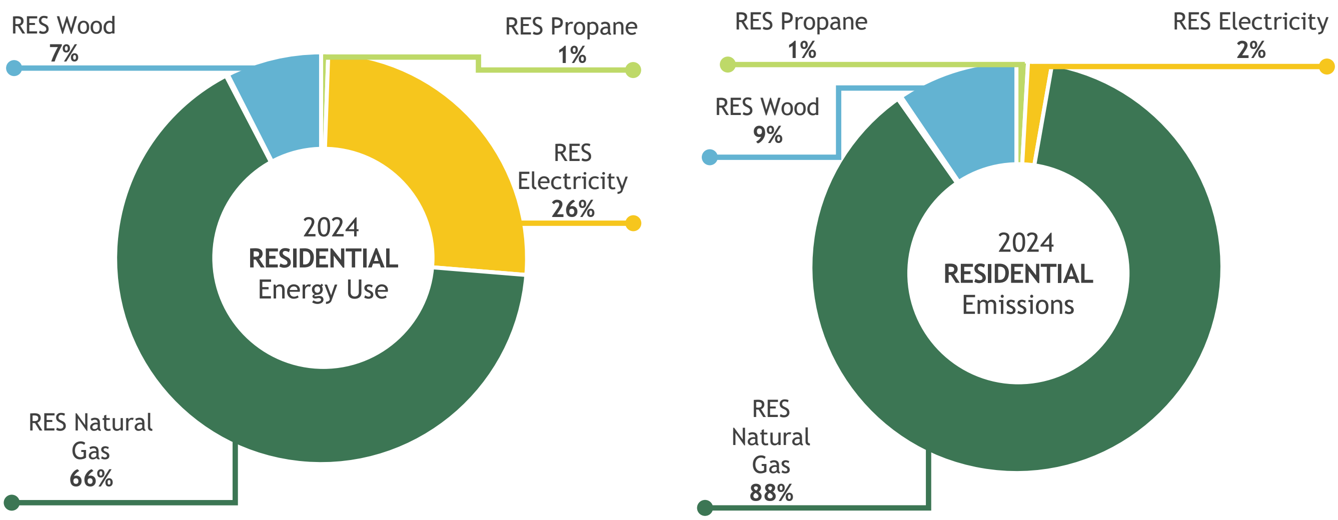


Figure 5: 2024 Residential Energy Use (GJ) and Emissions (tC02e)

OBSERVATIONS FROM THE RESIDENTIAL ENERGY AND EMISSIONS INVENTORY INCLUDE:

- Most energy use in residential applications is derived from natural gas (66%), followed by electricity (26%, followed by wood (7%) and propane (1%).
- A majority of all our residential emissions come from natural gas use (88%), with wood (9%), electricity (2%) and propane (1%) contributing to the remaining emissions.

3.2 LOCAL CLIMATE PROJECTIONS & HAZARD TRENDS

To effectively prepare for this new normal, we need to understand how local temperature and precipitation indicators are expected to change in the future, over the course of the century. Our 'climate profile' will enable us to identify climate hazard trends and gain a better understanding of how their impacts will affect us. For detailed information about climate projections and hazard trends, please refer to Appendix C.

The climate profile information is used in the risk assessment process (see Section 4.2) to incorporate the interaction between a hazard and infrastructure asset, the likelihood of occurrence and the consequence of the interaction.

Climate projections show that the District will experience:

- 3°C rise in average annual temperature by the 2050s.
- Warmer winters.
- A 15% increase in annual precipitation by the 2080s.
- Extreme rainfall events to increase by approximately 14% in the 2050s and up to 31% by the 2080s.
- Longer, hotter summers.
- Very hot days (over 30°C) to increase to 32 days in a year by the 2080s.
- Hottest day to increase from 30.5°C to 37°C by the end of the century.

Projections show that our future climate will be warmer, wetter, and wilder. They provide direction to build on the past work that we have done for resilience and highlight the need to proactively prepare for future impacts. These impacts are evaluated by identifying what climate hazards are relevant to the District and their projected trends (Table 1).

Table 1 - Summary of Climate Hazards and Projected Changes in Key Climate Indicators

Climate Hazard	Climate Indicator Influence on Severity/Likelihood
Wildfire	Increasing summer temperatures and an increasing frequency of very hot days will contribute to conditions conducive to wildfires.
Extreme Heat	Rising summer temperatures and an increasing number of very hot days indicate an increasing frequency of extreme heat events, especially towards the latter part of the century.
Drought	Rising summer temperatures will increase the likelihood of conditions conducive to drought.
Flooding	Precipitation indicators and IDF (intensity, duration and frequency) curves data show that the magnitude and frequency of extreme rainfall events are estimated to increase, which may lead to more flooding events.
Extreme Wind	Research indicates an increased frequency of high-speed wind events in the future for the District.
Freeze/ Thaw Cycles	Global Climate Models (GCMs) show that while warming weather is causing a decrease in the number of freeze/thaw cycles, they will still comprise enough days per year over future time periods to be considered a relevant hazard.
Extreme Cold	While GCMs show extremely cold weather being less frequent and of lower magnitude, very cold days still comprise enough days per year over future time periods to be considered a relevant hazard.

3.2.1 LOCAL PERSPECTIVES

Over the course of this project, interested parties and Indigenous neighbours were consulted to understand their priorities, where they are in their own climate resilience journeys and to identify any future avenues for collaboration.

Detailed information on the engagement activities undertaken for this project can be found in **Appendix D**.

For climate adaptation, the following interested parties were consulted:

- Cameron River Logistics
- Fort St. John & District Chamber of Commerce
- School District 60 Peace River North
- Northern Health – the northern way of caring
- Fort St. John – The Energetic City
- PRRD – Peace River Regional District
- Saulteau First Nations

Additionally, multiple workshops were held with District staff to gather critical institutional knowledge of climate change and impacts and to understand where current resilience gaps exist.

What We Heard

- Climate change is a priority and most of our neighbours and friends have begun work on formal policies and strategies to adapt.
- We need access to current and relevant climate information.
- Need to plan for greater service demand.
- Climate impacts – business and access/evacuation disruptions, physical and mental health impacts.
- Climate-related impacts are a noticeable gap.
- Internal team capacity and education required.
- Future pathways for collaboration: general community resilience, education and awareness for residents, local capacity building.
- We are reactive rather than proactive.
- Underequipped and understaffed.

What does success look like?

- Pre-emptive risk identification so we can serve the public and ensure resiliency.
- Recognizing impacts, maintaining and enhancing levels of service.
- Should educate and build staff capacity.
- Hazard-specific actions.
- A tool to support our decision-making processes.
- Incorporating climate change considerations.
- Minimal interruptions to service.
- Actionable plan.

4.0 WHAT MATTERS MOST?

In the preceding sections, we tracked and understood both the sources of our emissions and the trends and impacts of future climate hazards.

In this section, the mitigation subsection will assess energy reduction opportunities to reduce our energy consumption. Emissions reduction opportunities are also assessed by comparing a business-as-usual (BAU) scenario with an energy or emission reduction scenario based on a specific reduction opportunity.[6] Please refer to **Appendix A** for a detailed comparison of mitigation energy and emissions reduction opportunities.

The adaptation subsection presents highlights from the climate change risk assessment, breaks down our climate risks according to asset class and climate hazard and thematically summarizes the results from the risk assessment.

4.1 MITIGATION

Sections 4 and **5** will examine energy and emission reduction opportunities by comparing a business-as-usual (BAU) scenario with an energy or emission reduction scenario based on a specific reduction methodology. The BAU scenario was established using a baseline year of 2025, which was calculated as the average of the previous three years (2022, 2023, and 2024). In contrast, the energy/emission reduction scenario will estimate energy consumption or emission output for the same sector following the implementation of recommended technologies or strategies.

Both scenarios will be projected through 2040 for each energy/emission reduction opportunity to assess their long-term impacts on energy demand and emission reductions in the District. These projections incorporate a consistent population growth factor of 0.75% per year to estimate future energy demand and emissions.

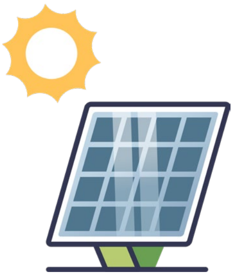
[6] A Business-as-Usual scenario means that no additional efforts are made to reduce GHG emissions.

4.1.1 ENERGY REDUCTION OPPORTUNITIES

This section will identify technologies and methods which can be implemented by the District to **reduce the overall demand for energy within the District**. Please note that while these energy reduction opportunities will lead to corresponding decreases in emissions, they will be less pronounced compared to the significant emissions reductions achievable from specific emissions reduction opportunities.

Mitigation in Action

Communities in northeastern BC, such as Hudson's Hope, have been successful in implementing widespread solar projects. Since the Hudson's Hope Community Solar Initiative (2018), it is estimated that $350,000 has been saved in energy costs and 970 tonnes of CO_2 emissions have been avoided.



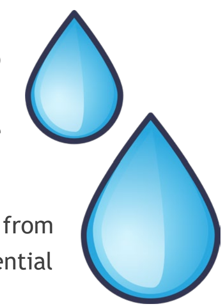
Solar Panels

Solar photovoltaic (PV) power generation is among the most popular renewable energy sources worldwide. This is mainly due to the simplicity of system design and the relatively low installation costs, especially when compared to other renewable energy technologies.

A comparison[7] of energy savings from solar arrays with the total electricity consumption of the District, showed that the District could offset its energy usage by 770 MWh per year under the 100% solar displacement scenario and by 564 MWh per year under the 50% solar displacement scenario.

Water Metering

Overuse of water is a growing issue in many communities, with inefficient use and hidden leaks leading to unnecessary consumption and high costs. Additionally, our high lift pump station, water treatment plant, and wastewater treatment plant use electricity to process and distribute water and wastewater to the community, making waste even more impactful.



A comparison between a BAU scenario and one where a 2025 water metering program was introduced in the District, could reduce the annual electricity demand by 20%.

One way that water use can be lowered is by switching from a flat rate to a water metering program for all residential water users.

Mitigation in Action

An Oxford Economic Paper, "*The effects of the universal metering programme on water consumption, welfare and equity,*" found that installing a water metering program reduced community water use by 22% in England.[8]

[7] Please note that this comparison was based on solar array sizing which would be required to offset 100% and 50% of District building's total annual energy consumption – to a maximum of 100kW array sizing.

[8] https://academic.oup.com/oep/article/73/1/399/5620404

4.1.2 DEMAND SIDE MANAGEMENT MEASURES

Demand Side Management (DSM) refers to a set of strategies and initiatives designed to modify consumer energy use patterns, aiming to reduce overall energy demand, improve efficiency, and lower costs. Rather than focusing on increasing energy supply, DSM targets how energy is consumed.

By encouraging the adoption of energy-efficient technologies, promoting behaviour changes, and optimizing energy use through tools such as smart devices and better infrastructure, DSM helps decrease the reliance on energy sources such as electricity, natural gas, and transportation fuels.

Incorporating the BC Energy Step Code in Local Building Practices

Implementing the BC Energy Step Code for local buildings could offer a structured and proven way to improve energy efficiency in new buildings. Policy makers could incentivize building projects that meet or exceed the BC Energy Step Code, ensuring that both new developments and major renovations align with progressive energy performance targets.

The BC Energy Step Code's incremental approach of starting from baseline energy standards and progressing to more energy-efficient levels gives flexibility to builders and developers while pushing for more energy-efficient construction.

By requiring Step 3 or higher for new builds, the District could reduce future energy demands in the community. Furthermore, updating the building bylaw to incorporate the Energy Step Code could create long-term benefits, reducing energy consumption and operating costs for homeowners and businesses alike.

Energy-Efficient Lighting

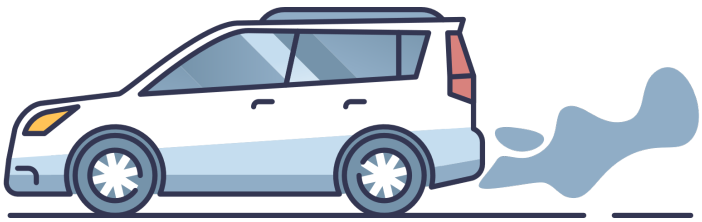
Replacing traditional incandescent lightbulbs with light emitting diode (LED) in our residential and ICI buildings can significantly reduce electricity consumption.

LED bulbs are the recommended bulbs for energy savings, as they only use about 20%[9] of the energy of a traditional incandescent bulb.

[9] https://www.consumerenergycenter.org/led-vs-incandescent-energy-use/

4.1.3 EMISSION REDUCTION OPPORTUNITIES

This subsection will identify technologies and methods that can be implemented within the District to reduce overall emissions, in line with the targets outlined in the OCP (a 16% reduction in emissions by 2030 and a 40% reduction by 2040). While these reductions will also result in a decrease in energy consumption, the primary focus will be on achieving emission reductions. This section will explore emission reduction opportunities by comparing a BAU scenario to a 'low carbon scenario' for a specific sector.



Anti-Idling Policy for Corporate Vehicles

Vehicle idling occurs when a vehicle's engine is running, but the vehicle is not in motion. It is a commonly overlooked action that results in large amounts of avoidable emissions.

Emission data from the corporate fleet vehicle fuel use in the District was acquired for the BAU scenario. Two scenarios were projected: the business-as-usual scenario, and a scenario where a 2025 anti-idling policy was introduced, which reduced the fuel use and therefore the emissions of fleet vehicle fuel use by 10%.

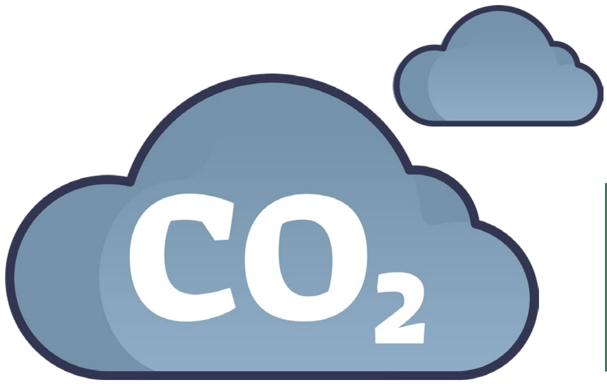
Mitigation in Action

The City of Richmond, BC, implemented an idling-free policy for their corporate fleet vehicles. They saved approximately 10% of their annual fuel costs, equaling $117,000 during the first year of the project's implementation.[10]

Fleet Improvements

We operate approximately 55 vehicles across all departments, excluding the golf carts. This includes pickup trucks, rotary mowers, sweepers and Zambonis. Despite semi-regular fleet upgrades, many are outdated, with an average acquisition year of 2007. Various upgrades/replacements for vehicles have been proposed within the District of Taylor's 2025-2029 Capital Plan.[11] This plan suggests between one and two vehicle upgrades each year between 2025 and 2029. For consistency, an average of two vehicle upgrades per year was assumed for the 2025-2040 period.

[10] https://toolkit.bc.ca/tool/idle-reduction-bylaw/
[11] https://taylor.civicweb.net/document/111886/2025-2029%20Proposed%20Financial%20Plan%20and%202025%20Prop.pdf?handle=1512251A090D464DB7542BEF6FAAAC61



Emission data from the corporate fleet in the District were acquired for the BAU scenario. To produce a low-carbon scenario, the estimated replacement/upgrade of two vehicles per year was utilized.

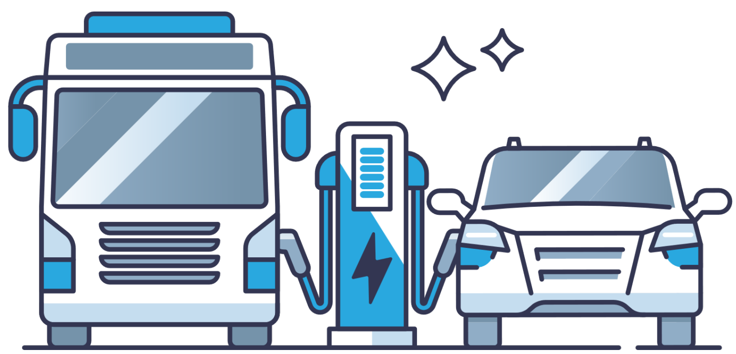
Under this scenario, it is estimated that the District can expect a 20% decrease in emissions reduction per vehicle. By 2040, it is estimated that, compared to the BAU scenario, fleet improvements will reduce our emissions by approximately 18%.

Mitigation in Action

The EPA 2020 Automotive Trends Report states that, on average, vehicles' CO_2 emissions have decreased by 23% from 2004 to 2020, and fuel economy has increased by 29% in the same period.[12].

Fleet Zero Emission Vehicle (ZEV) Replacements

To even further reduce emissions from fleet vehicle fuel use, the District could begin transitioning to an electrified fleet. Given the rapid advancements in electric vehicle (EV) technology and the increasing importance of environmental sustainability, transitioning the existing fleet to ZEVs would support the District's commitment to reducing its carbon footprint. It would also align with BC's Zero-Emission Vehicles Act, which mandates that all new light-duty vehicle sales in the province be zero-emission by 2040.



A comparison between a BAU and low-carbon scenarios found that each District vehicle upgraded to a ZEV resulted in the complete removal of emissions from two fleet vehicles per year, reducing the overall fleet fuel emissions. By 2035, it is estimated that, compared to the BAU scenario, adoption of ZEVs will reduce our emissions by approximately 61%.

4.1.4 ENERGY EFFICIENT RETROFITS

Natural gas use makes up a large portion of the emissions from residential, institutional, commercial and industrial facilities in the District. Much of this natural gas is used for heating buildings. However, a significant amount of this heating is likely wasted due to heat loss, inefficient usage patterns, and outdated heating systems. The following options present several opportunities for us to make our energy usage more efficient.

For all energy-efficient retrofit options, low and medium-carbon scenarios were contrasted to understand the emission reduction potential.

[12] https://www.epa.gov/sites/default/files/2021-01/documents/420s21001.pdf

Building Envelope Retrofits

One of the primary sources of heat loss in buildings is poor insulation. Inadequate insulation in walls, attics, and floors allows heat to escape, leading to higher energy consumption as heating systems work harder to maintain comfortable indoor temperatures. Building retrofits can significantly reduce energy usage, especially for cold climates such as northeastern BC.

Under a low-carbon scenario that retrofits 20% of corporate and 5% of residential buildings annually for 5 years, the District can expect a 30% emission reduction for its buildings. Under a medium carbon scenario that retrofits 20% of corporate buildings annually for 5 years, we can expect a 15% emission reduction for buildings.

Smart and Programmable Thermostats

Another factor contributing to heating inefficiency is the practice of heating buildings when they are unoccupied. A viable solution to this heating issue is the implementation of smart or programmable thermostat technology. These thermostats integrate directly with the heating system, enabling precise temperature control based on building occupancy. By adjusting heating based on when a building is in use, these technologies help optimize comfort while minimizing energy waste, ensuring that heating is reduced when the space is unoccupied.

Mitigation in Action

According to BC Hydro, these intelligent devices help homeowners save approximately 5%[13] on their energy bills by continuously monitoring and adjusting temperature settings based on real-time data and user preferences.

Buildings that adopt smart and programmable thermostats are assumed to reduce emissions by 5%. In the low-carbon scenario, a higher adoption rate (20% annually over five years) results in broader overall emissions reductions across the District, compared to the medium-carbon scenario, which assumes a 10% annual adoption rate annually for 5 years.

Upgrading Inefficient Heating Systems

A major contributor to wasted energy in building heating is the efficiency of the heating system. Upgrading outdated, inefficient natural gas systems to more efficient models can lower emissions and reduce heating costs throughout the system's lifespan.

A scenario where we upgrade 20% of our corporate buildings annually for 4 years (and assumes that 20% are already upgraded), shows that we could expect a 20% emissions reduction if we upgraded to high-efficiency heating systems.

4.1.5 REALICE®

The arena is one of the District's largest sources of emissions, with a significant portion stemming from ice maintenance. RealICE® technology offers two key opportunities for emission reduction: raising rink resting temperatures and lowering the temperature of water used for resurfacing.

A low-carbon scenario shows that adopting RealICE technology would reduce the District's emissions by approximately 8% by the year 2040. This has been approved by Council in June 2025.

4.1.6 SOLID WASTE REDUCTIONS

Municipal solid waste can also be a source of GHG emissions, particularly when items are disposed of in landfills. Transporting our waste to the Peace River Regional District (PRRD) landfill (approximately 35 km), sorting and compacting it into cells, and the waste decomposition within cells contribute to our overall GHG emissions and should not be ignored.

[13] https://www.bchydro.com/powersmart/residential/tips-technologies/smart-thermostats.html?utm_source=chatgpt.com – BC Hydro

Composting of organic waste, such as food scraps and yard trimmings, is an effective method of reducing emissions related to solid waste. The process of composting allows the organic material to break down naturally in a controlled, oxygen-rich environment, producing nutrient-rich compost instead of methane. However, implementing such a service would require setting up a composting facility, which would require significant capital investment and community support.

Home Composting & Recycling

Recycling and composting are essential for reducing landfill waste, cutting methane emissions, and conserving energy, all of which contribute to lowering the carbon footprint and advancing climate change mitigation efforts.

Mitigation in Action

According to the 2018 composition study, 27% of the waste in the PRRD landfill is recyclable material.

Our solid waste tonnage sent to the PRRD landfill was analyzed for the BAU scenario and compared with a low-carbon scenario that assumes adoption of home composting and recycling. The comparison highlighted that the District could achieve almost a 40% reduction in landfill tonnage if home composting and recycling are adopted.

4.1.7 DEMAND SIDE MANAGEMENT MEASURES

This subsection outlines Demand Side Management (DSM) measures specifically aimed at reducing emissions from transportation in the District. With the transportation sector being the largest source of emissions in the community, DSM strategies can play a pivotal role in mitigating these emissions. While these measures will also contribute to lower energy consumption, their primary impact will be a substantial reduction in emissions, bringing us closer to achieving our sustainability objectives.

Transportation Demand Management

Predicting emission reductions from the implementation of DSM measures is challenging, as the savings can vary significantly on a case-by-case basis. For instance, it is difficult to predict how many community members will participate in strategies such as carpooling or adopt active transportation methods such as cycling and walking.

Similarly, if a shuttle service were introduced between Taylor and Fort St. John, surveys would be necessary to estimate potential ridership (demand) and, by extension, the emissions reductions that could be achieved. As a result, specific emission projections for these measures have not been made. However, it is generally expected that their implementation would result in a positive impact on the community's overall emissions.

4.2 ADAPTATION

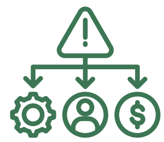
A climate hazard risk assessment was conducted for District assets and services to understand our risk profile and prioritize adaptation measures.

Detailed information for the risk assessment methodology can be found in **Appendix B**.

4.2.1 RISK ASSESSMENT HIGHLIGHTS

7 different climate hazards and projections summarized across 3 future time periods.

11 asset classes and 35 asset subcomponents analyzed for interactions with climate hazards.



151 impact statements[14] developed and rated for consequence and likelihood.

District-wide risk profile developed.

4.2.2 TAYLOR'S RISK SUMMARY

The District's climate impacts and resultant risks were assessed and summarized into the following themes:

Community & Connectivity

Climate hazards affect the places where we live and play, our lifestyles, and our communal fabric. They influence public health and safety, access to our social and recreational opportunities, and the sense of community we're so proud of.

Impacts under this theme include:

- Extreme weather caused power outages, disrupting daily life in the District.
- Greater demand for services due to the increasing frequency of climate hazards.
- Public health and safety risks to staff and community.
- Transportation networks being compromised, affecting not only access but also impairing evacuation routes.

[14] Impact statements are concise statements that outline locally relevant projected threats and how those changes are expected to affect the built, natural, social and economic systems of the District.

District Infrastructure and Services

District infrastructure services such as potable water, sanitary sewers, roads, sidewalks, streetlights and solid waste are essential elements of our community. Additionally, the District also provides multiple facilities and services that enhance residents' quality of life. Climate impacts can include:

- Actual physical damage to District infrastructure and assets, such as the main water pipeline.
- Interruptions to critical services like sewage or potable water, as well as the disruption of general District work such as construction, maintenance and repair efforts.

Natural Environment

Our natural environment, our beautiful landscapes, good water and forests are not only at physical risk from climate hazards such as drought, wildfire or extreme heat, but the crucial environmental services these ecosystems provide, carbon sequestration, stormwater drainage, and pollution control, are also at risk.

Impacts under this theme include:

- Drought affecting our potable water supply.
- Extreme heat events damaging natural vegetation and associated ecosystem services.
- Warming weather accelerating the introduction and impacts of invasive species and pests.

Local Economy and Businesses

Climate change also impacts the financial bottom line for the District. Our businesses and other drivers of the economy are at risk from climate hazards that affect their physical security, operations and business continuity. These can include:

- Impacts on the trade networks that we rely on.
- Direct impacts on businesses, employers and trade networks that we rely on, such as network disruptions or supply shocks.
- Increased direct and indirect costs for business/economic ventures in the form of development restrictions, increased insurance premiums and updated resilience requirements.

4.2.3 RISK BREAKDOWN

The figures below show the District's climate risk breakdown by:

Total Risk **Asset Class** **Climate Hazards**

Total Risks

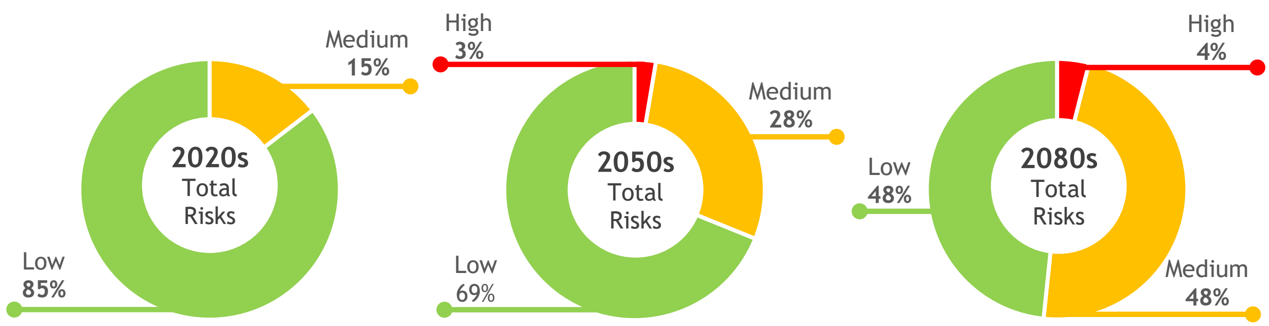
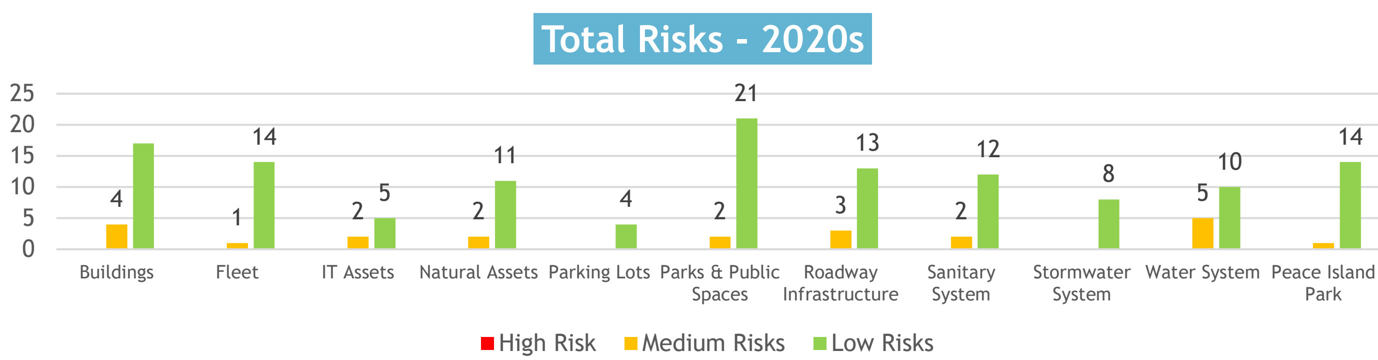
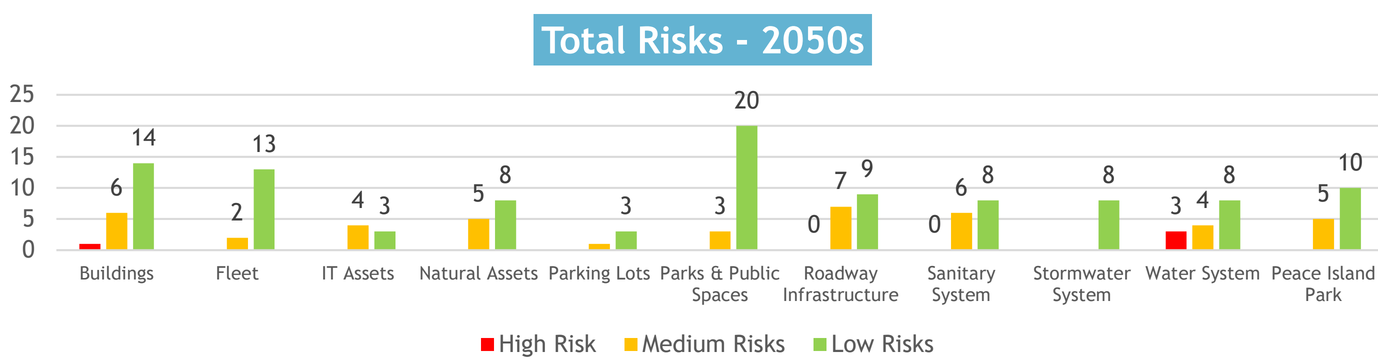


Figure 6: Total Risks by Future Time Periods

By Asset Category





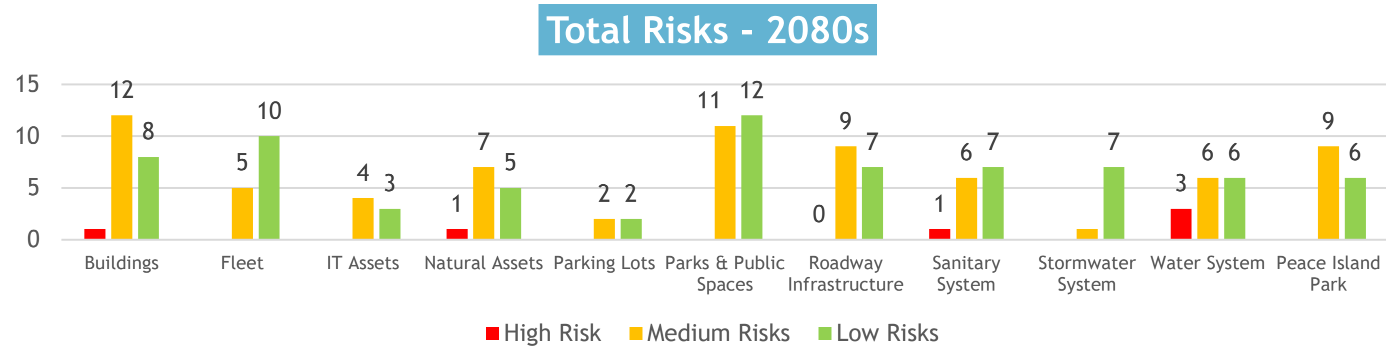
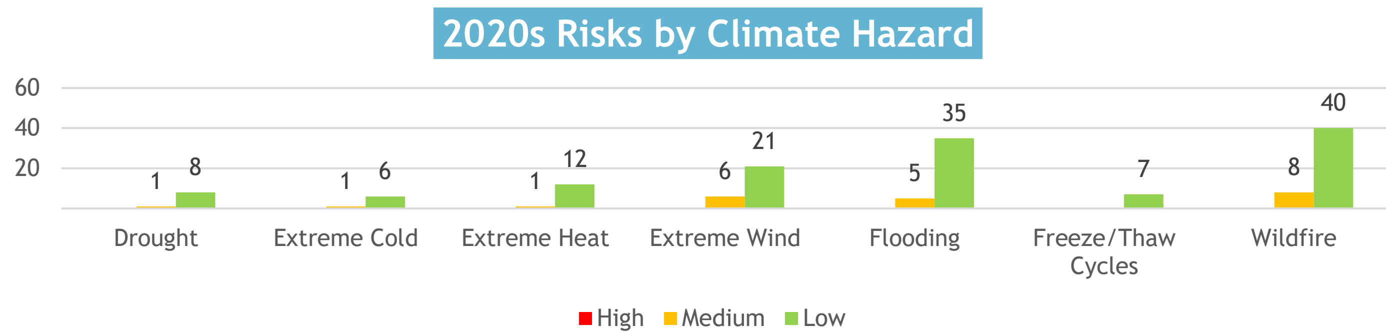
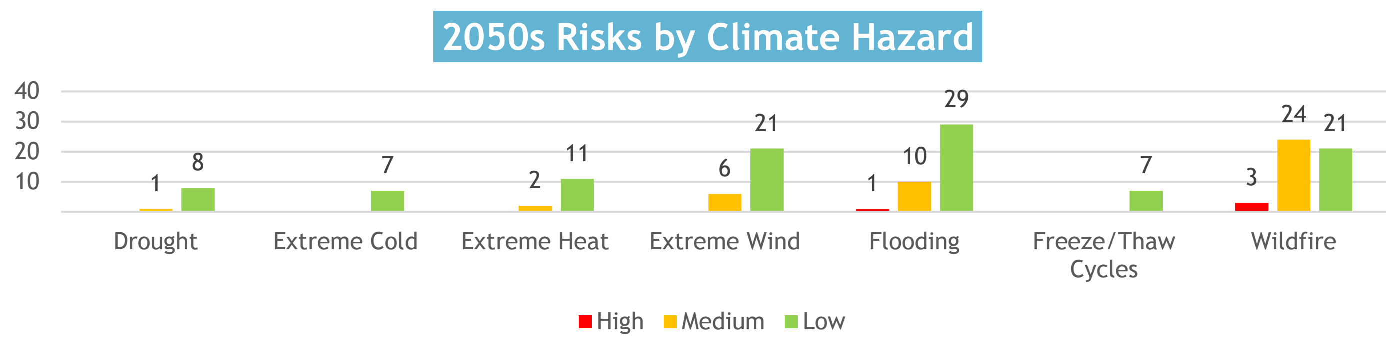


Figure 7: Total Risks by Asset Category

By Climate Hazard





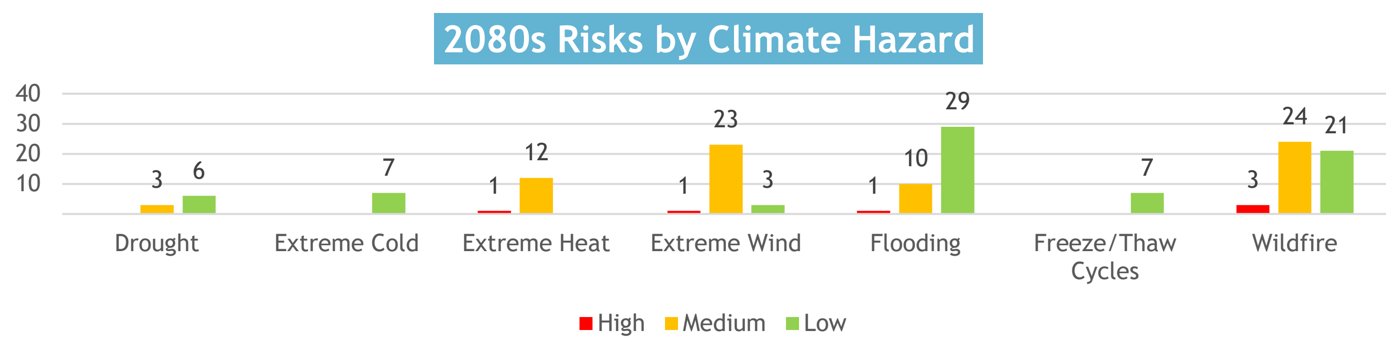


Figure 8: Total Risks by Climate Hazard

The District's risk profile is defined by its unique characteristics. Climate change impacts will be felt across the community spectrum, ranging from health and safety, infrastructure, economic vitality, the natural environment and District services and operations.

As we have seen in the preceding sections, the District's climate risk profile has been divided into 3 future time periods (2020s, 2050s and 2080s). Observations from the summarized risks for each time period include:

2020s

(2011-2040)

- Taylor has no climate risks rated "High" for the 2020s period, a testament to the preceding resilience work undertaken by the District. For the 2020s, Taylor has 22 risks rated "Medium" and 129 rated "Low".
- Of the "Medium" risks, the highest concentration lies in the Water System asset category (5), followed by District Buildings (4) and Roadway Infrastructure (3).
- Wildfire presents the most dangerous hazard for the District in the 2020s commu, with 8 of the total 22 "Medium" risks being assigned to the hazard.

2050s

(2041-2070)

- The District's risk profile shifts in the 2050s with 4 risks rated "High", 43 rated "Medium" and 104 rated "Low". This is because hazard frequency and magnitude increase in the 2050s, leading to higher likelihood ratings, resulting in higher risk scores.
- The "High" rated risks are divided between the Water System (3) and District Buildings (1). The greatest number of "Medium" risks are concentrated in the Roadway Infrastructure (7), Sanitary System (6), District Buildings (6) and Natural Assets (5).
- Wildfire is still the hazard of concern, with 3 of the 4 risks rated "High" being related to it. The greatest number of "Medium" risks in the 2050s are also linked to wildfire (24), followed by flooding (10).

2080s

(2071-2100)

- For the 2080s period, we see a slight increase in the climate risks rated "High" and a greater number of risks graduating from "Low" to "Medium". Again, this is driven by the increasing frequency and magnitude of climate hazards as climate change accelerates. In this time period, the District has a total of 6 risks rated "High" and 72 rated "Medium".
- The "High" rated risks again focus on Taylor's Water System (3), followed by the Sanitary System (1), Natural Assets (1) and Buildings (1).
- Wildfire continues to be the most prevalent climate hazard, driving half (3) of the "High" rated risks. Other hazards of concern for "High" risks are flooding, extreme heat and extreme wind events.

5.0 WHAT WE'RE DOING ABOUT IT

Building on all the information from preceding sections, this section:

- Provides a comparison between two possible mitigation pathways that the District might take to reduce emissions.
- Highlights three main adaptation pathways that address the District's highest rated climate risks.

5.1 MITIGATION ACTIONS

High Impact Actions Scenario

Through **Section 4.1**, a variety of energy use and emissions reduction methods were analyzed for their impacts on the District. While it is important to investigate community emissions, the focus was to provide actionable items to reduce energy and emissions that are within our ability to impact. For this reason, **most recommendations in this section aim to reduce corporate energy and emissions rather than community emissions**.

This section will outline a list of actions by the District that would have a high impact on reducing energy consumption and/or emissions from activities in the community. **Appendix A** outlines the detailed methodology for the high and medium impact scenarios.

As this is an aggressive scenario, many of the actions recommended carry high capital costs and/or levels of effort. The summary of high-impact actions can be found below in **Table 2**.

Table 2 - Summary of Taylor's High Impact Actions Scenario

Recommended Action	Type of Reduction	Primary Affected Party	Duration of Activity	Capital Investment[15]
Solar Panel Installations for 100% Displacement	Energy	Corporate	1-3 Years	$$$
Water Metering	Energy	Community	1 Year	$$$
Anti-Idling Policy	Emissions	Corporate	1 Year or less	$
Fleet ZEV Replacements	Emissions	Corporate	15+ Years	$$$
Low Carbon Scenario for Building Retrofits	Energy and Emissions	Corporate	5 Years	$$$
REALice® Installation	Energy and Emissions	Corporate	Ongoing	$$
Solid Waste Reductions	Emissions	Community	1 Year	$$
DSM Measures (Lighting upgrades, BC Step Code, Transportation Measures)	Energy and Emissions	Corporate and Community	Ongoing	$$-$$$

[15] Capital investment categories are classified as follows: $ for investments up to $50K, $$ for investments between $50K and $500K, and $$$ for investments exceeding $500K

Medium Impact Actions Scenario

The following recommended actions represent the medium-impact scenario. This scenario is similar to the high-impact scenario but contains more focused investments, aimed at actions that are more likely to be embraced by the District and its residents.

Table 3 - Summary of Taylor's Medium Impact Actions Scenario

Recommended Action	Type of Reduction	Primary Affected Party	Duration of Activity	Capital Investment[15][15]
Solar Panel Installations for 50% Displacement	Energy	Corporate	1-3 Years	$$$
Anti-Idling Policy	Emissions	Corporate	1 Year or less	$
Fleet Improvements	Emissions	Corporate	15+ Years	$$$
Medium Carbon Scenario for Building Retrofits	Energy and Emissions	Corporate	5 Years	$$
REALice® Installation	Energy and Emissions	Corporate	Ongoing	$$
Solid Waste Reductions	Emissions	Community	1 Year	$$

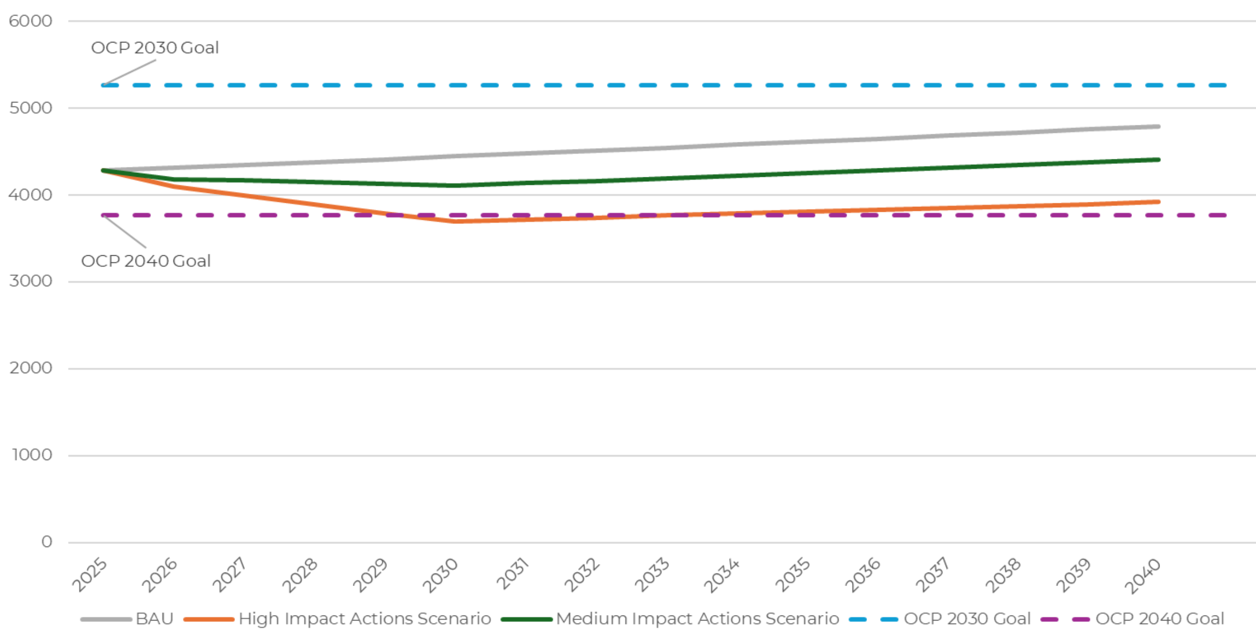


Figure 9: Modelled High And Medium Impact Actions Scenarios Compared Against the BAU Case and OCP Emission Reduction Goals (2025-2040)

As shown in **Figure 9** both the high and medium impact scenarios meet the OCP goal of a 16% reduction in emissions by 2030, compared to 2007 levels. However, according to the figure, neither scenario is projected to achieve the OCP goal of a 40% reduction by 2040 relative to 2007 levels. While difficult to estimate, the DSM measures outlined in **Section 4.1.2** could potentially be significant enough to help the District reach the 2040 OCP goal.

5.2 ADAPTATION PATHWAYS

The response to the District's highest-rated climate risks has been grouped into overarching adaptation pathways. Each pathway is a strategy with multiple proposed options to increase our community's resilience and address the highest-rated risks in that specific category. These pathways complement each other and work together to increase climate resilience in a holistic, strategic manner.

5.2.1 PATHWAY 1: SAFEGUARDING COMMUNITY & CONNECTIVITY

This pathway aims to protect the spaces where we work, live and play and our community members and staff who utilize those spaces. It deals with minimizing the climate risk to public health and the local economy through improving maintenance and management, proactive planning for post-hazard scenarios and acquiring additional information on possible future impacts.

What We're Doing

- Implement and review regular inspections and maintenance to detect weak roof elements of District buildings.
- Updating tree inspection and maintenance protocols to be done more frequently than just annually.
- Advocating BC Hydro for erosion control around important District infrastructure, such as the road around Peace Island Park.
- Considering upgrading power poles with fire-resistant wrappings.
- Exploring reserving power from the South to build resilience to outages.
- Developing a District-wide Firesmart Plan – key adaptation action that addresses multiple identified wildfire-related risks.
- Conduct scour analysis and investigate how climate change and the Site C dam's new hydrological regime will impact the Peace River Taylor bridge – a key evacuation and access point.
- Review the need for a District Business Continuity Plan that considers specific impacts on businesses, District operations and services and charts a more proactive approach to recovery.

FireSmart

What is a District Firesmart Plan & How Will It Help Taylor?

The FireSmart program helps reduce wildfire risks to homes, neighbourhoods, critical infrastructure, and vital natural resources.

The FireSmart program is implemented through seven disciplines to help communities address the threat of wildfire: ***Education***, ***Emergency planning***, ***Vegetation management***, ***Legislation Development***, ***Interagency Cooperation and Cross training***.

This is a key adaptation action for the District because it addresses a wide variety of fire related climate risks from the assessment and results in multiple benefits for Taylor. These include:

- Reduced risk of fire
- Better trained firefighters
- Improved community preparedness and resilience
- Efficient resource allocation

5.2.2 PATHWAY 2: MAINTAINING DISTRICT ASSETS AND SERVICES

The beating heart of our community's well-being is the assets we own and the essential services they provide. This pathway, in accordance with the District's strategic priority of asset maintenance and enhancement, provides adaptation options that improve existing O&M procedures, promote cross-jurisdiction collaboration, proactively guard against future climate shocks and increase the physical protection of these assets.

Install Early Warning/ Fire Detection Systems

- Early Fire Detection systems are sophisticated fire warning systems that have the ability to observe the warming of objects before smoke or flames grow.
- By determining whether the fire occurs in its initial stages, EFD systems can promptly warn building occupants and emergency responders.
- Deploying these systems in Taylor's key infrastructure locations will yield multiple benefits that include:
  - Early warning systems reduce the chance of fatalities (through early evacuation) and increase property protection (through decreased response time)
  - Can result in cost savings by lowering insurance costs, providing advance warning and allowing early action to reduce the amount of damage caused by fire incidents.

What We're Doing

- Conduct hazard tree mapping of key infrastructure sites. Update tree inspection and maintenance protocols to be done more frequently than just annually
- Consider elevating or rerouting vulnerable pipeline sections away from high-risk flood areas.
- Continue to replace ageing or exposed plastic assets with cold-rated composite or rubber.
- Develop a mutual aid agreement with neighbouring communities for emergency water trucking (continue as per BC Hydro agreement).
- Elevate electrical and vulnerable mechanical components above flood level.
- Implement and review regular inspections and maintenance to detect weak roof elements (such as shingles).
- Install early warning/fire detection systems at all key infrastructure locations. – key adaptation action that addresses multiple identified risks.
- Monitor the Pine Water gauge for Peace Island Park to be proactive regarding water level fluctuations.
- Relocate critical functions to flood-safe zones or have modular/mobile treatment backup.
- Secure funding for the second phase of the Water Source Supply assessment. – key adaptation action that addresses multiple identified risks.

Water Source Supply Assessment – Phase 2

Since 2020, we have been continuing with a Long-Term Water Source study to secure an adequate and sustainable amount of safe drinking water.

The first part of the study was performed in 2020 by analyzing the amount of water that our current system can produce. A report was completed at the end of 2022 which identified 4 scenarios (areas) as viable potable water sources for the District. These scenarios were investigated for integration with the existing system, lifespan, relative cost, O&M, land use considerations and regulatory approval. Phase 2 of this assessment was originally anticipated for 2024 and will include considerations and planning for increased storage and alternate water supply sources.

5.2.3 PATHWAY 3: PROTECTING THE NATURAL ENVIRONMENT

The District recognizes and appreciates the key contributions that our natural environment makes to the well-being and sustainability of our community. Not only does it provide drinking water and assist in stormwater management, but it also acts as a habitat for terrestrial and aquatic wildlife, aids in carbon sequestration and makes up some of our favourite recreational places.

This adaptation pathway is geared towards recognizing and protecting our natural environment so it can continue to provide these benefits for future generations of Taylor.

What We're Doing

- Conduct proactive tree pruning and species selection for wind resilience.
- Monitor vulnerable tree species for invasive species and pest stress
- Update integrated pest management in natural asset management planning

Integrated Pest Management (IPM)

Integrated Pest Management (IPM) is a sustainable, science-based approach to managing pests that considers the entire ecosystem and uses a variety of control methods to minimize environmental, health, and economic risks. It focuses on long-term prevention of pests and damage through a combination of techniques, emphasizing minimal reliance on chemical pesticides.

6.0 IMPLEMENTING THE CLIMATE ACTION PLAN

Taylor's strength lies in our ability to adapt and prioritize projects based on current conditions and context. The actions presented in the Plan will be considered for implementation based on multiple criteria, some of which include strategic priorities, health and safety, corporate efficiency, risk mitigation and available funding.

The modelled high and medium-impact mitigation action scenarios demonstrate promising pathways toward reducing emissions in our community. Both scenarios are aligned with the OCP goal of achieving a 16% reduction in emissions by 2030, compared to 2007 levels.

This analysis underscores the importance of continued investment in and commitment to sustainable practices, as well as the need for adaptive strategies to address unforeseen challenges in emission reduction efforts. The scenarios provide a valuable framework for future planning and highlight the potential impact of targeted actions in mitigating climate change at the corporate and community level.

The adaptation actions identified in the Plan are all considered priority actions as they correspond to the highest-rated climate risks. Tools developed for staff during this project will help by acting as a centralized database for the District's climate impacts and risks and identifying key metrics that aid decision-making. These tools are designed to slot into the District's existing Annual Project Form with minimal disruption and embed climate change considerations into staff's existing annual planning processes by including information like alignment details, project rationale and key assumptions, relevant department leads and potential funding opportunities.

As new technological advancements and government policies continue to arise, the Climate Action Plan must evolve and adapt to ensure we're taking advantage of all possible opportunities. New actions and initiatives will be added or modified as technologies change over the coming years. As each action is implemented, we will continue to engage with subject matter experts and the public to understand the challenges and opportunities, and to ensure actions are implemented efficiently and equitably.

7.0 CONCLUSION

As the impacts of climate change become increasingly tangible, we have a responsibility to ensure our community is resilient and adaptable. By taking informed and proactive action, our District is positioned to make the right decisions within the time necessary, using the best available data, tailored to our unique context.

The scenarios and actions identified within the Climate Action Plan provide a blueprint for our staff and partners that will help ensure Taylor continues to grow into a vibrant and livable community for decades to come.

APPENDIX A:

CORPORATE AND COMMUNITY ENERGY PLAN

CORPORATE AND COMMUNITY ENERGY AND EMISSIONS PLAN

DISTRICT OF TAYLOR

November 13, 2025

URBAN SYSTEMS

PREPARED FOR:

District of Taylor
10007 100A St
Taylor BC, V0C 2K0

10808 - 100th Street, Fort St. John, BC V1J 3Z6 | T: 250.785.9697

File: 1770.0081.01

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EXECUTIVE SUMMARY

The District of Taylor is dedicated to addressing climate change by reducing energy consumption and greenhouse gas (GHG) emissions. This report presents a comprehensive Corporate and Community Energy and Emissions Plan (CCEP) designed to guide the community in taking action to lower energy use and emissions at both the corporate and community levels.

It was found that natural gas and electricity are the District's primary corporate energy sources, with 48% and 41% of energy use in 2024, respectively. Natural gas was identified as the largest contributor to corporate emissions, making up 68% of emissions in 2024.

Transportation fuels, such as diesel and gasoline, along with natural gas for corporate, industrial, and residential use, accounted for the largest portions of community energy consumption. Transportation made up 37% of total energy use, while natural gas contributed 46%. A similar trend was observed in community-wide emissions, with transportation fuels accounting for 49% and combined natural gas sources comprising 48% of total emissions.

An investigation of energy and emission reduction strategies was conducted to assess their potential impact on reducing the community's energy use and emissions. Based on this analysis, two scenarios were developed: a high-impact scenario, featuring aggressive actions, and a medium-impact scenario, which includes more moderate, yet effective, measures to reduce environmental impacts in the community. These two scenarios can be seen below.

Table 1 - High-Impact Scenario

Recommended Action	Type of Reduction	Primary Affected Party	Duration of Activity	Capital Investment
Solar Panel Installations for 100% Displacement	Energy	Corporate	1-3 Years	$$$
Water Metering	Energy	Community	1 Year	$$$
Anti-Idling Policy	Emissions	Corporate	1 Year or less	$
Fleet ZEV Replacements	Emissions	Corporate	15+ Years	$$$
Low Carbon Scenario for Building Retrofits	Energy and Emissions	Corporate	5 Years	$$$
REALice® Installation	Energy and Emissions	Corporate	Ongoing	$$
Solid Waste Reductions	Emissions	Community	1 Year	$$
DSM Measures (Lighting upgrades, BC Step code, Transportation Measures)	Energy and Emissions	Corporate and Community	Ongoing	$$-$$$

Table 2 - Medium-Impact Scenario

Recommended Action	Type of Reduction	Primary Affected Party	Duration of Activity	Capital Investment
Solar Panel Installations for 50% Displacement	Energy	Corporate	1-3 Years	$$$
Anti-Idling Policy	Emissions	Corporate	1 Year or less	$
Fleet Improvements	Emissions	Corporate	15+ Years	$$$
Medium Carbon Scenario for Building Retrofits	Energy and Emissions	Corporate	5 Years	$$
REALice® Installation	Energy and Emissions	Corporate	Ongoing	$$
Solid Waste Reductions	Emissions	Community	1 Year	$$

Based on projected cumulative emission reductions across the corporate, residential, and solid waste sectors, both the high-impact and medium-impact scenarios are currently on track to meet the Official Community Plan (OCP) target of a 16% reduction in emissions by 2030, relative to 2007 levels. However, reaching the more ambitious goal of a 40% reduction by 2040 will require the implementation of additional, more aggressive measures.

1.0 INTRODUCTION AND BACKGROUND

Taylor is a community located in north-eastern British Columbia (BC) in a valley along the Peace River, within the District. Local governments across BC, such as the District of Taylor have begun to bear the impacts of changing climate and have taken a leadership role in both mitigating and adapting to climate change. To help address the challenge, the province developed the Local Government Climate Action Program (LGCAP), which provides local governments with predictable funding to plan and implement climate change initiatives. The District is committed to supporting the Province's goal of reducing GHG emissions and building climate resiliency. This report includes the development of a Corporate and Community Energy and Emissions Plan (CCEP), which will help the District implement tangible actions aimed at reducing corporate and community-wide emissions. To accomplish this, the District's existing emissions and relevant documents will be reviewed, future emission scenarios will be forecasted, and key stakeholders will be engaged. The goal of the CCEP is to then identify a vision, targets, action items, and an implementation strategy for priority items.

1.1 PROJECT BACKGROUND

There is broad scientific agreement that human activities, particularly the burning of fossil fuels, are driving significant changes in the natural environment. When fossil fuels are burned, they release GHG's, such as carbon dioxide into the atmosphere. Changes in the level of GHG's in the atmosphere cause fluctuations in the planet's temperature. The addition of GHG's to the atmosphere since the industrial revolution has led to a warming climate, with 2024 being the warmest year in global temperature records dating back to 1850[1]. The increased heat has added more energy to the atmosphere, fueling more intense and frequent climate events such as droughts, wildfires, floods, heatwaves, and storms. Unless actions are taken to reduce emissions, the continued buildup of GHG's will create conditions that favor more severe weather events[2].

Climate mitigation and climate adaptation are the two essential strategies for addressing climate-related challenges. **Climate mitigation** involves efforts to reduce or prevent the emission of GHG's, aiming to limit the extent of climate change by addressing its root causes. This includes actions such as transitioning to renewable energy, improving energy efficiency, using alternative fuels, and adopting low-carbon technologies. The following report will define potential climate mitigation strategies for the District. In contrast, **climate adaptation** focuses on adjusting systems and practices to minimize the impacts of climate change that are already happening or expected to occur. A simultaneous study is being completed (Climate Change Adaptation Plan) to review predicted impacts and measures for adaptation for the District and community of Taylor. Mitigation aims to prevent further climate change, while adaptation assists societies in managing the effects of current or anticipated climate change. Both strategies are essential for an effective response.

Climate related challenges can be addressed at many levels. Globally, initiatives such as the Paris Agreement and Climate Action Summit have brought global leaders together to align their climate goals to prepare ambitious climate agreements. Nationally, Canada has enacted the 2030 Emissions Reduction Plan, outlining a pathway to achieve goals from the Paris agreement. Provincially, BC has released the Zero-Emission Vehicles Act (2019), Climate Change Accountability Act (2007), and Energy Step Code (2017). Within the District of Taylor, the Draft Official Community Plan (2025) has outlined municipal goals

[1] https://climate.copernicus.eu/copernicus-2024-first-year-exceed-15degc-above-pre-industrial-level
[2] https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Headline-statements.pdf

towards a greener future. A summary of actions outlined in these climate related mandates are shown in Table 3.

Table 3 - Governmental Climate Policies and Agreements Summary

Name of Policy	Level of Government	Year	Goals
Paris Agreement	Global	2015	Hold global average temperature below +2°C from pre-industrial levels
Climate Action Summit	Global	2019	Enhance pledges from Paris agreement to cut emissions further
Canadian Net-Zero Emissions Accountability Act	Federal	2021	Sets Canada's 2030 emissions target at a 40-45% reduction from 2005 levels under the Paris Agreement
2030 Emissions Reduction Plan	Federal	2022	40% CAN emissions reduction by 2030, net-zero by 2050, relative to 2005 levels
Zero-Emission Vehicles Act	Provincial	2019	100% zero-emission vehicle (ZEV) sales target by 2035
Climate Change Accountability Act*	Provincial	2007	By 2030, BC emissions will be at least 40% below 2007 levels; by 2040, 60% below; and by 2050, 80% below
Climate Action Charter	Provincial	2007	Local Governments commit to take their own actions towards carbon neutrality (including Taylor)
BC Energy Step Code	Provincial	2017	New buildings in BC will be 20% more energy efficient in 2022, 40% by 2027, and 80% by 2032, when compared to 2018 levels
Official Community Plan	Local	2025	By 2025, Taylor emissions will be at least 16% below 2007 levels; by 2030, 40%

*Formerly titled Greenhouse Gas Reduction Targets Act

The Province of BC has also provided guidance in achieving the ambitious emission reduction goals which have been set. This guidance can be found in the CleanBC Roadmap to 2030[3], and the Climate Preparedness and Adaptation Strategy (Actions for 2022-2025)[4]. To assist communities in following the recommended actions to reduce emissions, the Local Government Climate Action Program (LGCAP) has also been enacted. This program provides local governments with predictable funding to plan and implement climate change initiatives to meet the goals outlined in the CleanBC roadmap. This LGCAP funding is accessible to all signatories of the BC Climate Action Charter[5] and BC Modern Treaty Nations. The District has chosen to use some of their LGCAP funding to invest in a CCEP. The CCEP and Climate Change Adaptation Plan work together to cover the two main actions against climate change: mitigation, and adaptation. The CCEP will focus on the potential reductions in GHG emissions, energy usage and financial savings, by implementing energy and emission reduction tactics.

The District, in conjunction with Stantec Consulting Ltd., produced a Community Energy Plan (CEP) in 2010. This report defined the District's role in working towards provincial and community level climate

[3] cleanbc_roadmap_2030.pdf
[4] https://www2.gov.bc.ca/assets/gov/environment/climate-change/adaptation/cpas.pdf
[5] https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/local-governments/planning-land-use/bc_climate_action_charter.pdf

goals. This CEP included a list of actionable items, with a timeline for initiation (seen in Appendix A). This current CCEP can be seen as a successor to the 2010 CEP, with updated data and goals for the District.

1.2 COMMUNITY BACKGROUND

Many residents of Taylor commute to work in nearby areas, such as Fort St. John. The climate in Taylor can be described as a northern, semiarid climate which experiences short summers and cold winters. The average highest and lowest temperatures in the area are 29°C and -36°C, respectively. Due to the cold winters in the area, a substantial amount of energy is required for heating buildings in the Peace Region. In the climate normal period of 2011-2040, ClimateData estimates that there is an average 5,458 heating degree days per annum in the Taylor Region[6]. A heating degree day is the number of days that the temperature is below 18°C, multiplied by the temperature below 18°C.

The District has experienced fluctuating population growth over the past decade. From 2011 to 2019, the population grew steadily each year; however, from 2020 to 2022, there was a decline in population. In total, from 2011-2022, the average growth rate was 0.8%, with a slower 0.25% rate from 2016-2022[7]. Within the District of Taylor's Draft Official Community Plan (2025), three annual population growth scenarios were developed. These three scenarios are: low growth (+0.25%), medium growth (+0.75%), and high growth (+1.25%). These scenarios aim to forecast potential population changes, recognizing that actual growth will be influenced by factors like economic conditions, immigration, birth rates, and quality of life. These population growth scenarios will be utilized to assist in estimating energy and emission forecasts for the District and the community.

2.0 ENERGY AND EMISSIONS BASELINE

To establish a comprehensive understanding of the current energy consumption and GHG emissions in the District of Taylor, an energy use and emissions baseline was developed for the CCEP. This baseline considers the community and corporate energy and emissions from all reported sources, such as electricity, natural gas, transportation, solid waste, propane, fleet vehicle fuel, fuel oil, and wood. The corporate and community energy uses are reported separately: corporate energy data was compiled by the District. Community energy uses are reported by service providers such as Pacific Northern Gas (PNG) to the province. For corporate energy, historical data could be found dating back to as early as 2003 for some sources. For community energy, historical data could be found dating back to 2007, although various years were subject to data gaps and errors in the dataset.

The corporate and community energy inventories provide energy consumption in standard units of measurement based on the fuel source, for example electricity is reported in kilo-watt hours (kWh) and giga-joules (GJ), while fleet vehicle fuel consumption is measured in litres of gasoline and diesel. To accurately compare fuel consumption, conversion rates were applied to convert all sources of energy into GJ. For GHG emission analysis, emission factors were obtained from the *2024 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions*[8] report, which were used to convert all energy sources into tonnes of carbon dioxide equivalent (tCO_2e) emissions. CO_2e is the standard unit in carbon

[6] https://climatedata.ca/download/?var=hddheat_18#var-download
[7] DRAFT - District of Taylor Official Community Plan (2025)
[8] https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2024_methodology_for_quantifying_greenhouse_gas_emissions.pdf

accounting used to quantify GHG emissions, reductions, and credits, with emissions of other gases converted into an equivalent amount of CO_2 based on their global warming potential.

Emission factors are based on the fuel source and the chemical composition of the fuel. A table containing the emission factors for various fuel types, as well as solid waste is found in Table 4.

Table 4 - Emission Factors for Various Fuels and Solid Waste

Fuel Type / Emission Source	Emission Factor	Units	Source
Propane	60.8-61.2	kg CO2e/GJ	2024 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions
Natural Gas	49.3-50.4	kg CO2e/GJ	2024 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions
Oil	67.7-68.8	kg CO2e/GJ	2024 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions
Wood	41.9-51.6	kg CO2e/GJ	2024 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions
Electricity	2.1-9.0	kg CO2e/GJ	2024 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions
Gasoline	64.5-68.2	kg CO2e/GJ	2024 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions
Diesel	67.3-70.6	kg CO2e/GJ	2024 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions
Solid Waste	300.0	kg CO2e/tonne	Landfilling Of Waste: Accounting Of Greenhouse Gases and Global Warming Contributions

In Table 4 it is seen that all fuel types (excluding solid waste) have variable emission factors. Within the *2024 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions* document, an emission factors catalogue is provided. This catalogue provides the annual emission factors (2007-2024) for various fuels, derived primarily from the National Inventory Report[9]. The variability in emission factors is primarily influenced by factors such as the specific source of the fuel, differences in production and refining processes, and advancements in technology or practices over time, all of which can impact the emissions associated with each fuel type. The emission factors were utilized on an annual basis to reflect changing emission factors.

To convert energy usage into emissions, the emission factor for the fuel is multiplied by the energy usage in GJ. For example, to convert GJ of natural gas used into tonnes of emissions, the energy use would be multiplied by the emission factor and converted into tonnes (seen in Equation 2.1).

[9] https://publications.gc.ca/site/eng/9.506002/publication.html

Equation 2.1 – Conversion of Energy Use to Emissions

$$50{,}000\ GJ_{Natural\ Gas} * \left(50.4\ \frac{\text{kg CO}_2\text{e}}{GJ_{Natural\ Gas}}\right) * \left(\frac{1\ tonne}{1000\ kg}\right) = 2{,}520\ t\ CO_2e$$

2.1 CORPORATE ENERGY AND EMISSIONS INVENTORY

The District's inventory consists of energy and emissions related to corporate activities such as community buildings and corporate fleet vehicles. The four fuel types for corporate activities in Taylor are fleet vehicle fuel (the combination of diesel and gasoline), electricity, propane, and natural gas. A semi-continuous data set (missing data in 2008, 2009, and 2010) is observed from 2007 to 2024. Due to the data gap, the corporate data inventories will only be investigated between 2011 and 2024. The total annual energy usage (normalized to MJ) from all four energy sources can be seen in Figure 1.

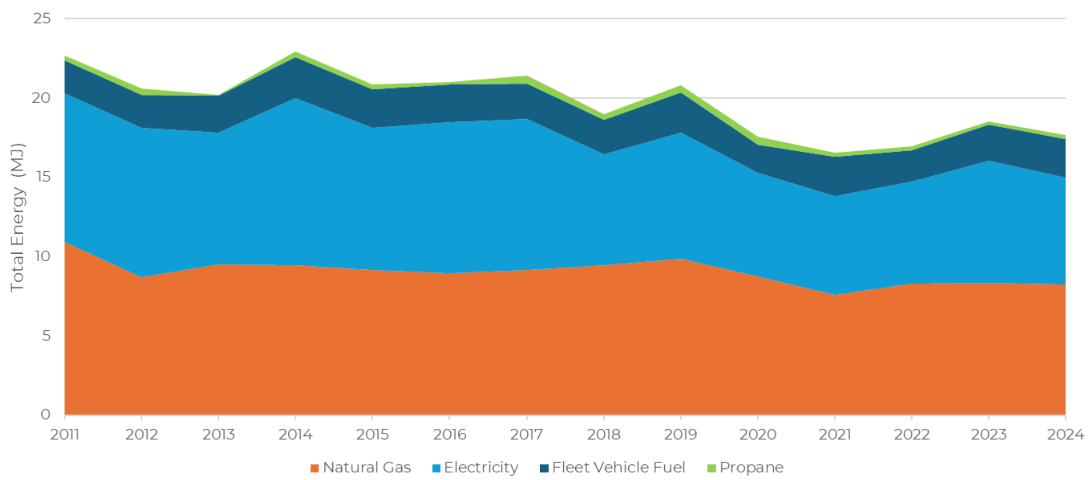

Figure 1 - Annual Corporate Energy Use from District of Taylor by Energy Source (MJ) (2011-2024)[10]

The figure shows that the District's primary sources of corporate energy are natural gas and electricity. The two lesser used energy sources are fleet vehicle fuel and propane. A comparison of 2011 to 2024 energy sources was used to analyze any shifts in energy use patterns from the start to end of the 12-year period. Figure 2, and Figure 3 display the breakdown (by percent) of corporate energy uses in 2011 and 2024.

[10] Proxy data for fleet vehicle fuel data in 2011

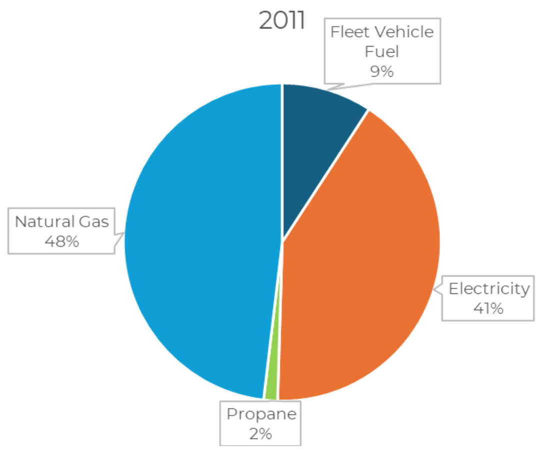

Figure 2 - Breakdown of Corporate Energy Use by Percent of Each Energy Source (2011)

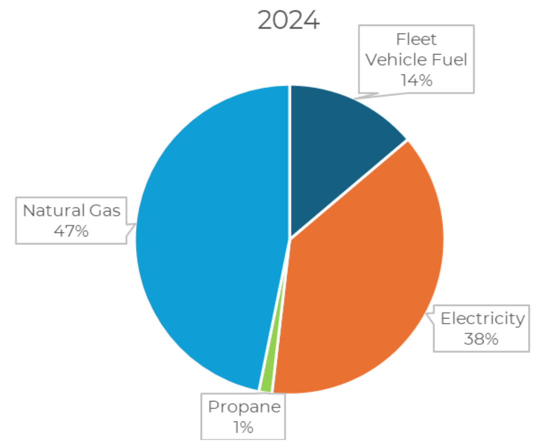

Figure 3 - Breakdown of Corporate Energy Use by Percent of Each Energy Source (2024)

Figures 2 and 3 show a generally consistent trend in energy breakdown. Natural gas and electricity continue to be the primary energy sources, with a slight decrease of 1% in natural gas use and a small decrease of 3% in electricity use. Propane and fleet vehicle fuel also show small changes, with a decrease of 1% in propane use and an increase of 5% in fleet vehicle fuel use.

Using the methodology described in Section 2.0, the energy uses were converted into annual emissions (tCO_2e). The annual emission breakdown by energy source from 2011 to 2024 can be seen below in Figure 4.

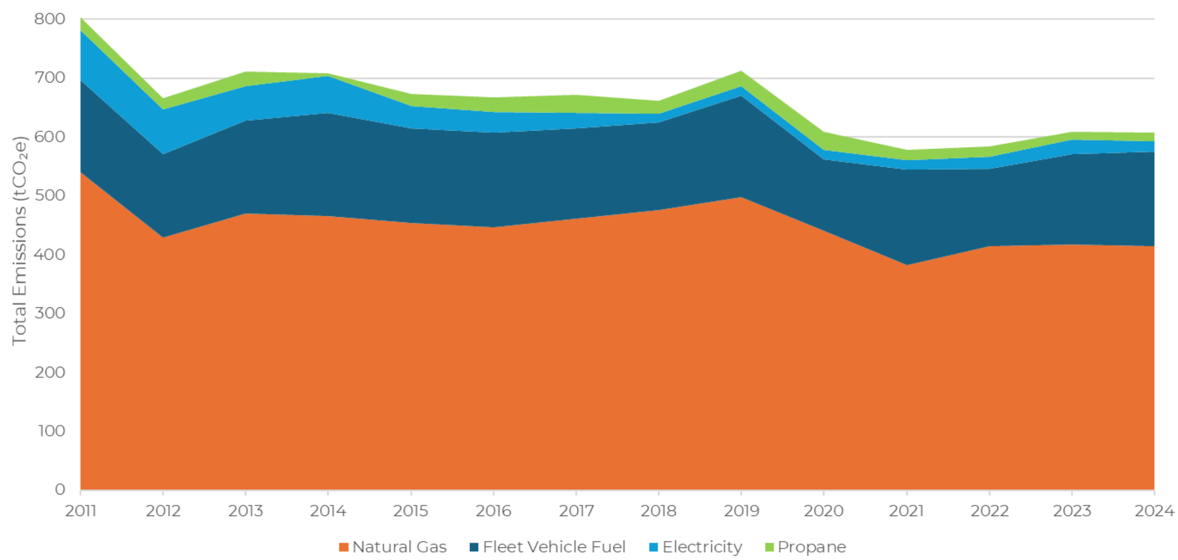

Figure 4 - Annual Corporate Emissions from District of Taylor by Energy Source (tCO_2e) (2011-2024)[11]

The figure above shows a breakdown of emissions from energy sources related to corporate activities by the District. The figure shows that most emissions result from natural gas use, this is both due to the large dependance on the energy source (approximately 45% of energy) and the high emission factor of 49.3-

[11] Proxy data for fleet vehicle fuel data in 2011

50.4 $kgCO_2e/GJ$. The next largest emitting energy source was found to be fleet vehicle fuel. Although this energy source makes up less than 15% of energy used by the District, the high emission factors result in high emissions per unit of energy. The propane and electricity sources make up much smaller portions of the total emissions. For propane, this is due to the small utilization of the fuel. For electricity, this is due to the electrical grid becoming relatively clean in British Columbia. As the emission factor decreases, the associated emissions from electricity use by the District have also declined, as seen in Figure 4.

Between 2019 and 2021, there was a notable decline in natural gas emissions, followed by a slight increase from 2021 to 2024. However, levels remained below those recorded in 2019. This overall reduction can be attributed to several key factors. The COVID-19 pandemic led to a widespread shift to remote work, which significantly decreased the need for heating in corporate buildings. Around 2021 to 2022, the temporary closure of the local curling rink further reduced natural gas demand. Additionally, the community hall underwent a boiler upgrade in 2022 to 2023, replacing the existing unit with a more energy-efficient system. Together, these developments contributed to a sustained decrease in natural gas usage in corporate operations.

A comparison of 2011 to 2024 emission sources was used to analyze any shifts in emission production patterns from the start to end of the 12-year period. Figure 5, and Figure 6 display the breakdown (by percent) of corporate emission sources in 2011 and 2024.

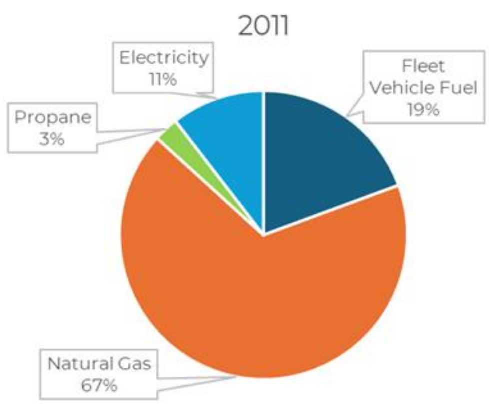

Figure 5 - Breakdown of Corporate Emissions by Percent of Each Source (2011)

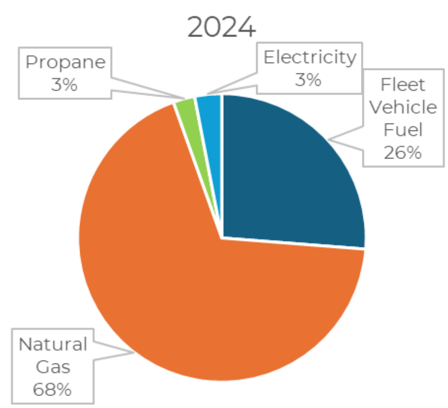

Figure 6 - Breakdown of Corporate Emissions by Percent of Each Source (2024)

Figures 5 and 6 show a generally consistent trend in emissions from the District's sources. Natural gas and fleet vehicle fuel remain the top sources of emissions, with a slight increase of 1% in natural gas emissions and a moderate rise of 7% in fleet vehicle fuel emissions. Emissions from propane experienced no change emissions from electricity decreased by 8%. It is important to note that the decrease in electricity-related emissions is primarily due to the BC Hydro grid becoming cleaner, rather than a reduction in the District's reliance on electricity.

To further investigate the sources of energy use and emissions by the District, the corporate accounts were split up into their associated departments and the top five sources of emissions are displayed in Figure 7.

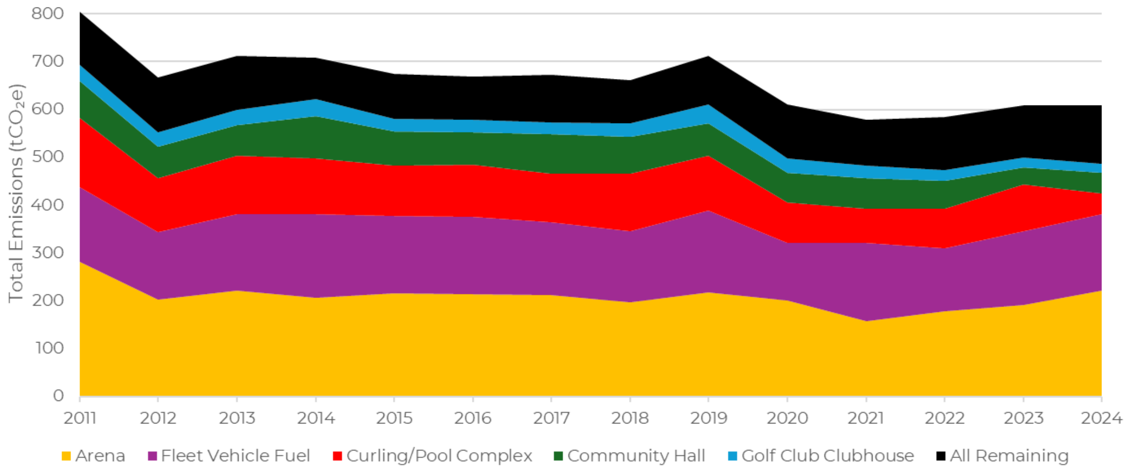

Figure 7 - Annual Corporate Emissions (tCO_2e) from Top Five Emitters in District of Taylor (2011-2024)[12]

The figure above indicates that the top five sources of corporate emissions for the District are the arena, fleet vehicle fuel, the curling/pool complex, the community hall, and the golf club clubhouse, ordered from first to fifth in total annual emissions. For comparison, the remaining emissions for the District are also included in Figure 7. The figure depicts that the arena and fleet vehicle fuel together contribute over 50% of corporate emissions. As these two contribute a large portion of total emissions, special attention will be directed to these sources in the opportunities for energy and emission reduction section.

2.2 COMMUNITY ENERGY AND EMISSIONS INVENTORY

The Taylor community energy and emissions inventory consists of energy and emissions related to residential, institutional, commercial, and small/medium industrial activities within Taylor. The category of institutional energy and emissions contains the corporate energy and emissions from section 2.1. Data for this section was primarily obtained from the provincial *Community Energy and Emission Inventory*[13] online. Supplementary data was obtained through direct requests to provincial government officials and resource suppliers. The 2023 and 2024 public datasets were still undergoing quality assurance processes at the time of collection. Additionally, solid waste data was provided by a representative from the PRRD, as this information is not publicly available.

The community activities include fuel uses for energy/heating (such as propane, electricity, natural gas, heating oil, and wood) as well as transportation and solid waste production. While it is important to investigate community emissions, the focus of this report is to provide actionable items to reduce energy and emissions, that are within the ability of the District to impact. For this reason, **most recommendations in Section 5.0 aim to reduce corporate energy and emissions rather than community**.

A data set was produced from various sources of energy and emission data between 2007 and 2024 (missing some data in 2008, 2009, 2013, 2022, 2023, and 2024). The data was categorized into transportation (all vehicles in Taylor), solid waste (all landfill waste originating in Taylor), residential and

[12] Proxy data for fleet vehicle fuel data in 2011
[13] https://www2.gov.bc.ca/gov/content/environment/climate-change/data/ceei

institutional/commercial/industrial (ICI) sources. Figure 8 presents a summary of all community energy use (normalized to MJ) from 2007 to 2024.

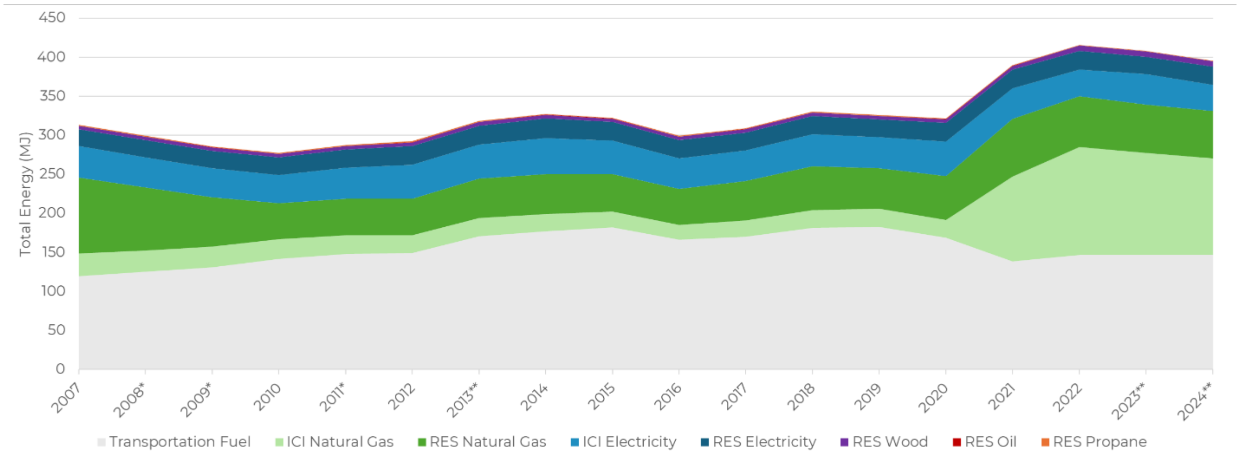

Figure 8 - Annual Community Energy Use (MJ) from District of Taylor by Energy Source (2007-2024)[14]

The figure shows that Taylor's primary energy uses are transportation fuel, both residential and ICI natural gas, and both residential and ICI electricity. The lesser used energy sources are residential wood, propane, and oil. When combining all community energy use, transportation fuel and natural gas from ICI activities make up a significant portion (over 65% in 2024) of total energy use.

A comparison of 2007 to 2024 energy sources was used to analyze any shifts in energy use patterns. Figure 9 and Figure 10 display the breakdown (by percent) of community energy uses in 2007 and 2024.

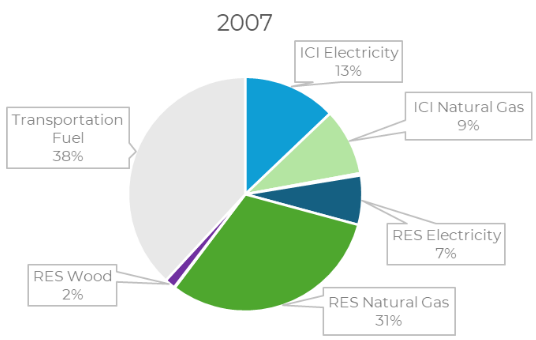

Figure 9 - Breakdown of Community Energy Use by Percent of Each Source (2007)[15]

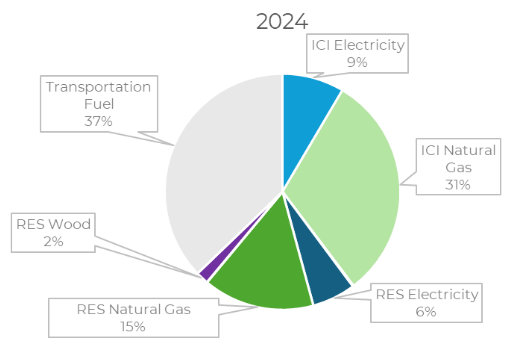

Figure 10 - Breakdown of Community Energy Use by Percent of Each Source (2024)[15]

Figures 9 and 10 show moderate variations in energy use from Taylor's community sources from 2007 to 2024. Natural gas and transportation fuel use remain the top sources of energy in Taylor; however, a large shift in natural gas use occurs from 2007 to 2024, where the majority of gas use shifts from residential to ICI. It is suspected that this large increase in natural gas use from ICI facilities is related to a potential shift in operating procedures from one or more industrial facilities in 2021/2022. Future discussion between the District and industrial partners will investigate the cause of this increase and any potential room for

[14] *Proxy data for natural gas, electricity, wood, oil, and propane **Proxy data for wood, oil, and propane

[15] Negligible sources (<1%) not shown

improvement. Residential wood, oil and propane use are negligible in both reporting years. The most notable shift from 2007 to 2024 is the 23% increase in ICI natural gas.

Using the methodology described in Section 2.0, the energy uses were converted into annual emissions (tCO_2e). The annual emission breakdown by energy source from 2007 to 2024 can be seen below in Figure 11.

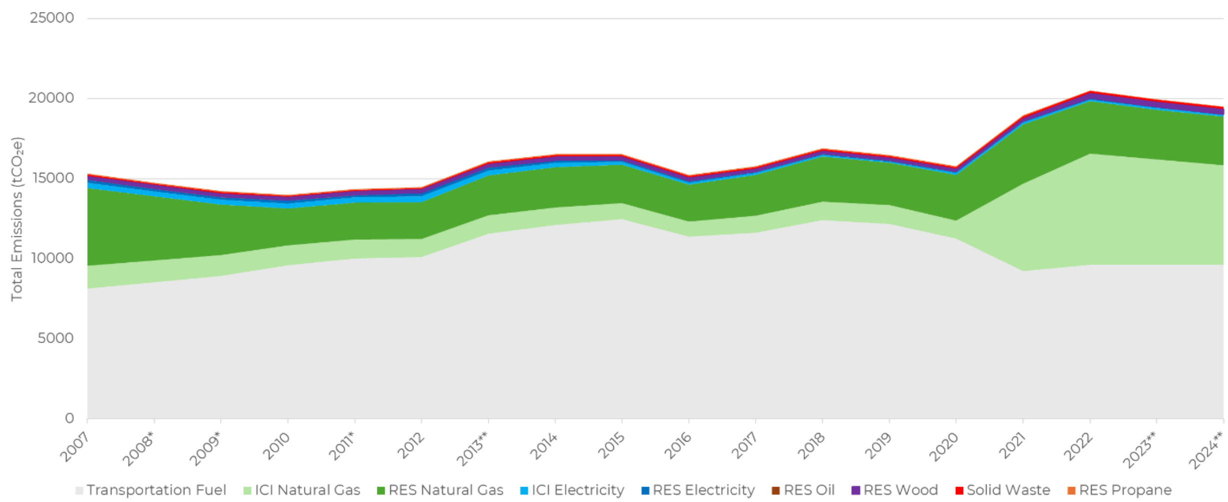

Figure 11 - Annual Community Emissions (tCO_2e) from the District of Taylor by Energy Source (2007-2024)[16]

The figure above shows a breakdown of emissions from energy sources related to community activities in Taylor. Figure 11 shows that most emissions reside from transportation (over 50% most years). This is both due to the large dependance on the energy source and the high emission factors of gasoline and diesel (64.5-68.2 $kgCO_2e/GJ$ and 67.3-70.6 $kgCO_2e/GJ$, respectively). As a nature of servicing in the region, transportation is likely to remain a high driver of emissions.

Since 2021, the second-largest source of emissions has been natural gas, primarily from industrial, commercial, and institutional (ICI) facilities. Before 2021, residential (RES) activities were the main contributors to natural gas-related emissions. This continued dependence on natural gas is linked to the substantial heating required to keep buildings comfortable during Taylor's long, cold winters. As previously mentioned, further investigation is underway to better understand the increase in natural gas use within the ICI sector after 2021. When this increase is excluded, total emissions since 2020 have actually decreased.

Other energy sources such as propane, wood, heating oil, solid waste, and electricity account for a much smaller portion of corporate emissions in Taylor. A comparison of 2007 to 2024 emission sources was used to analyze any shifts in emission production patterns from the start to end of the 17-year period. Figures 12 and 13 display the breakdown (by percent) of community emissions in 2007 and 2024, respectively.

[16]*Proxy data for natural gas, electricity, oil, wood, and propane **Proxy data for oil, wood, and propane

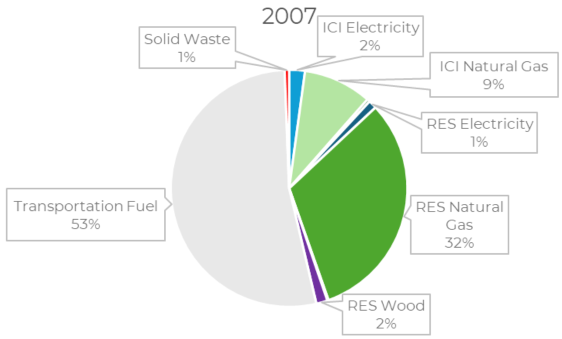

Figure 12 - Breakdown of Community Emissions by Percent of Each Source (2007)[17]

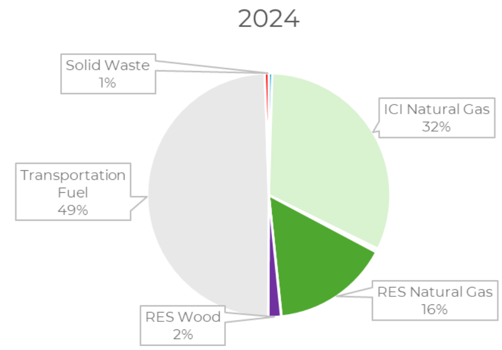

Figure 13 - Breakdown of Community Emissions by Percent of Each Source (2024)[17]

Figures 12 and 13 show notable changes in emission production from Taylor's community sources between 2007 and 2024. Natural gas and transportation fuels remain the primary sources of emissions, together accounting for 97% of emissions from these two fuel types in 2024. A clear shift in natural gas use is observed, with the majority of consumption transitioning from the residential to the industrial, commercial, and institutional (ICI) sectors. Residential use of wood, oil, and propane remains minimal in both years. The most prominent change during this period is a 23% increase in ICI natural gas use. As previously mentioned, this increase is currently being investigated in collaboration with the industrial working group.

2.3 RESIDENTIAL COMMUNITY ENERGY AND EMISSIONS INVENTORY

Upon reviewing the total community energy use and emissions in Section 2.2, it became clear that the bulk of community emissions in Taylor were primarily from transportation and ICI-related natural gas, particularly after 2020. As a result, it was decided to investigate residential specific community emissions (including natural gas, electricity, wood, and oil) separately in this section. By separating residential emissions from total community emissions, this approach provides a more accurate depiction of energy use and emissions that are directly within the control of Taylor's residents, in contrast to Section 2.2, which includes a broader range of activities.

A data set was produced from various sources of energy and emission data between 2007 and 2024 (missing some data in 2008, 2009, 2013, 2022, 2023, and 2024). The data was categorized into the five sources of fuel use among residential activities. Figure 14 presents a summary of all residential community energy use (in MJ) from 2007 to 2024.

[17] Negligible sources (<1%) not shown

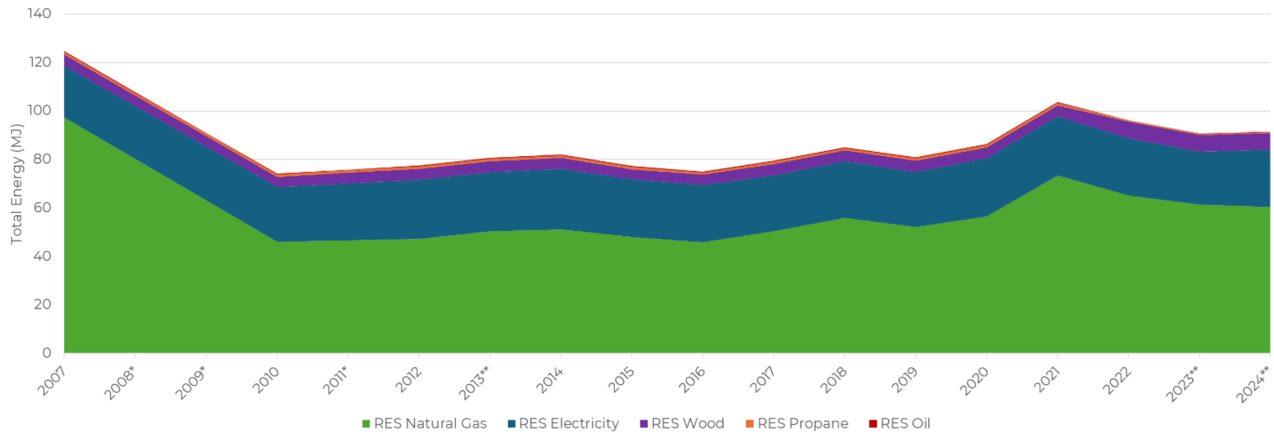

Figure 14 - Annual Residential Specific Community Energy Use (MJ) in Taylor by Energy Source (2007-2024)[18]

The figure above shows a breakdown of energy use related to residential community activities in Taylor. The figure shows a trend of decreasing energy use from 2007 to 2010, followed by a steady/slowly increasing demand for energy from 2010 to 2021, and a final decrease in energy consumption from 2021 to 2024. It is visible that most energy use in residential applications is derived from natural gas, followed by electricity. This follows the expectations for the region as a significant amount of energy must be spent on heating homes during the winters that Taylor experiences, most of which is derived from natural gas and electricity.

A comparison of 2007 to 2024 energy sources was used to analyze any shifts in energy use patterns from the start to end of the 17-year period. Figure 15 and Figure 16 display the breakdown (by percent) of residential specific community energy uses in 2007 and 2024.

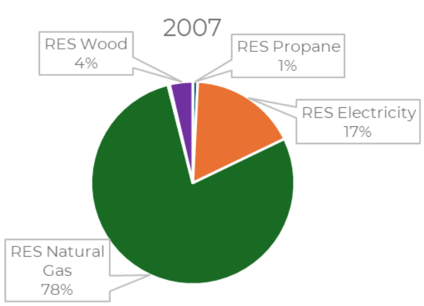

Figure 15 - Breakdown of Residential Community Energy Use by Percent of Each Energy Source (2007)[19]

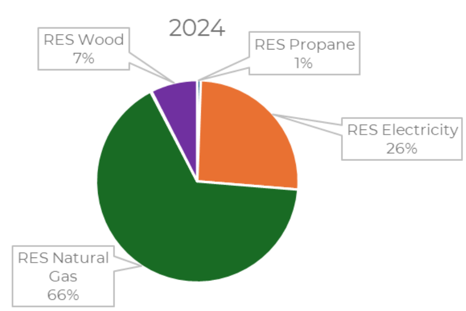

Figure 16 - Breakdown of Residential Community Energy Use by Percent of Each Energy Source (2024)[19]

Figures 15 and 16 illustrate a moderate change in energy usage trends for Taylor's residential sources. Natural gas and electricity continue to be the primary energy sources for residential uses, with natural

[18] *Proxy data for natural gas, electricity, wood, propane, and oil **Proxy data for wood, propane, and oil

gas usage decreasing by 12% and electricity usage increasing by 9%. Additionally, wood use as a fuel source shows a slight increase of 3% over the 17-year period.

Using the methodology described in Section 2.0, the energy sources were converted into annual emissions (tCO_2e). The annual emission breakdown by energy source from 2007 to 2024 can be seen below in Figure 17.

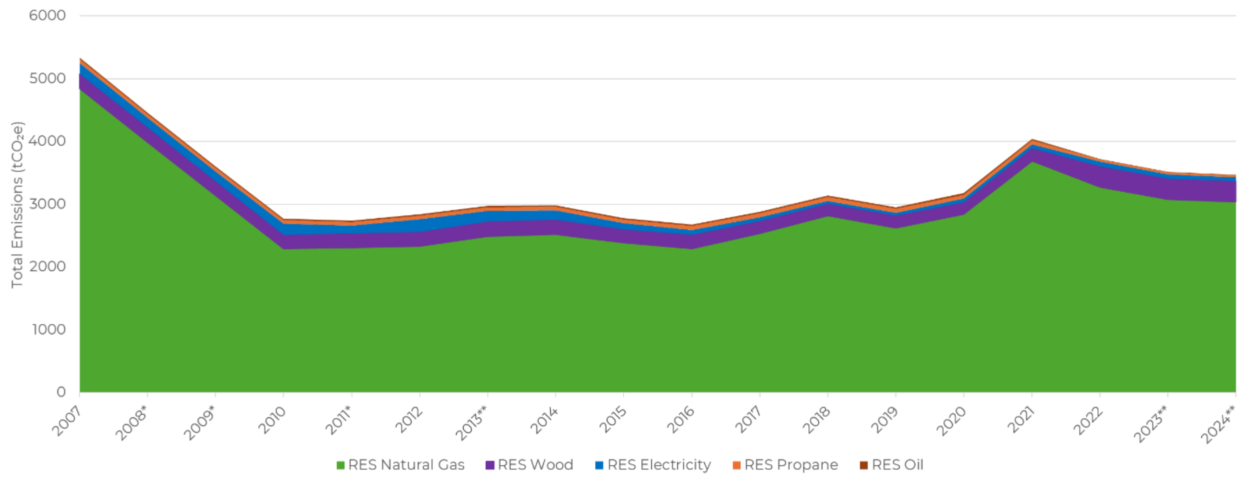

Figure 17 - Annual Residential Community Emissions (tCO_2e) in Taylor by Energy Source (2007-2024)[20]

The figure above shows a breakdown of emissions from energy sources related to residential activities in Taylor. It highlights that nearly all emissions come from natural gas use, driven by both the high reliance on this energy source (over 65% of total energy) and its high emission factor (49.3-50.4 $kgCO_2e/GJ$). The emissions trend over the 17-year period mirrors energy use patterns: a decrease from 2007 to 2010, followed by a gradual increase in emissions from 2010 to 2021, and a final decline in emissions from 2021 to 2024. Similar to emission breakdowns for Corporate and Community sources, emissions from electricity, wood, oil, and propane each contribute very little to the total emissions.

From 2020 to 2021, there was a notable rise in natural gas emissions, followed by a gradual decline from 2021 to 2024. In 2021, PNG revised its billing structure by consolidating Taylor and South Taylor, which added 116 new accounts to the existing 528. This expansion, along with the possibility of increased at-home energy use due to the COVID-19 pandemic, likely contributed to the spike in natural gas consumption.

A comparison of 2007 to 2024 emission sources was used to analyze any shifts in energy use patterns from the start to end of the 17-year period. Figure 18, and Figure 19 display the breakdown (by percent) of community emissions in 2007 and 2024.

[19] Negligible sources (<1%) not shown

[20] *Proxy data for natural gas, wood, electricity, propane, and oil **Proxy data for wood, propane, and oil

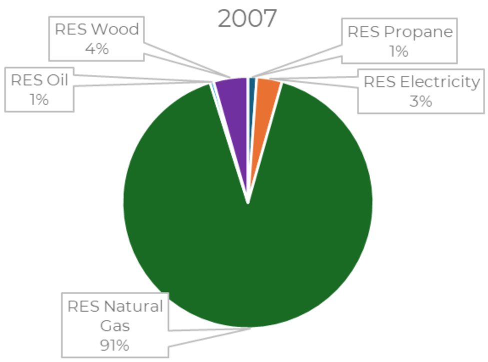

Figure 18 - Breakdown of Corporate Emissions by Percent of Each Source (2007)[21]

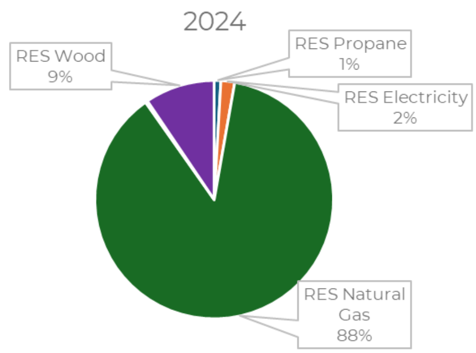

Figure 19 - Breakdown of Corporate Emissions by Percent of Each Source (2024)[21]

Figures 18 and 19 demonstrate minimal variation in emissions from Taylor's residential community sources between 2007 and 2024. Natural gas continues to be the leading source of emissions for both years, showing a small decrease of 3% from 2007 to 2024. Wood emissions are the second highest, increasing by 5% over the same period. Contributions from electricity, propane, and oil remain minimal, each accounting for only 0-3% of the total emissions annually.

3.0 BUSINESS-AS-USUAL PROJECTIONS

Sections 4 and 5 will examine energy and emission reduction opportunities by comparing a business-as-usual (BAU) scenario with an energy or emission reduction scenario based on a specific reduction methodology. The BAU scenario will be established using a baseline year of 2025, which is calculated as the average of the previous three years (2022, 2023, and 2024). In contrast, the energy/emission reduction scenario will estimate energy consumption or emission output for the same sector following the implementation of recommended technologies or strategies.

Both scenarios will be projected through 2040 for each energy/emission reduction opportunity to assess their long-term impacts on energy demand and emission reductions in Taylor. These projections will incorporate a consistent population growth factor of 0.75% per year, as defined in Section 1.2 under the medium growth scenario, to estimate future energy demand and emissions.

4.0 ENERGY REDUCTION OPPORTUNITIES

In Section 2, the corporate and community energy uses in Taylor were examined. It was determined that natural gas, electricity, and transportation were all significant sources of energy use in the community. This section will identify technologies and methods which can be implemented by the District to **reduce the overall demand for energy within Taylor**. While these reductions will lead to corresponding decreases in emissions, the primary focus on electricity use means that the impact on emissions will be less pronounced compared to the significant reductions in energy consumption.

[21] Negligible sources (<1%) not shown

4.1 SOLAR PANELS

Solar photovoltaic (PV) power generation is among the most popular renewable energy sources worldwide. This is mainly due to the simplicity of system design and the relatively low installation costs, especially when compared to other renewable energy technologies.

Communities in northeastern BC, such as Hudson's Hope, have been successful in implementing widespread solar projects. Since the Hudson's Hope Community Solar Initiative (2018), it is estimated that $350,000 has been saved in energy costs and 970 tonnes of CO_2 emissions have been avoided[22].

For facilities with significant energy needs, driven by their operational demands, transitioning to cleaner energy is an effective way to reduce emissions. In Taylor, facilities such as the high lift pump station and water treatment plant, arena, complex, wastewater treatment plant, community hall, golf club maintenance building, and public works shop could significantly benefit from solar solutions, helping to reduce electricity consumption (and costs) while also lowering emissions.

To assist in the capital investment of solar arrays, BC Hydro has enacted the self generation program. For businesses, this program will provide rebates up to $50,000 ($25,000 for panels, $25,000 for battery storage system)[23] for arrays up to a sizing of 100 kW and maximized to a net zero production capacity.

4.1.1 ENERGY REDUCTION PROJECTION

Energy consumption data from the facilities of highest electricity demand in the District were obtained. The 2024 consumption data from these buildings was used as a representative estimate of the facility's average annual consumption for sizing solar installations. The wastewater treatment plant should be reanalyzed in 2026, as a new meter and additional usage will be introduced in late 2025.

[22] https://hudsonshope.ca/district-office/solar-energy/
[23] https://www.bchydro.com/powersmart/business/programs/business-solar-battery.html

Using the Global Solar Atlas[24], the yield of solar power in kilowatt-hour/kilowatt installed was determined to be 1254 in Taylor, BC. This value was used to determine solar array sizing which would be required to offset 100%, 75%, and 50% of each building's annual energy consumption. The results, rounded to the nearest 5 kW to align with standard panel sizes, are shown in Table 5. Due to sizing limitations of the current self-generation program with BC Hydro (100 kW), the higher electricity use buildings were maxed out at 100 kW sizing, and that corresponding energy production reduction.

Table 5 - Solar Array Sizing (kW) to Offset Annual Electricity Consumption at Corporate Facilities (Limited to 100 kW)

Facility	Solar Array Sizing (kW) by Percent of Annual* Energy Consumption Displaced		
	100%	**75%**	**50%**
High Lift Pump Station and Water Treatment Plant	100	100	100
Arena	100	100	100
Curling/Pool Complex	100	100	95
Wastewater Treatment Plant	100	100	50
Community Hall	95	75	50
Golf Club Maintenance Building	85	65	40
New Public Works Shop	35	25	15

**Assuming 2024 electricity data is representative of future years*

The annual energy production potential for each solar array installation were calculated based on the solar power yield specific to Taylor, BC. A summary of energy production by solar array, converted to Megawatt-hours (MWh), is presented in Table 6.

Table 6 - Solar Energy Production (MWh) by Percent of Annual Energy Consumption Displaced

Facility	Clean Energy Produced (MWh) by Percent of Annual* Energy Consumption Displaced		
	100%	**75%**	**50%**
High Lift Pump Station and Water Treatment Plant	125	125	125
Arena	125	125	125
Curling/Pool Complex	125	125	119
Wastewater Treatment Plant	125	125	63
Community Hall	119	94	63
Golf Club Maintenance Building	107	82	50
New Public Works Shop	44	31	19

**Assuming 2024 electricity data is representative of future years*

To compare the energy savings from the solar arrays with the total electricity consumption of the District, the annual electricity consumption from all corporate facilities was obtained. Three scenarios were then plotted on a line graph: the business-as-usual scenario, and two solar array installation scenarios (the 100% and 50% displacement scenarios). This graph is presented in Figure 20.

[24] https://globalsolaratlas.info/map?c=56.15079,-120.681527,14&r=CAN&s=56.15035,-120.677794&m=site

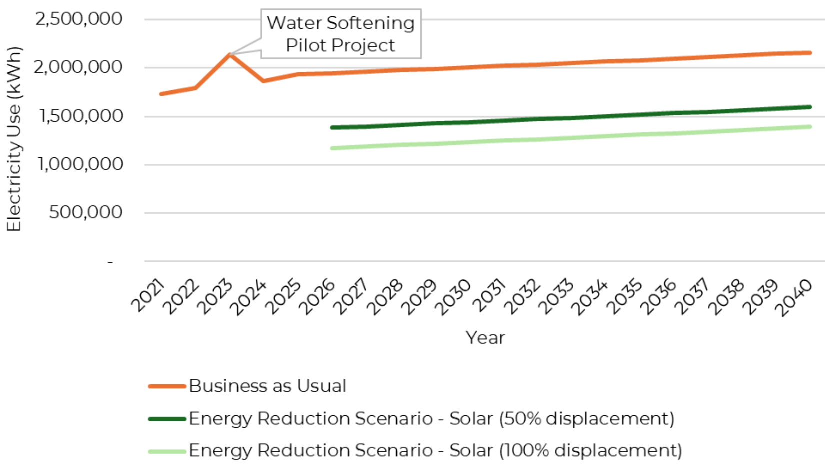

Figure 20 - Corporate Electricity Use (kWh) in BAU and Energy Reduction Scenarios (2021-2040)

4.1.2 LIMITATIONS

Under BC Hydro's Self Generation program, the current maximum nameplate capacity is 100 kW. If the District decides they are interested in one or more of the solar opportunities introduced above, a feasibility analysis should be conducted.

As outlined in Section 2.3, electricity consumption accounted for a significant portion of total residential energy use in recent years (26% in 2024). The solar array sizes needed to displace 50%, 75%, or 100% of residential energy use are generally not expected to exceed the 100-kW capacity. Due to the complexity of individual household energy loads and the varying availability of funding for residential buildings, an analysis of solar installations for residential properties was not included within the scope of this report. However, several programs offer incentives to support these installations. For example, the BC Hydro Self-Generation Program provides funding for residential, grid-connected solar systems, offering rebates of up to $5,000 for solar panels and an additional $5,000 for a battery storage system[25]. Other potential funding opportunities include the Green Municipal Fund, a program of the Federation of Canadian Municipalities (FCM), which can cover up to 50% of eligible energy upgrade costs, with grants up to $500,000. Additionally, the Clean Technology (CT) Investment Tax Credit (ITC) offers a refundable tax credit of 30% of the capital cost of the product or installation[25].

4.2 WATER METERING

Overuse of water is a growing issue in many communities, with inefficient use and hidden leaks leading to unnecessary consumption, high costs, and added pressure on local resources. Additionally, the high lift pump station, water treatment plant, and wastewater treatment plant in Taylor use electricity to process and distribute water to the community, making water waste even more impactful. One way that water use can be lowered is by switching from a flat rate to a water metering program, for all residential water users. The user would be charged for their water usage, at a billing interval decided on by the municipality.

[25] https://app.bchydro.com/accounts-billing/electrical-connections/self-generation.html?utm_source=direct&utm_medium=redirect&utm_content=selfgeneration

Water metering can also assist in identifying small, otherwise unnoticeable water leaks. Even a leaky tap or bad pipe fitting can account for a large amount of water over a long timespan. Water metering allows the user/homeowner to track their water use and to flag any unexpected changes in consumption.

The application of water meters incentivizes water conservation. The direct connection between water usage and utility costs motivates individuals to use less water. By implementing water metering, consumers are charged based on the volume of water they consume. This pricing model encourages more mindful usage, as users naturally seek to reduce their bills by cutting back on unnecessary water use.

4.2.1 ENERGY REDUCTION PROJECTION

Electricity consumption data from the high lift pump station, water treatment plant, and wastewater treatment plant in Taylor were analyzed to assess the impact of implementing a water metering program. An Oxford Economic Paper "*The effects of the universal metering programme on water consumption, welfare and equity"* found that installing a water metering program reduced community water use by 22% in England[26]. To provide conservative estimates, a 20% reduction in water use was assumed to be the result of installing a water metering program in Taylor, BC.

The electricity demand for the high lift pump station, water treatment plant, and wastewater treatment plant was analyzed for potential reductions from the implementation of a water metering programme. Two scenarios are presented: the business-as-usual scenario, and a scenario where a 2025 water metering program was introduced in Taylor, which reduces the annual electricity demand on the high lift pump station, water treatment plant, and wastewater treatment plant by 20%. This graph can be seen in Figure 21.

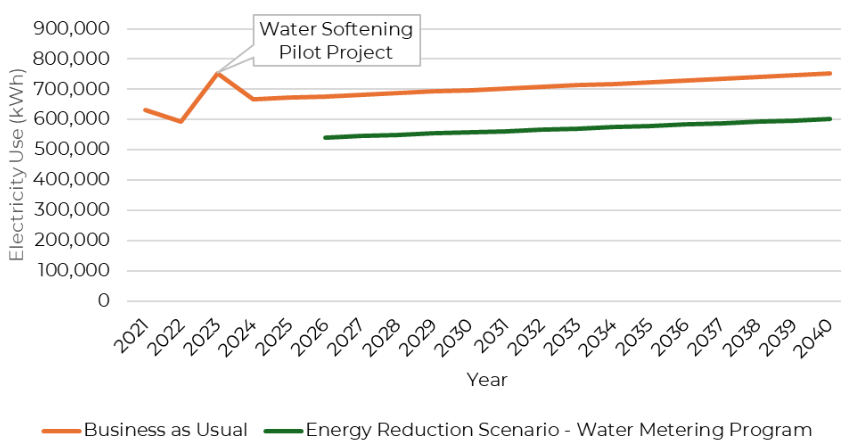

Figure 21 - Water Resource Infrastructure Electricity Use (kWh) in BAU and Energy Reduction Scenarios (2021-2040)

4.2.2 LIMITATIONS

A challenge with water metering for the District is the prevalence of mobile homes, which often have uninsulated water connections. To keep the water meter functional during the winter, it needs to be heated, insulated, or placed in a heated area within the building. In the past, water meters have frozen during winter, leading to water supply disruptions and additional costs for users and/or the District due

[26] https://academic.oup.com/oep/article/73/1/399/5620404

to damaged equipment. It is recommended that solutions to this limitation are explored if water metering is chosen as an energy reduction method of interest.

4.3 DEMAND SIDE MANAGEMENT MEASURES

Demand Side Management (DSM) refers to a set of strategies and initiatives designed to modify consumer energy use patterns, aiming to reduce overall energy demand, improve efficiency, and lower costs. Rather than focusing on increasing energy supply, DSM targets how energy is consumed. By encouraging the adoption of energy-efficient technologies, promoting behavior changes, and optimizing energy use through tools such as smart devices and better infrastructure. DSM helps decrease the reliance on natural resources like electricity, natural gas, and transportation fuels. This not only leads to reduced energy consumption and lower utility bills but also supports sustainability by minimizing environmental impacts.

4.3.1 INCORPORATING THE BC ENERGY STEP CODE IN LOCAL BUILDING PRACTICES

Implementing the BC Energy Step Code for local buildings could offer a structured and proven way to improve energy efficiency in new buildings. Policy makers could incentivize building projects that meet or exceed the BC Energy Step Code, ensuring that both new developments and major renovations align with progressive energy performance targets.

The BC Energy Step Code's incremental approach of starting from baseline energy standards and progressing to more energy-efficient levels gives flexibility to builders and developers while pushing for more energy-efficient construction. By requiring Step 3 or higher for new builds, Taylor could reduce future energy demands in the community. Furthermore, updating the building bylaw to incorporate the Energy Step Code could create long-term benefits, reducing energy consumption and operating costs for homeowners and businesses alike.

4.3.2 ENERGY-EFFICIENT LIGHTING

Replacing traditional incandescent lightbulbs with light emitting diode (LED) in residential and ICI buildings can significantly reduce electricity consumption. LED bulbs are the recommended bulb for energy savings as they only use about 20%[27] of the energy of a traditional incandescent bulb.

4.3.3 LIMITATIONS

Predicting energy use reductions from the implementation of DSM measures can be challenging, as savings tend to vary on a case-by-case basis. As a result, no specific energy reduction projections were made for these measures. However, it is generally assumed that their incorporation would lead to a positive impact on the community's overall energy consumption.

5.0 EMISSION REDUCTION OPPORTUNITIES

In Section 2, the corporate and community energy use in Taylor was examined, revealing that natural gas and transportation (both corporate fleet and community vehicles) were the primary sources of emissions within the community. This section will identify technologies and methods that can be implemented within the community to reduce overall emissions in Taylor, in line with the targets outlined in the OCP. These targets aim for a 16% reduction in emissions by 2030 and a 40% reduction by 2040. While these

[27] https://www.consumerenergycenter.org/led-vs-incandescent-energy-use/

reductions will also result in a decrease in energy consumption, the primary focus will be on achieving emission reductions.

This section will explore emission reduction opportunities by comparing a BAU scenario to a 'low carbon scenario' for a specific sector. The BAU scenario will use a baseline year (2025), calculated as the average of the previous three years (2022, 2023, and 2024). The low carbon scenario will estimate the emissions for the same sector after implementing the recommended technologies or methods. Both the BAU and low carbon scenarios are projected through 2040 to assess long-term impacts on emissions in Taylor.

5.1 ANTI IDLING POLICY FOR CORPORATE VEHICLES

Vehicle idling occurs when a vehicle's engine is running, but the vehicle is not in motion. It is a commonly overlooked action that results in large amounts of avoidable emissions. Natural Resources Canada states that any stop longer than 10 seconds will use more fuel than shutting off the engine and starting it back up[28]. Many believe that this action is also harder on your vehicle due to the excessive use of the starter, however, this is a misconception, and modern vehicles are built with starters that are capable of this wear and tear. Additionally, many newer vehicles feature auto start/stop technology, which automatically shuts off the engine during idle periods to reduce emissions, further demonstrating that advanced starters are built to withstand this extra use.

The most effective way that idling can be prevented is by implementing an idling policy. The most common time limit prohibits idling for more than 3 minutes, this amount being the maximum recommended warm up time for newer diesel engines, as well as a reasonable amount of time for a driver to warm the cabin of their vehicle before their trip.

The City of Richmond, BC implemented an idle-free policy for their corporate fleet vehicles. They saved approximately 10% of their annual fuel costs, equaling $117,000 during the first year of project's implementation[29].

5.1.1 EMISSION REDUCTION PROJECTION

Emission data from the corporate fleet vehicle fuel use in Taylor was acquired for the BAU scenario. Two scenarios were projected: the business-as-usual scenario, and a scenario where a 2025 anti idling policy was introduced in Taylor, which reduced the fuel use, and therefore the emissions, of fleet vehicle fuel use by 10%. This graph can is shown in Figure 22.

[28] https://oee.nrcan.gc.ca/transportation/idling/material/ottawa-idling-brochure.cfm
[29] https://toolkit.bc.ca/tool/idle-reduction-bylaw/

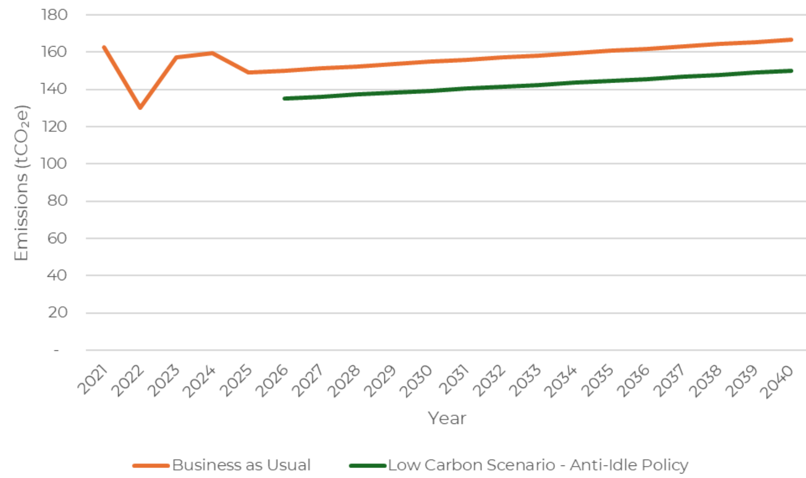

Figure 22 - Fleet Vehicle Fuel Emissions (tCO_2e) in BAU and Low Carbon Scenarios (2021-2040)

5.1.2 LIMITATIONS

Implementing an anti-idling bylaw for all vehicles (community and corporate) in Taylor could lead to a substantial reduction in emissions. However, due to Taylor's location, residents often warm their vehicles for 5-10 minutes before driving during the colder winter months. Cold weather, like the harsh winters in this region, is a common exemption in anti-idling regulations, which can create loopholes and make enforcement challenging. Additionally, staffing officers to enforce an anti-idling bylaw in Taylor could be challenging. Given these factors, it is recommended that the District introduce a self-regulated anti-idling policy within the corporate team as a pilot project. If this initiative results in a 5% or greater reduction in fleet vehicle fuel use, it would be worth exploring the potential for a community-wide anti-idling bylaw.

5.2 FLEET IMPROVEMENTS

The District operates approximately 55 vehicles across all government departments, excluding the golf carts. This includes pickup trucks, rotary mowers, sweepers and Zambonis. Despite semi-regular fleet upgrades, many are outdated, with an average acquisition year of 2007. Newer vehicles are designed to meet stricter emission standards with advanced, fuel-efficient engines, exhaust systems, and catalytic converters that reduce GHG's. Various upgrades/replacements for vehicles have been proposed within the District of Taylor's 2025-2029 Capital Plan[30]. This plan suggests between one and two vehicle upgrades each year between 2025 and 2029. For consistency, an average of two vehicle upgrades per year was assumed for the 2025-2040 period.

The EPA 2020 Automotive Trends Report states that on average, vehicles CO_2 emissions have decreased by 23% from 2004 to 2020, and fuel economy has increased by 29% in the same period[31]. Since these values are based on averages for passenger vehicles, a conservative 20% reduction in CO_2 emissions was applied to the projections for Taylor, which accounts for a variety of vehicle types. As the District is

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[30] https://taylor.civicweb.net/document/111886/2025-2029%20Proposed%20Financial%20Plan%20and%202025%20Prop.pdf?handle=1512251A090D464DB7542BEF6FAAAC61
[31] https://www.epa.gov/sites/default/files/2021-01/documents/420s21001.pdf

upgrading vehicles after at least 15 years of use, it is assumed that the 20% reduction in CO_2 emissions from the EPA can be directly applied to each vehicle upgraded by the District.

5.2.1 EMISSION REDUCTION PROJECTION

Emission data from the corporate fleet in the District was acquired for the BAU scenario. To produce a low-carbon scenario, the estimated replacement/upgrade of two vehicles per year was utilized. The total fleet vehicle emissions from 2024 were divided by the fleet vehicle population (55), to acquire an average value of emissions (tCO_2e)/vehicle. A decrease of 20% emissions per vehicle upgraded (2 annually) was then applied to the sum of fleet vehicle emissions to project the corporate fleet emissions from 2026 to 2040. The BAU and low carbon scenarios are shown in Figure 23.

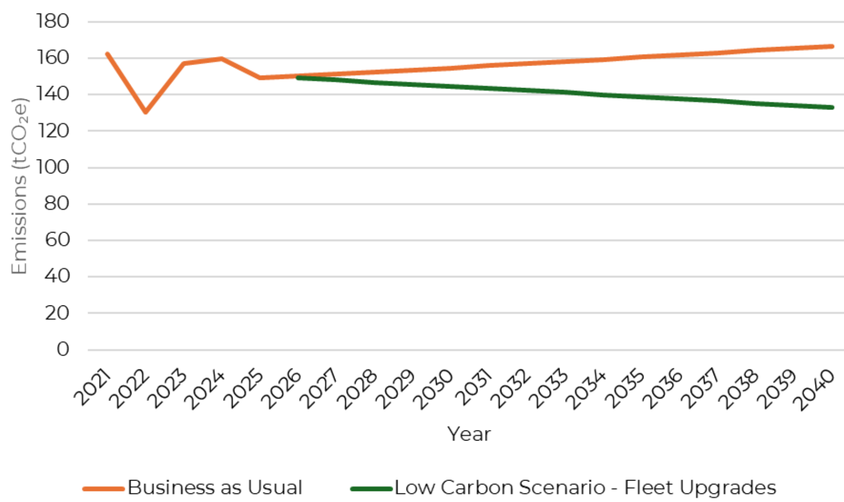


Figure 23 - Fleet Vehicle Fuel Emissions (tCO_2e) in BAU and Low Carbon Scenarios (2021-2040)

5.3 FLEET ZERO EMISSION VEHICLE (ZEV) REPLACEMENTS

To significantly reduce emissions from fleet vehicle fuel use, the District could begin transitioning to an electrified fleet. Given the rapid advancements in electric vehicle (EV) technology and the increasing importance of environmental sustainability, transitioning the existing fleet to ZEVs would support the District's commitment to reducing its carbon footprint. It would also align with BC's Zero-Emission Vehicles Act, which mandates that all new light-duty vehicle sales in the province be zero-emission by 2040.

Adopting ZEVs would provide multiple benefits: it would assist the District in meeting its environmental goals and it would also ensure compliance with upcoming provincial regulations. As the District replaces older, less efficient vehicles with electric models, it would contribute directly to the community effort to achieve the emission reduction goals outlined in the OCP.

5.3.1 EMISSION REDUCTION PROJECTION

The same methodology described in Section 4.2.1 was applied to both the BAU and low-carbon scenarios for the implementation of ZEVs. In this approach, only those fleet vehicles already scheduled for replacement were upgraded, with a rate of two vehicles per year. In the low-carbon scenario, each vehicle upgraded to a ZEV resulted in the complete removal of emissions from two fleet vehicles per year, reducing the overall fleet fuel emissions. Both the BAU and low-carbon scenarios are illustrated in Figure 24.

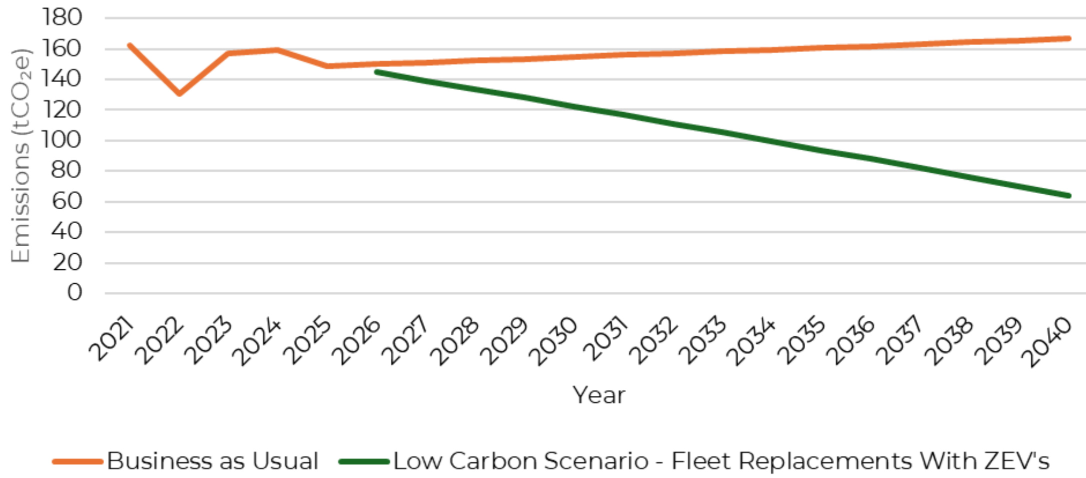


Figure 24 - Fleet Vehicle Fuel Emissions (tCO_2e) in BAU and Low Carbon Scenarios (2021-2040)

5.3.2 LIMITATIONS

The introduction of ZEVs would have to be done carefully, as there are some challenges which may arise for a community such as Taylor. Harsh winter temperatures, often below -10°C, can significantly reduce the range and efficiency of EV batteries, impacting the reliability of corporate fleets in cold conditions. The lack of charging infrastructure in the region, with few stations available, could make the management of fleet charging difficult, especially during longer trips. Additionally, the cold climate can accelerate battery degradation, leading to higher long-term costs for businesses due to more frequent battery replacements and reduced vehicle lifespan. If the District decides to transition to ZEVs for their fleet, it is crucial to explore solutions to address these limitations effectively.

5.4 ENERGY EFFICIENCY RETROFITS

Natural gas use makes up a large portion of the emissions from residential, institutional, commercial and industrial facilities in Taylor. Much of this natural gas is used for heating buildings. However, a significant amount of this heating is likely wasted due to heat loss, inefficient usage patterns, and outdated heating systems.

5.4.1 BUILDING ENVELOPE RETROFITS

One of the primary sources of heat loss in buildings is poor insulation. Inadequate insulation in walls, attics, and floors allows heat to escape, leading to higher energy consumption as heating systems work harder to maintain comfortable indoor temperatures. Similarly, old or poorly sealed windows and doors can be major culprits of heat loss, allowing warm air to leak out and cold air to seep in. This results in increased natural gas usage, leading to higher utility bills and emission production.

Building retrofits can significantly reduce energy usage, especially for cold climates such as northeastern BC. The energy savings will vary based on the level of effort. Measures such as air sealing and increasing the quality and thickness of attic insulation can be expected to achieve 12-18% energy reduction. Deeper retrofit measures such as installing higher-efficiency windows and upgrading insulation in walls can increase energy savings to approximately 33%[32].

Building envelope retrofits can be costly for both corporations and individuals, but there are various funding opportunities available at the provincial and federal levels to help offset these expenses. For corporations, the Clean Buildings Tax Credit[33] offers a 5% rebate on the qualifying cost of retrofits, while the CleanBC Better Buildings program[34] offers various funding opportunities for commercial and institutional buildings, although none are currently specifically focused on building envelope retrofits. New programs are introduced frequently, so opportunities may become available in the future.

For residential retrofits, the CleanBC Better Homes program[35] offers up to $5,500 for insulation and up to $2,000 for windows and doors, with $100 available per window or door. Additionally, the PNG Residential Building Envelope Program[36] provides up to $2,100 for insulation and up to $2,000 for windows and doors, with the same $100 per window or door.

5.4.2 SMART AND PROGRAMMABLE THERMOSTATS

Another factor contributing to heating inefficiency is the practice of heating buildings when they are unoccupied. Many residential buildings are heated throughout the day, even when users are not present. This is particularly common in homes where occupants are away at work or school during the day. Similarly, many institutional/commercial/industrial buildings are heated throughout the night, even when they are unoccupied.

A viable solution to this heating issue is the implementation of smart or programmable thermostat technology. These thermostats integrate directly with the heating system, enabling precise temperature control based on building occupancy. Programmable thermostats allow users to set customized heating schedules, while smart thermostats learn occupancy patterns automatically. By adjusting heating based on when a building is in use, these technologies help optimize comfort while minimizing energy waste, ensuring that heating is reduced when the space is unoccupied. According to BC Hydro, these intelligent devices help homeowners save approximately 5%[37] on their energy bills by continuously monitoring and adjusting temperature settings based on real-time data and user preferences.

As the technology has advanced, smart thermostats have become more affordable. Entry-level models such as the Ecobee Smart Thermostat and Google Nest are priced between $100-$300. This makes them accessible to a wide range of users. To encourage homeowners and businesses to adopt this technology, Pacific Northern Gas (PNG) offers a rebate of up to $250 on eligible smart thermostat installations[38].

5.4.3 UPGRADING INNEFFICIENT HEATING SYSTEMS

A major contributor to wasted energy in building heating is the efficiency of the heating system. Upgrading outdated, inefficient natural gas systems to more efficient models can lower emissions and reduce heating costs throughout the system's lifespan. Heating systems are rated on efficiency using the AFUE *or Annual Fuel Utilization Efficiency* scale from 0-100%. This rating indicates the amount of produced heat by the burning of natural gas that is used to heat the building, the remaining heat is lost

[32]https://www.aceee.org/sites/default/files/pdfs/empowering_electrification_through_building_envelope_improvements_-_encrypt.pdf
[33] https://www2.gov.bc.ca/gov/content/taxes/income-taxes/corporate/credits/clean-buildings
[34] https://www.betterbuildingsbc.ca/
[35] https://www.betterhomesbc.ca/rebates/cleanbc-better-homes-and-home-renovation-rebate-programs/
[36] https://png.ca/smartenergysolutions-2/residential-building-envelope-program/
[37] https://www.bchydro.com/powersmart/residential/tips-technologies/smart-thermostats.html?utm_source=chatgpt.com – BC Hydro
[38] https://png.ca/smartenergysolutions-2/furnace-tune-up-program/

in the combustion process. Typical heating systems will fall under the low efficiency (65% AFUE), or mid-efficiency (78-82% AFUE) classifications. High efficiency models with additional heat exchangers can achieve between 85-99% efficiency.

While the efficiency ratings of heating systems in Taylor's corporate buildings are currently unknown, it is assumed that they are either low- or mid-efficiency models (65-82% AFUE). The capital investment of upgrading to high efficiency heating systems will vary depending on the building size, however residential systems could be expected to cost between $5,000-10,000 while corporate systems could cost between $10,000-100,000. In upgrading from low- or mid-efficiency models to high-efficiency gas furnaces, emission reductions between 20-30% could be expected.

To help offset the significant costs of replacing heating systems, utilities like PNG and BC Hydro frequently offer rebates for such installations. One example is the PNG Commercial Efficient Boiler Retrofit Program[39]. While this program is currently closed, similar initiatives are expected to become available in the near future.

5.4.4 EMISSION REDUCTION PROJECTION

Natural gas uses for residential and corporate buildings were obtained for the creation of a BAU scenario. The emission reduction potential from energy efficiency retrofits was deemed to be noteworthy in Taylor, but it would require high capital investments. For this reasoning, the emission projection was split into two scenarios: low carbon (more aggressive actions) and medium carbon (less aggressive actions). These two scenarios are shown in Table 7.

Table 7 - Solar Energy Production (MWh) by Percent of Annual Energy Consumption Displaced

Metric	Low Carbon Scenario	Medium Carbon Scenario
Building Envelope Retrofits	30% emission reduction for buildings. Retrofits 20% of corporate buildings & 5% of residential buildings yearly for 5 years.	15% emission reduction for buildings. Retrofits 20% of corporate buildings yearly for 5 years.
Smart and Programmable Thermostats	5% emission reduction. 20% adoption per year for 5 years.	5% emission reduction. 10% adoption per year for 5 years.
High-Efficiency Heating Systems	20% emission reduction. Upgrades 20% of corporate buildings yearly for 4 years. Assumes 20% already upgraded.	

A BAU scenario was developed, projecting the total natural gas emissions from both corporate and residential sources through 2040. Additionally, both the low and medium carbon scenarios were visualized, as shown in Figure 25.

[39] https://www.betterbuildingsbc.ca/incentives/commercial-efficient-small-boiler-retrofit-program/

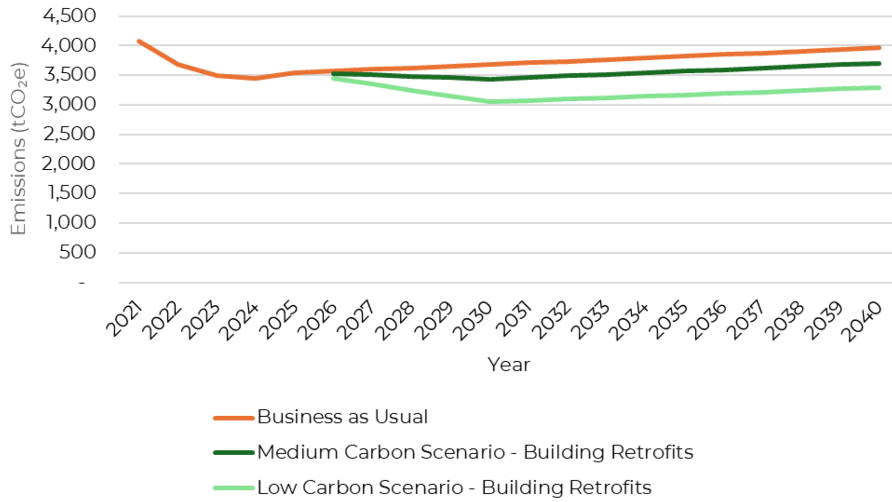


Figure 25 - Corporate and Residential Natural Gas Emissions (tCO_2e) in Business-as-usual, Medium and Low Carbon Scenarios (2021-2040)

5.4.5 LIMITATIONS

One limitation of energy efficiency retrofits is the high upfront cost associated with deep retrofitting measures, such as upgrading insulation and heating systems. Homeowners and businesses may be reluctant to undertake these costly investments, despite the long-term energy savings, due to financial constraints or uncertainty about the return on investment. The substantial initial expense of these upgrades can be a significant barrier to widespread adoption, especially for those with limited budgets or competing financial priorities. Even with the availability of rebates and incentives, the initial cost may still be prohibitive for many, limiting the overall uptake of these energy-efficient technologies.

5.5 REALICE®

As identified in Section 2.1, the arena is one of the District's largest sources of emissions, with a significant portion stemming from ice maintenance. REALice® technology offers two key opportunities for emission reduction: raising rink resting temperatures and lowering the temperature of water used for resurfacing.

REALice® utilizes vortex technology to remove air bubbles and impurities from water, eliminating the need for hot water during ice building and resurfacing. Traditionally, ice maintenance requires heating water to over 54°C, consuming substantial energy[40]. With REALice®, resurfacing water only needs to reach 20°C, significantly cutting energy demand[41].

Additionally, conventional rinks rely on natural gas-powered compressors to circulate refrigerant and keep the ice cold. Because REALice® produces denser, more stable ice, arenas can increase brine (ice cooling) temperatures by 2–3°C without affecting ice quality—further reducing energy consumption and emissions.

In 2014, FortisBC conducted a pilot study in BC[40], analyzing the energy savings from using REALice® technology. The findings, an average from eight of ten pilot sites (the other two facilities encountered operational challenges and were unable to evaluate natural gas reductions), showed natural gas savings

[40] https://www.realice.ca/wp-content/uploads/2015/02/irre_-_mv_result_final.pdf
[41] https://realice.ca/

of 330 GJ/year and electricity savings of 22,400 kWh/year. The cost of installing REALice® ranges between $35,000 and $40,000, depending on facility specifics.

5.5.1 EMISSION REDUCTION PROJECTION

The total emissions from the arena were obtained, and a baseline year (2024) was produced using the average from the three previous years. To calculate a low carbon scenario, the results from the FortisBC pilot study (energy savings) were converted to emission reductions, using similar methodology to that described in Section 2.0. This emission reduction projection is shown in Figure 26.

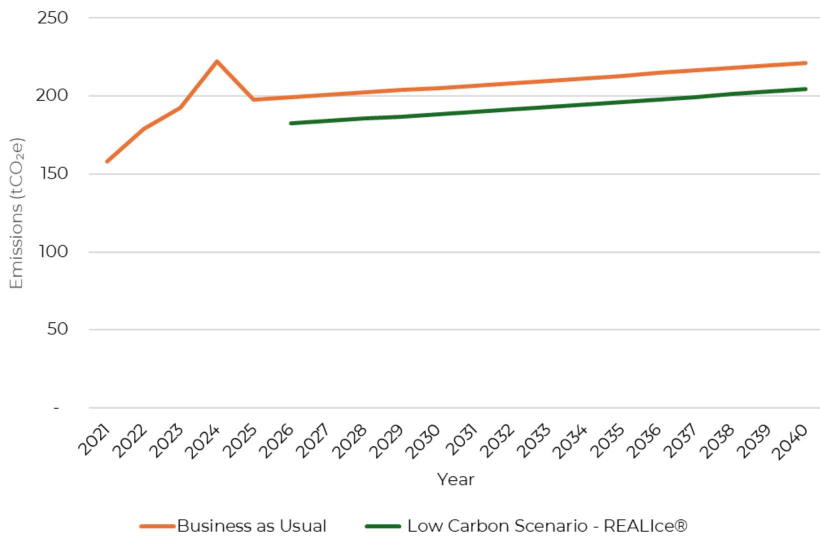


Figure 26 - Arena Emissions (tCO_2e) in BAU and Low Carbon Scenarios (2021-2040)

5.6 SOLID WASTE REDUCTIONS

Municipal solid waste can also be a source of GHG emissions, particularly when items are disposed of in landfills. The first source of GHG's is during transport, the trucks that transport the waste from Taylor to the Peace Regional District landfill (approximately 30-35 kilometres) are a significant source of emissions, included within the transportation emissions accounted for in the total community emissions. Once the waste arrives at the facility, energy must be spent sorting and compacting the waste into cells. These processes are typically done by heavy machinery such as loaders and compactors, with high demands for fossil fuels which emit additional GHG's. Once waste is deposited in cells, the organic material within the waste decomposes and produces methane, a harmful GHG's, due to the absence of oxygen. Therefore, waste being sent to landfill from Taylor cannot be ignored when measuring emissions from the district.

Solid waste data was obtained from the Peace River Regional District landfill for the period from 2005 to 2025. This data includes an annual summary of all solid waste drop-offs (in tonnes) from Taylor to the landfill over the past 20 years (from residential, corporate, and commercial drop-offs). A trendline for the last 10 years (Figure 27) reveals that Taylor's solid waste tonnage sent to the PRRD landfill has consistently exceeded 300 tonnes per year for the past five years. The graph shows a steady increase in tonnage from 2017 to 2022, followed by a significant rise in 2023 and a decline in 2024. The significant rise in 2023 is likely attributed to site clearing activities conducted by the District, resulting in additional waste being delivered to the PRRD landfill.

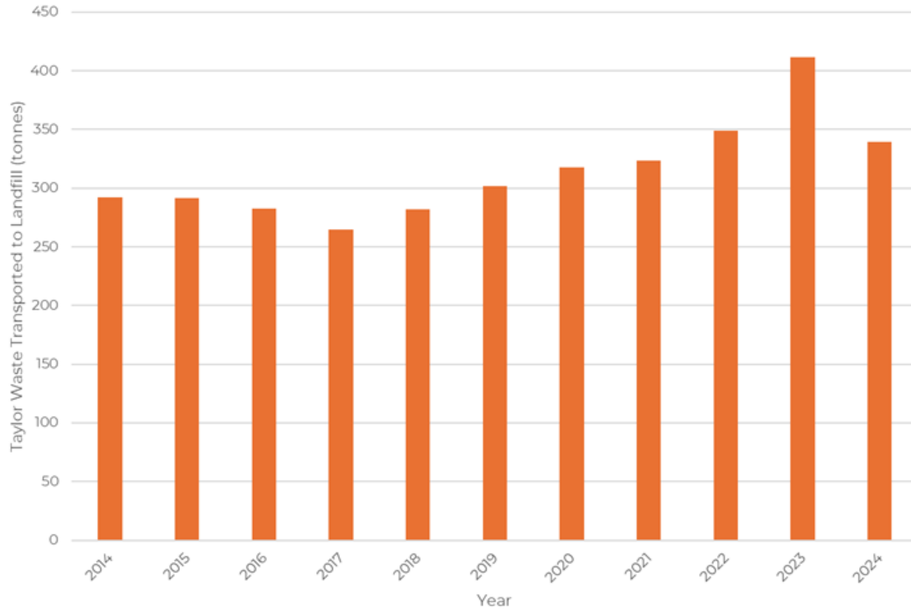


Figure 27 - Taylor's Solid Waste Tonnage Sent to PRRD Landfill (2014-2024)

The PRRD's 2019 regional solid waste management plan[42] was also examined. The plan featured a study that analyzed landfill waste composition, showing that compostable organics accounted for 30.6%, while recyclables (paper and plastics) collectively made up 27%. The complete breakdown of waste composition is found in Figure 28.

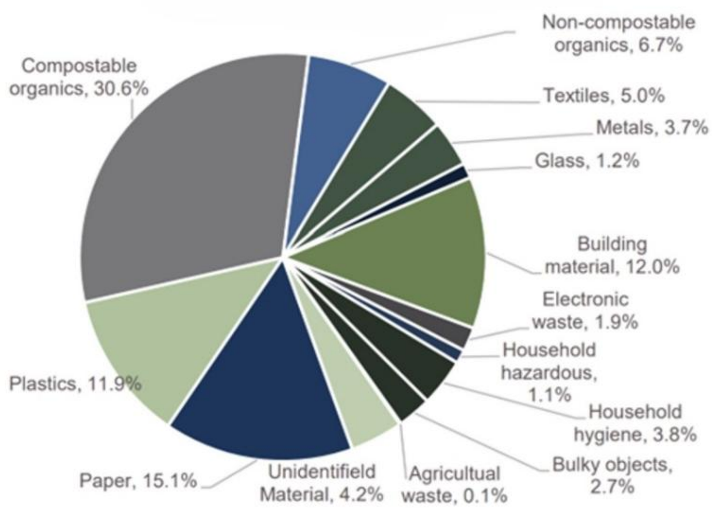


Figure 28 - PRRD Landfill Waste Composition Breakdown from Regional Solid Waste Management Plan (2019)[42]

Composting of organic waste, such as food scraps and yard trimmings, is an effective method of reducing emissions related to solid waste. The process of composting allows the organic material to break down naturally in a controlled, oxygen-rich environment, producing nutrient-rich compost instead of methane. Composting avoids the methane production and returns valuable organic matter to the soil, enhancing

[42] https://prrd.bc.ca/wp-content/uploads/PRRD_RSWMP_final-for-Ministry-submission.pdf

soil health. The primary challenge associated with composting within the PRRD is the lack of a curbside organics collection service and lack of composting facilities regionally. Implementing such a service would require setting up a composting facility which would require significant capital investment and community support. Composting facilities in British Columbia are regulated under the Organic Matter Recycling Regulation (OMRR)[43], which oversees their construction, operation, and compliance. The OMRR also governs the production, distribution, storage, sale, and use of both biosolids and compost, ensuring environmental and public health standards are met.

5.6.1 HOME COMPOSTING

Home composting is an effective way to reduce a portion of organic waste from landfills, without the need for a municipal composting facility. In a home composting setup, kitchen and yard scraps can be turned into nutrient rich soil which is great for gardening. Items that are recommended for this type of composting include: fruit and vegetable scraps, eggshells, coffee grounds, leaves, weeds, etc. Items that are not recommended include: meat, bones, cheese and dairy products, fats, oils, etc. The PRRD Four Season Waste Composition Study (2018)[44], a study completed by TetraTech to determine the composition of waste in the PRRD, determined that approximately 13% of total waste from single-family residential, and approximately 6% from ICI buildings waste can be categorized as "Food waste – backyard compostable (unavoidable)" a subset of the total 30% of waste that is defined as compostable.

By promoting home-composting in Taylor, up to 13% of landfill waste from residential homes could be avoided. To achieve this, the District could take a variety of actions. Some of these actions include: an information campaign, a local workshop, incentive programs, and social composting challenges.

5.6.2 RECYCLING

Increasing the recycling of paper and plastic could also serve as a source of emission reduction for the District. According to the 2018 composition study, 27% of the waste in the PRRD landfill is recyclable material. Currently, the District has no curbside collection for recyclables. Therefore, residents must sort their waste and transport their recyclables to a transfer station for cost-free recycling of paper, plastic and cardboard recyclables. Recycling diverts waste from landfills and promotes the reuse of material for future applications.

To achieve a 27% reduction in landfill waste through recycling, the District could implement a curbside pickup program. To minimize additional costs for waste collection, the current waste collection vehicles could adopt a week-on, week-off schedule, alternating between garbage and recyclables.

5.6.3 EMISSION REDUCTION PROJECTION

Recycling and composting are essential for reducing landfill waste cutting methane emissions, and conserving energy, all of which contribute to lowering the carbon footprint and advancing climate change mitigation efforts. In Taylor, roughly 13% of residential waste could be composted at home, and 27% could be diverted to recycling facilities via curbside pickup. Together, this accounts for 40% of the total waste that could be redirected from landfills. Using landfill tonnage data from Figure 27 and an estimated emission factor of 0.3 tCO_2e per ton of mixed landfill waste[45], the potential emission reductions from composting and recycling can be calculated. It's important to note that this emission factor only

[43] https://www2.gov.bc.ca/gov/content/environment/waste-management/food-and-organic-waste/regulations-guidelines
[44] https://prrd.bc.ca/wp-content/uploads/page/plans-and-strategies/Four-Season-Report_IFU062918.pdf
[45] https://www.researchgate.net/publication/26875718_Landfilling_of_waste_Accounting_of_greenhouse_gases_and_global_warming_contributions

accounts for the CO_2e released due to material decomposition in an anaerobic environment, not emissions from transportation. It is assumed that transportation-related emissions from solid waste will remain unchanged, as garbage trucks will now follow a rotating schedule for both garbage and recycling pickup every two weeks, replacing the previous weekly garbage collection.

Taylor's solid waste tonnage sent to the PRRD landfill was analyzed for the BAU scenario, with a 40% reduction in landfill tonnage assumed for the low-carbon scenario. Emissions (tCO_2e) were calculated for both scenarios, and the results, including the impact of home composting and curbside recycling, are compared in Figure 29.

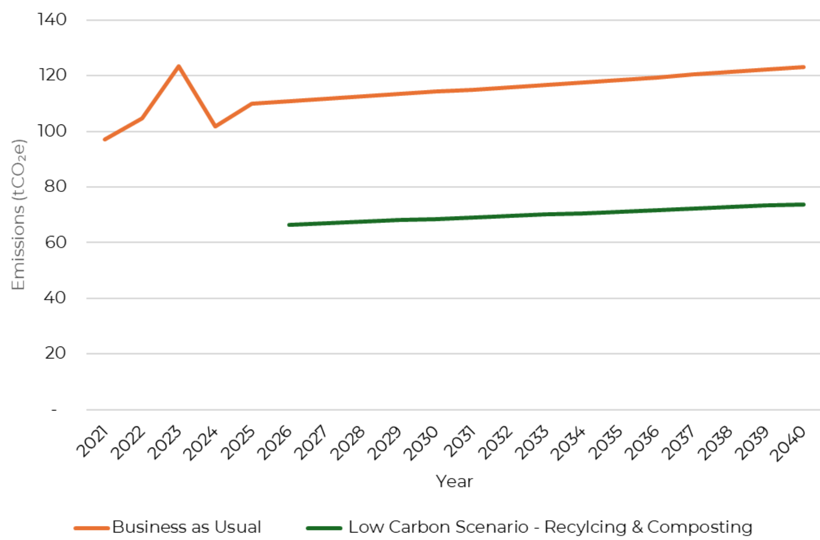


Figure 29 - Landfill Emissions (tCO_2e) in BAU and Low Carbon Scenarios (2021-2040)

5.6.4 LIMITATIONS

Implementing a curbside pickup program for recyclables would require adjustments to the current garbage collection routine. With pickups occurring half as often, especially during the warmer months, there may be concerns about waste becoming more prone to decomposition and attracting pests. It will be essential to consult with the community before making changes to the waste pickup system to gauge their interest and support. A successful recycling program relies on active participation and enthusiasm from both the community and the District.

The home composting method for emission reduction will require ample support and action by members of the community as well. As not every resident of Taylor has access to open land with room for composters, community members will need to collaborate to achieve maximum landfill garbage displacement.

5.7 DEMAND SIDE MANAGEMENT MEASURES

This section outlines Demand Side Management (DSM) measures specifically aimed at reducing emissions from transportation in Taylor. With the transportation sector being the largest source of emissions in the community, DSM strategies can play a pivotal role in mitigating these emissions. While these measures will also contribute to lower energy consumption, their primary impact will be a substantial reduction in emissions, bringing Taylor closer to achieving its sustainability objectives.

5.7.1 TRANSPORTATION DEMAND MANAGEMENT

Transportation is a critical sector where DSM can significantly reduce both energy consumption and emissions. Encouraging Taylor residents to adopt more sustainable transportation options can decrease reliance on gasoline and diesel, thereby cutting transportation-related emissions. Strategies such as promoting carpooling, expanding cycling and pedestrian infrastructure, improving transit options and offering incentives for electric vehicle (EV) adoption are key steps toward a more sustainable, low-emission transportation system. As part of its DSM strategy, Taylor, FSJ, and BC Transit could work together to assess the feasibility of a shuttle bus service linking the town to Fort St. John, which would reduce individual vehicle use and associated emissions.

5.7.2 LIMITATIONS

Predicting emission reductions from the implementation of DSM measures is challenging, as the savings can vary significantly on a case-by-case basis. For instance, it is difficult to predict how many community members will participate in strategies such as carpooling or adopt active transportation methods such as cycling and walking. Similarly, if a shuttle service were introduced between Taylor and Fort St. John, surveys would be necessary to estimate potential ridership (demand) and, by extension, the emissions reductions that could be achieved. As a result, specific emission projections for these measures have not been made. However, it is generally expected that their implementation would result in a positive impact on the community's overall emissions.

6.0 RECOMMENDATIONS

Sections 2 and 3 analyzed the energy and emission patterns within Taylor's corporate, community, and residential specific sectors. Sections 4 and 5 explored potential strategies for reducing energy use and emissions, offering solutions to help the community achieve its sustainability goals. This section will build on those findings by revisiting the recommendations made in the 2010 CEP and presenting two distinct scenarios: a high-impact scenario, which calls for significant capital investment and effort to achieve rapid reductions in energy use and emissions, and a medium-impact scenario, requiring substantial but more focused investments, aimed at actions that are more likely to be embraced by the District and its residents. Both scenarios will be compared against a Business-As-Usual (BAU) scenario, highlighting the key actions needed to meet the goals outlined in the Official Community Plan (OCP).

6.1 PREVIOUS WORK

Appendix A provides a summary list of actionable items from Taylor's 2010 CEP. By categorizing these actions, progress can be analyzed more effectively. The five categories outlined in the 2010 CEP are Buildings (B), Land Use (LU), Transportation (T), Alternative Energy (AE), and Solid Waste (SW).

In the Buildings category, the most significant development has been the initiation of the BC Energy Step Code, which has been enforced since 2017. However, no other major actions have been recorded within this category.

The Land Use category has seen notable success. The District has managed to accommodate new growth and is currently developing the Official Community Plan (OCP), which works in tandem with the zoning bylaw to promote a variety of housing types within the community.

Transportation-related actions have had some success, though there is still room for improvement. The idea of a daily shuttle bus between Taylor and Fort St. John has been discussed intermittently since the creation of the CEP, but no concrete plans have been made. However, pedestrian infrastructure has received some attention, with various sidewalks in the community being widened and an increased trail network developed.

In the Alternative Energy category, there have been some challenges in implementing actions, but progress has been made. On a positive note, plans are in place to update the building bylaw, which is expected to occur within the next 1-2 years.

In the Solid Waste category, the regional district has developed the Regional Solid Waste Management Plan (2019), which outlines a comprehensive list of strategies and a 10-year implementation plan.

6.2 HIGH IMPACT ACTIONS SCENARIO

Through Sections 3 and 4, a variety of energy use and emissions reductions methods were analyzed for their impacts for Taylor. This section will recommend a list of actions by the District that would cause a high impact on reducing energy consumption and/or emissions from activities in the community. As this is an aggressive scenario, many of the actions recommended carry high capital costs and/or levels of effort. The summary table of actions for the high impact actions scenario can be found below in Table 8.

Table 8 - Summary of Actions, Associated Timelines, and Costs for Taylor's High Impact Actions Scenario

Recommended Action	Type of Reduction	Primary Affected Party	Duration of Activity	Capital Investment[46]
Solar Panel Installations for 100% Displacement	Energy	Corporate	1-3 Years	$$$
Water Metering	Energy	Community	1 Year	$$$
Anti-Idling Policy	Emissions	Corporate	1 Year or less	$
Fleet ZEV Replacements	Emissions	Corporate	15+ Years	$$$
Low Carbon Scenario for Building Retrofits	Energy and Emissions	Corporate	5 Years	$$$
REALice® Installation	Energy and Emissions	Corporate	Ongoing	$$
Solid Waste Reductions	Emissions	Community	1 Year	$$
DSM Measures (Lighting upgrades, BC Step Code, Transportation Measures)	Energy and Emissions	Corporate and Community	Ongoing	$$-$$$

[46] Capital investment categories are classified as follows: $ for investments up to $50K, $$ for investments between $50K and $500K, and $$$ for investments exceeding $500K

6.3 MEDIUM IMPACT ACTIONS SCENARIO

The following recommended actions represent the medium-impact scenario. This scenario is alike to the high impact scenario found in section 5.2 but contains more focused investments, aimed at actions that are more likely to be embraced by the District and its residents.

Table 9 - Summary of Actions, Associated Timelines, and Costs for Taylor's Medium Impact Actions Scenario

Recommended Action	Type of Reduction	Primary Affected Party	Duration of Activity	Capital Investment[4646]
Solar Panel Installations for 50% Displacement	Energy	Corporate	1-3 Years	$$$
Anti-Idling Policy	Emissions	Corporate	1 Year or less	$
Fleet Improvements	Emissions	Corporate	15+ Years	$$$
Medium Carbon Scenario for Building Retrofits	Energy and Emissions	Corporate	5 Years	$$
REALice® Installation	Energy and Emissions	Corporate	Ongoing	$$
Solid Waste Reductions	Emissions	Community	1 Year	$$

6.4 MODELLED HIGH AND MEDIUM IMPACT ACTIONS SCENARIOS

To model the impacts of the high and medium impact scenarios on the overall emissions in Taylor, all energy and emission reduction technologies from Sections 3 were converted to emission reductions (even though they are primarily important due to their energy redcuion). These emission reductions were then added to the emission reduction methods identified in Section 4. The two scenarios summarized in sections 5.2 and 5.3, the High and Medium impact actions scenarios, were then produced using the correlated emission reductions from the included measures.

To produce a BAU for the community to compare the two scenarios against, a baseline year was first produced. This baseline year (2025) was calculated using the average of total emissions from corporate and residential emissions in 2022, 2023, and 2024. A projection of emissions forward to 2040 was then produced, to compare the modelled emissions against Taylor's OCP goal of 40% reduction by 2040, compared to 2007 levels. This was done by using a growth factor of 0.75% annually, assuming no large shifts in operating procedures would occur in the near future.

To model the impacts of the high and medium-impact scenarios on overall emissions in Taylor, all energy reduction technologies from Section 3 were converted into emission reductions. While these measures are primarily important for their energy-saving potential, they were included in the emission reduction calculations. These reductions were then incorporated with the additional emission reduction methods identified in Section 4.

The high and medium impact action scenarios, as outlined in Sections 5.2 and 5.3 were developed by applying the corresponding emission reductions from the methods described above. The two scenarios from Sections 5.2 and 5.3, as well as the BAU scneario and OCP goals can be seen below in Figure 30.

Disclaimer: For this BAU scenario, the emissions from corporate, residential, and solid waste sectors were considered, rather than including all community emissions. This approach provides a more representative analysis of emission trends within Taylor. Including emissions from industrial and transportation sectors would significantly overshadow the impact of climate mitigation efforts within the community, skewing the results. The District recognizes that community-wide emissions are challenging to control; therefore, reduction strategies and the application of OCP goals are primarily directed toward residential and corporate energy use and emissions.

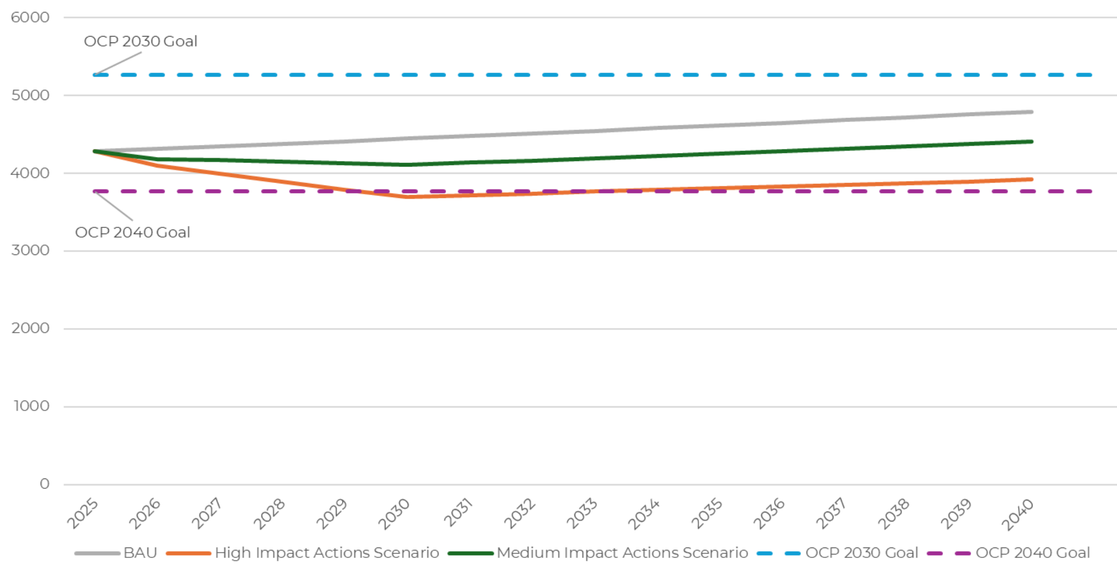


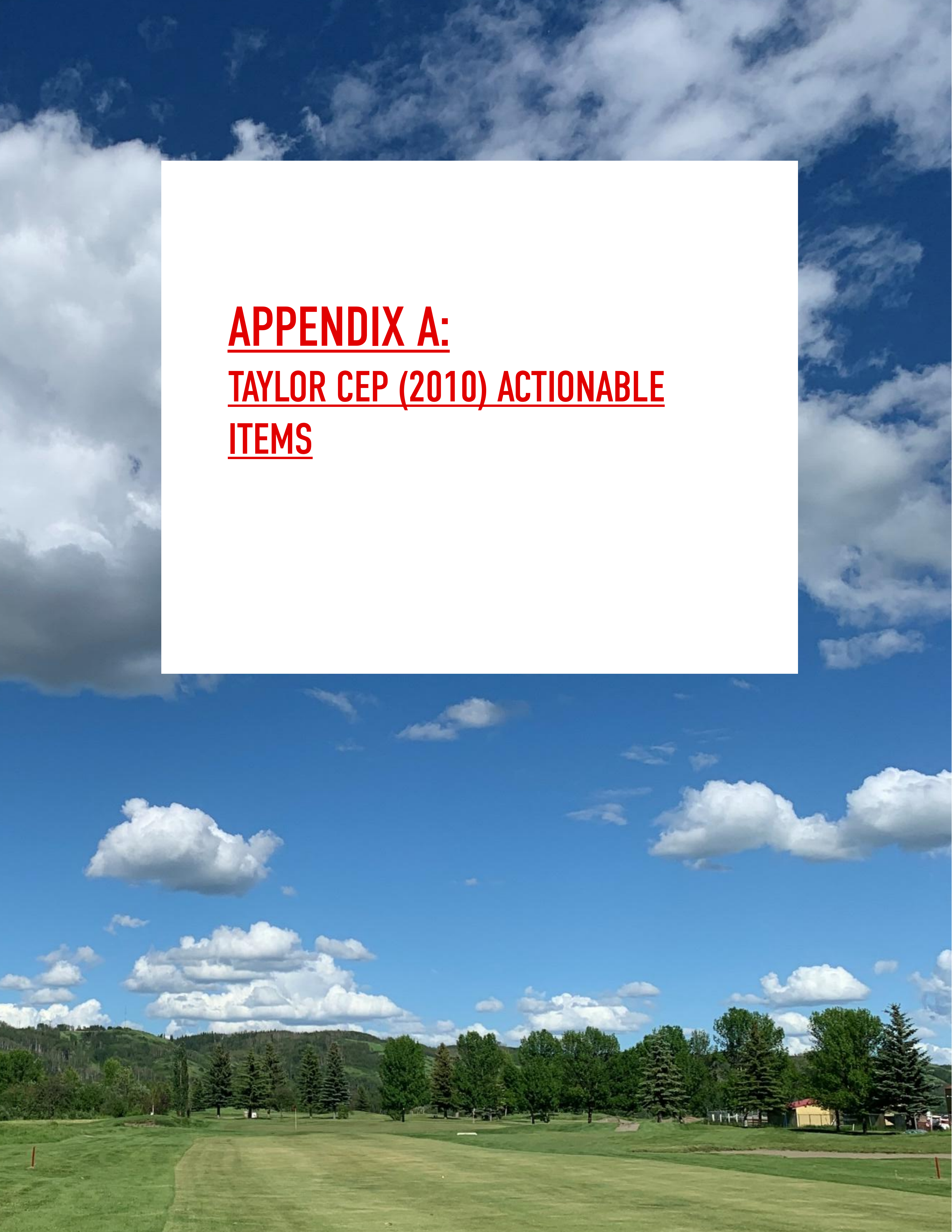
Figure 30 - Modelled High And Medium Impact Actions Scenarios Compared Against the BAU Case and OCP Emission Reduction Goals (2025–2040)

As shown in Figure 30, both the high and medium impact scenarios meet the OCP goal of a 16% reduction in emissions by 2030, compared to 2007 levels. However, according to the figure, neither scenario is projected to achieve the OCP goal of a 40% reduction by 2040 relative to 2007 levels. While difficult to estimate, the DSM measures outlined in Sections 3.3 and 4.7 could potentially be significant enough to help Taylor reach the 2040 OCP goal.

7.0 CONCLUSION

In conclusion, the modelled high and medium impact action scenarios demonstrate promising pathways toward reducing emissions in Taylor. Both scenarios are aligned with the OCP goal of achieving a 16% reduction in emissions by 2030, compared to 2007 levels. However, achieving the more ambitious 40% reduction by 2040 remains a substantial challenge. The inclusion of additional demand-side management measures could be crucial in bridging this gap and meeting the long-term targets. This analysis underscores the importance of continued investment in and commitment to sustainable practices, as well as the need for adaptive strategies to address unforeseen challenges in emission reduction efforts. The scenarios provide a valuable framework for future planning and highlight the potential impact of targeted actions in mitigating climate change at the corporate and community level.

APPENDIX A:
TAYLOR CEP (2010) ACTIONABLE ITEMS



APPENDIX A: TAYLOR CEP (2010) ACTIONABLE ITEMS

Action	Duration of activity	Time line for initiation
B-1: Develop an education campaign to encourage energy efficient renovations and new buildings.	Ongoing	1
B-2: Provide an "Energy Efficiency Checklist" with building permits.	6 months	1
B-3: Build / retrofit District facilities to LEED equivalent standards and promote this to the public.	As needed	As needed
B-4: Encourage the Regional District to develop a regional financial incentive program to improve energy efficiency in buildings.	1 year	1
LU-1: Accommodate new growth and development through infill of existing lots.	Ongoing	Current
LU-2: Encourage a variety of housing types, including multi-family units, secondary suites and cottages.	Ongoing	Current
T-1: Support development of a region-wide social marketing campaign to reduce fuel consumption from driving.	2 years	1
T-2: Develop core commercial services.	Ongoing	Current
T-3: Work with BC Transit and the City of Fort St John to assess the viability of operating a daily shuttle bus.	2 years	4-5
T-4: Continue to install and maintain pedestrian and cycling infrastructure to encourage non-motorized transportation.	Ongoing	Current
T-5: Work with the Regional District and neighbouring municipalities to reduce idling.	6 months	2-3
AE-1: Explore, in partnership with the major industrial plants, the feasibility of using waste heat to develop a future district energy system.	6 months	2-3
AE-2: Coordinate with neighbouring municipalities to train building inspectors and operational staff in alternative energy technologies.	6 months	2-3
AE-3: Develop an alternative energy pilot project and promote this to the public.	1 year	2-3
AE-4: Endeavour to locate future municipal facilities adjacent to existing civic facilities to support a future district energy system.	As needed	As needed
AE-5: Update the building bylaw to define allowances for alternative energy systems, based on a model bylaw developed regionally.	6 months	4-5
SW-1: Work with the Regional District to implement the Regional Solid Waste Management Plan.	Ongoing	Current

APPENDIX B:

RISK ASSESSMENT METHODOLOGY AND FRAMEWORK

MEMORANDUM

URBAN SYSTEMS

DATE	28th October 2025	FROM	Ali Mujahid
TO	Tyla Pennell	FILE	1770.0083.01
CC	Lisa Ford, Dawn McGinn	SUBJECT	District of Taylor – Risk Assessment Methodology & Framework Memorandum

1.0 INTRODUCTION

The District of Taylor (the District) is faced with a warmer, wetter, wilder future climate. Projected climate changes indicate that the District can expect increased precipitation, higher temperatures, and more frequent extreme weather events. The District is already seeing climate impacts and climate projections put them at an increased risk from climate hazards, whose impacts may stress ecosystems and biodiversity, compromise water resources, negatively impact public health and safety of residents, adversely affect economic development, strain local infrastructure and impact service delivery.

Recognizing this, the District is taking a proactive approach to climate adaptation by preparing for the impacts of climate change and ensuring long-term sustainability by developing a Climate Change Adaptation Plan (CCAP). As part of the development of the CCAP, the District is conducting a climate change risk assessment. This will assess the exposure of the District's assets and services to relevant climate change hazards, understand the likelihood, develop impact statements and assign consequence ratings to come up with risk rankings. This assessment will result in the identification and prioritization of climate risks for the District and will inform the risk management approach – selecting the best course of action and guiding the most efficient deployment of Taylor's limited time and resources to enhance climate resilience.

This memorandum contains the following information:

- Relevant climate hazards
- District assets and services being assessed
- Assessment methodology – exposure analysis, likelihood and consequence assessments, risk assessment and risk scores

2.0 CLIMATE HAZARDS

Relevant climate hazards were identified through publicly available data sources, regional reports, and professional experience and were refined through engagement sessions with stakeholders and a workshop with District staff. Climate projection reports for the BC Northeast region and the City of Fort St. John were reviewed and then cross-checked for accuracy and relevance with the District's temperature and precipitation indicators.

Table 1 summarizes the selected climate hazards and how the projections for the climate indicators influence their severity and likelihood

Table 1: Summary of Climate Hazards and Projected Changes in Key Climate Indicators

Climate Hazard	Climate Indicator Influence on Severity/Likelihood
Wildfire	Increasing summer temperatures and an increasing frequency of very hot days will contribute to conditions conducive to wildfires.
Extreme Heat	Rising summer temperatures and an increasing number of very hot days indicate an increasing frequency of extreme heat events, especially towards the latter part of the century.
Drought	Rising summer temperatures will increase the likelihood of conditions conducive to drought.
Flooding	Precipitation indicators and IDF curves (intensity, duration and frequency) data show that the intensity, duration and frequency of extreme rainfall events are estimated to increase, which may lead to more flooding events.
Extreme Wind	Research indicates an increased frequency of high-speed wind events in the future for the District.
Freeze/Thaw Cycles	GCMs show that while warming weather is causing a decrease in the number of freeze/thaw cycles, they will still comprise enough days per year over future time periods to be considered a relevant hazard.
Extreme Cold	While GCMs show extremely cold weather being less frequent and of lower magnitude, very cold days still comprise enough days per year over future time periods to be considered a relevant hazard

3.0 ASSET LIST

This risk assessment analyzed the potential impacts of 7 different climate hazards across 11 asset systems (comprising 35 assets) to understand where the District is most vulnerable to climate change.

Table 2 shows the list of assets and asset systems included in the assessment.

Table 2: List of District of Taylor Assets

Asset	Asset System	Details	Description/Notes
Buildings	Community Buildings	Complex 1, Hockey Rink, Community Hall, Library	Provide facilities for residents and staff to work and provide recreational opportunities within. District office, Community Hall/Hub, Fire Hall, PW Shop - have backup power.
	Public Services Buildings	District Office, Medical Center, Public Works Shop, Firehall, Tourist Info Center, Post Office	
	Miscellaneous Buildings	Golf Course buildings (clubhouse, maintenance shop, greenhouse), assorted washrooms and miscellaneous buildings.	
Fleet	Maintenance Vehicles	Turf care vehicles, Zambonis, Sweepers	Provide vehicles and equipment for the maintenance of District properties and infrastructure.
	Construction Vehicles	Dump trucks, skid-steers, water trucks, backhoes, graders, tractors, and hydrovac	
	Fire Trucks	Trucks used by the fire department for firefighting.	Provide fire and emergency protection for residents.
	Miscellaneous	Utility vehicles, SUVs, Pickup trucks/vans, golf carts	Provide vehicles and equipment for the maintenance of District properties and infrastructure
Information Technology Assets	Radio Towers	One radio tower	Provide information technology to assist in conducting District business and tracking of operations and maintenance.
	Misc.	Cell phones, computers, tablets, printers, accessories, radios	
Natural Assets	Shrubland and grassland (including trees)	All District shrubland, grassland and trees (excluding parks - total 320 ha)	Utilized for stormwater rate control, erosion control
	Aquifers	199. ha of District aquifers utilized for drinking water supply and treatment	Utilized for water supply
	Watercourses	District watercourses (36,983 m)	Utilized for stormwater conveyance and detention
Parking Lots	Parking Lots	All district parking lots (including the cemetery parking lot and the Peace Island Park boat launch)	Provides parking for District, resident and visitor vehicles.
Parks and Public Spaces	Green Spaces	Natural vegetation areas in the District (excluding parks)	Provide recreation opportunities for residents and tourists.
	Playgrounds	District playgrounds, including the ones on Peace Island Park	
	Trails	Jarvis Crescent, Ball Diamond, Asphalt Trails, Participation & 15 trails in phase 1 (asphalt and dirt trails)	

URBAN SYSTEMS

Asset	Asset System	Details	Description/Notes
	Athletic Fields & Outdoor Courts (including Lone Wolf Golf Course)	Tennis court, athletic field and Golf Course (greens, natural areas, ponds, fairways)	
Roadway Infrastructure	Roads	Paved and unpaved District roads and transportation corridors (including bridges)	Allow residents and tourists to recreate and travel around the District.
	Sidewalks & Curbs	Pavements, footpaths and curbs.	
	Power Poles	Wooden power poles owned by BC Hydro	
Sanitary System	Collection System	Buried gravity mains, manholes and related appurtenances	Provide collection, treatment, and disposal of residential and commercial wastewater.
	Wastewater Treatment Plant (WWTP)	1 WWTP that treats wastewater	
	Sanitary Sewer Lift Stations	2 lift stations - LS2 (has a heater, no backup power) and LS3 (end of NGL road). LS3 has a backup generator.	
Stormwater System	Culverts, Ditches & Swales	District culverts, ditches and swales - used for stormwater drainage.	Provide adequate drainage and conveyance of stormwater within the District.
	Misc.	Gravity mains, catch basins, leads and manholes	
Water System	Water Distribution System	Buried watermains, valves, hydrants and related appurtenances	• Provides potable water treatment and distribution, and fire hydrants for fire protection. • Provides raw water for golf course irrigation.
	Groundwater Wells	3 groundwater wells that are located on an island in the Peace River, near the water treatment plant	
	Water Treatment Plant	Filtration system, building structure, HVAC, electrical equipment	
	High Lift Pump Station	Station, pumps, HVAC, frequency drives	
	Golf Course Irrigation	Mobile Pumphouse, pumps, piping, transmission line	
	Reservoirs	2 above-ground, bolted steel reservoirs.	
Peace Island Park	Buildings	Peace Island Historic Rocky Forts, Office and Caretaker house, outhouse, gazebo, pavilion,	Assets are limited to Peace Island Park.

Asset	Asset System	Details	Description/Notes
	Campgrounds	Peace Island Park (PIP) campgrounds	
	Water Assets	Prefab water treatment plant	
	Wastewater Assets	Lift Station & tank (goes to septic field)	

4.0 RISK ASSESSMENT METHODOLOGY

A climate change risk assessment evaluates the exposure of selected systems/services to current and future climate hazards and appraises likelihoods and consequences to understand and prioritize climate risks. Risk assessments range in scope and complexity. Some assessments are focused on the evaluation of a single system or hazard, whereas others are broader in scope and consider several systems and hazards. Therefore, a customized risk assessment framework is needed to support the objectives of a particular project.

Taylor's risk assessment includes the interaction of various climate hazards and selected District assets. The custom assessment framework for the District incorporates guidelines, principles and techniques from the International Standards Organization's risk management guidelines and techniques (ISO 31000[1] and IEC 31010[2]).

The custom framework also adapts elements from the International Council for Local Environmental Initiatives (ICLEI) Canada's Building Adaptative and Resilient Communities (BARC)[3] for assigning likelihood ratings and risk classification. Consequence considerations and ratings were adapted from Alberta's Municipal Climate Change Action Centre's Community Climate Adaptation Planning guide.[4] The adaptation prioritization framework for suggested adaptation strategies was created using elements of multiple Canadian climate adaptation plans.[5, 6, 7]

4.1 LIKELIHOOD ASSESSMENT

Likelihood scores were determined using PIEVC's "Middle-Baseline" Rating Scale Criteria (Error! Reference source not found.)

[1] ISO 31000:2018 - Risk management — Guidelines
[2] IEC 31010:2019 - Risk management — Risk assessment techniques
[3] BARC Program | ICLEI Canada
[4] CRE_Planning-Guide_Final.pdf
[5] City of Selkirk's Climate Change Adaptation Strategy (2019): Climate-Change-Adaptation-Strategy-Final-May2019.pdf
[6] City of Port Alberni's Together for Climate Project Report (2020): Port-Alberni-Climate-Adaptation-Report_FINAL.pdf
[7] City of Hamilton's Climate Change Impact Adaptation Plan (2022): filestream.ashx

Likelihood Score (L)	Middle Baseline Approach - Establish Base	Method	Suggested Rational
1	▲	Likely to occur less frequently than current climate	50 – 100% reduction in frequency or intensity with reference to Baseline Mean
2			10 – 50% reduction in frequency or intensity with reference to Baseline Mean
3	Establish Current Climate Baseline Per Parameter	Likely to occur as frequently as current climate	Baseline Mean Conditions or a change in frequency or intensity of ±10% with reference to the Baseline Mean
4			10 – 50% increase in frequency or intensity with reference to Baseline Mean
5	▼	Likely to occur more frequently than current climate	50 – 100%+ increase in frequency or intensity with reference to Baseline Mean

Figure 1: PIEVC HLSG Middle-Baseline" Rating Scale Criteria

The "middle-baseline" scoring method assigns likelihood to hazard indicators by establishing the baseline conditions in the historical period (e.g. 1981 – 2010), with the mean conditions over this period being represented as a 3 in the scoring system. Please see **Figure 1** for a full list of likelihood ratings. For example, if the climate indicator chosen is Days with Maximum Temperature over 30°C and historically, these occur 5 days per year, this would be represented in the baseline period by a 3 on the likelihood scale, as shown in **Error! Reference source not found.**.

Hazards with multiple climate indicators had their trends analyzed, and a unified likelihood rating with a rationale was generated for each hazard. The Middle Baseline likelihood framework was then used to generate likelihood ratings for each future period of the assessment, up to the end of the century: the 2020s (2011-2040), the 2050s (2041-2070) and the 2080s (2071-2100).

Table 3 shows an example from the risk register of how likelihood ratings were created in the risk register.

Table 3: Likelihood Example from Taylor's Risk Register

Climate Hazard	Climate Indicator	Unit	Time Period	Change from Baseline			Likelihood	Likelihood	Likelihood	Unified Likelihood Rating			Rationale
				2020s	2050s	2080s	2020s	2050s	2080s	2020s	2050s	2080s	
Wildfire	Mean temperature during summer season	°C	Annual	1.4	3.0	5.8	3	4	4	3	4	4	GCMs show that wildfires will be more frequent by the end of the century due to the climate being significantly hotter. Increasing very hot days and rising temperatures during summers all contribute towards wildfires of increasing magnitude and frequency.
	Days with Tmax > 30°C	No. of days	Annual	3.0	10.0	29.0	5	5	5				
	Days with Tmax > 32°C	No. of days	Annual	1.0	5.0	19.0	5	5	5				
	Max number of consecutive dry days	No. of days	Annual	1.0	0.0	0.0	3	3	3				
	Total precipitation during summer season	mm	Summer	0.0	2.0	2.0	3	3	3				

4.2 EXPOSURE ANALYSIS

Exposure of asset systems was assessed by considering the question, **"Will the climate hazard impact the asset system and/or the service it provides?"** A simple **(Yes/No)** was determined for each combination of asset system and climate hazard.

Table 4: Sample Exposure Analysis

CLIMATE HAZARDS	Asset System: Buildings		
	Assets		
	Community Buildings	Public Services Buildings	Miscellaneous Buildings
Wildfire	Y	Y	Y
Extreme Heat	Y	Y	Y
Drought	N	N	N
Flooding	Y	Y	Y
Extreme Wind	Y	Y	Y
Freeze/Thaw Cycles	Y	N	N
Extreme Cold	Y	N	N

Each **(Yes)** will be carried forward in the assessment, and a consequence score will be determined based on a rationale for the specific risk to the asset. **Table 4** shows an example of the exposure analysis for the Buildings asset category for Taylor.

4.3 IMPACT STATEMENT DEVELOPMENT

Once climate hazard trends and district assets were identified, multiple workshops were held with teams from District staff to understand how assets and services would be affected by the impacts of climate change. These 2-hour workshops were held virtually during March 2025 and consisted of the combined teams for each asset category.

The findings from these workshops were then translated into individual risk statements.

A risk statement is "a concise statement that outlines locally relevant projected threats and how those changes are expected to affect the built, natural, social and economic systems of the municipality".[8] It acts as a narrative description of a realistic hazard that may impact the District.

Developing impact statements provides District staff with context for their future adaptation discussions and is used to focus those conversations on an event that might impact District assets or disrupt service delivery. The risk should be structured as a general overview of a hazard or event impacting the community. It should provide enough detail that staff can think about impacts on the community.

Each of the impacts identified by District staff, along with general impacts on assets and services, was converted into risk statements. A total of **151** risk statements were developed.

Examples of some risk statements developed for this assessment include:

- Wildfire damages the main line and disrupts Taylor's potable water supply.
- Extended drought periods impact water supply from District aquifers.
- Freeze/thaw cycles cause physical damage to the above-ground main water line, leading to service disruptions and increased O&M costs
- Flooding causes damage to the water treatment plant and impacts its ability to provide potable water to the community.

Table 5 shows an example of an impact statement for Public Services Buildings in the risk register.

Table 5: Impact Statement Example

Asset System	Assets	Climate Hazard	Exposure	2020s	2050s	2080s	Impact Statements
Buildings	Public Services Buildings	Wildfire	**Y**	3	4	4	Wildfire physically damages or destroys one or more public service buildings.

To aid staff in developing impact statements, a simple one-page guide was developed (**Appendix A**)

[8] Guidance on Good Practices in Climate Change Risk Assessment

4.4 CONSEQUENCE ASSESSMENT

Consequence ratings (**C**) were assigned to each risk statement to analyze the severity of the potential consequences. Consequences were assessed using a five-point rating scale, which differentiates between insignificant and extreme consequences for the District. The severity of consequences anticipated to result from the impact statements was then assessed with the considerations outlined in **Table 6**.

These considerations were then converted into a rating based on the scale shown in **Table 7**.

This rating reflects the severity of the consequences of the risk statement affecting the District's service and operational objectives associated with a particular asset system and assets.

Each consequence rating included a rationale that explained the severity of potential consequences from the risk statement and provided details to inform future adaptation discussions. The rationale may describe hazard impacts and measurable outcomes (e.g., how the risk affects the District's operational goals, duration of service interruptions, safety of staff and residents, critical infrastructure loss, financial implications, environmental effects, etc.).

An example of an impact statement with assigned consequence ratings and rationale is shown in **Table 8**. The example shows a consequence rating of 5 (Very High), reflecting the severe impact of the risk statement on the District and providing additional context for the rating assigned.

Table 6: Consequence Considerations

Consequence Considerations	
Instructions: Users should assess (score) the severity of consequences anticipated to result from a climate hazard by considering how the risk statement might have consequences for one or more of the following considerations:	
Health and Safety	Fatalities, injuries, disease, and hospitalization, as well as impacts on mental health and emotional well-being.
Social Function	Temporary or permanent displacement, disruption to community cohesion, exacerbation of inequalities, and impacts to cultural or historical resources.
Buildings & Infrastructure	Damage to buildings, equipment, vehicles and infrastructure, and loss of services such as transportation, water, energy, etc.
Economic Vitality	Disruption or loss of ability to produce, consume and trade goods and services, and generate revenue or income or support livelihoods.
Natural Environment	Impacts to land, water, air, plants and animals, and the provision of ecosystem services.
District Services & Operations	Impacts to the District's reputation, access, ability to deliver services without interruption, and operating and capital budgets, including contingency reserves.

Table 7: Consequence Rating Scale

Consequence Score		
1	**Very Low**	• Insignificant impact on one or more of the following dimensions: health & safety, social function, buildings & infrastructure, economic vitality, natural environment and/or District services & operations. • Very minor recovery/repair cost • Minimal or no recovery time
2	**Low**	• Minor impact on one or more of the following dimensions: health & safety, social function, buildings & infrastructure, economic vitality, natural environment and/or District services & operations. • Small or insignificant recovery/repair cost. • Short recovery time
3	**Moderate**	• Noticeable impact on one or more of the following dimensions: health & safety, social function, buildings & infrastructure, economic vitality, natural environment and/or District services & operations. • Noticeable recovery/repair cost. • Above normal recovery time
4	**High**	• Major impact on one or more of the following dimensions: health & safety, social function, buildings & infrastructure, economic vitality, natural environment and/or District services & operations. • Major recovery/repair cost. • Substantial recovery period.
5	**Very High**	• Widespread/severe impact on one or more of the following dimensions: health & safety, social function, buildings & infrastructure, economic vitality, natural environment and/or District services & operations. • Prohibitive recovery/repair cost • Long-term recovery period.

Table 8: Consequence Rating Example

Asset System	Assets	Climate Hazard	Exposure	2020s	2050s	2080s	Impact Statements	Consequence Rating	Consequence Rationale
Buildings	Public Services Buildings	Wildfire	**Y**	3	4	4	Wildfire physically damages or destroys one or more public service buildings.	5	Severe/widespread impact to critical District public services buildings, critical District services and operations (emergency and medical services), prohibitive recovery/replacement costs, and long-term recovery period.

4.5 RISK ASSESSMENT

The risk ratings were assigned to impact statements, using a risk rating scale (**Figure 2**) based on the PIEVC's HLSG, based on the following formula:

$$R = L \times C$$

Where **R** is the risk score, **L** is the likelihood score assigned to climate hazards (discussed earlier in **Section 4.1**), and **C** is the consequence score based on the anticipated impacts on the asset.

The risk register generated the risk rating for each impact statement based on the formula above, corresponding to **Figure 2**.

Consequence					
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5
Likelihood	1	2	3	4	5

Figure 2: Risk Rating Scale

Risk Score (R)	Risk Classification		
1 - 9		Low Risk	Risks requiring minimal action
10 - 16		Medium Risk	Risk that may require further action
17 - 25		High Risk	Risks that require action

Figure 3: Risk Classification

Table 9 shows an example of how the risk register calculates risk ratings for each impact statement. The table shows the likelihood scores for 3 risk statements from the register, along with the consequence ratings. The columns marked Risk Ratings show the rating for each future time period, calculated by the formula **R = L x C**.

In **Table 9** the 2020s risk rating for the first risk statement (**ID 1**) is **15**, denoting a medium risk as per the rating scale. The risk rating for the same impact statement evolves to a **20** for the 2050s and 2080s time periods, denoting a high risk, showing the evolution of the risk as the conditions for wildfires grow more likely towards the middle and end of the century. The second risk statement (ID 2) has a 2020s risk rating of **12** (medium risk), which stays the same for the 2050s and rises to **16** (still a medium risk) towards the end of the century. Similarly, the third impact statement's (**ID 3**) risk rating of **9** (low risk) in the 2020s evolves to a rating of **6** (low risk) over the course of the century, reflecting the lower likelihood of freeze-thaw cycles as the climate warms.

This process was repeated for each of the 148 impact statements. Once each statement was assigned a risk rating, the results were compiled into the final risk register.

5.0 RISK REGISTER

Table *9* below shows a sample from the full risk register for this project. The risk register contains relevant climate hazards, likelihood ratings, consequence ratings and risk scores along with the rationale for the assigned risk scores. It is intended to be a central repository of District climate risk data and is a tool to be used by staff when deciding on adaptation actions.

Table 9: Risk Rating Example

ID	Asset System	Assets	Climate Hazard	Exposure	2020s	2050s	2080s	Impact Statements	Consequence Rating	Consequence Rationale	2020s Risk Rating	2050s Risk Rating	2080s Risk Rating
1	**Buildings**	Public Services Buildings	Wildfire	Y	3	4	4	Wildfire physically damages or destroys one or more public service buildings.	5	Severe/widespread impact to critical District public services buildings, critical District services and operations (emergency and medical services), prohibitive recovery/replacement costs, and long-term recovery period.	**15**	**20**	**20**
2	**Natural Assets**	Aquifers	Drought	Y	3	3	4	Extended drought periods impact water supply from District aquifers.	4	Major impact on critical District service (water supply)	**12**	**12**	**16**
3	**Water System**	Distribution System	Freeze/Thaw Cycles	Y	3	2	2	Freeze/thaw cycles cause physical damage to the above-ground main water line, leading to service disruptions and increased O&M costs	3	Noticeable impact to critical infrastructure (only 1 main line), noticeable impact to critical service delivery (potable water).	**9**	**6**	**6**

6.0 NEXT STEPS

It is important to understand that assessing climate change risks should be an iterative process, as risks will evolve and change over time. Risk assessments provide a snapshot of risk at a given time, whereas climate change is not a linear process, and what was (or was not) identified at a given point in time may not be valid at a later date. In order to be meaningful in the long term, risk assessments need to be repeated, following an iterative process that assists participants in understanding how climate change has and/or could impact a given jurisdiction, as well as the effects of adaptation work and/or actions that have been undertaken.

APPENDIX A:

IMPACT STATEMENT DEVELOPMENT GUIDE

IMPACT STATEMENT DEVELOPMENT GUIDE

Impact Statement: A concise statement that outlines locally relevant projected threats and how those changes are expected to affect the built, natural, social and economic systems of the municipality.[9]

An impact statement is a narrative description of a realistic hazard that may impact the District. This scenario provides District staff with context for their discussions and is used to focus conversations on an event that might damage District assets or disrupt service delivery.

The Impact Statement should be structured as a general overview of a hazard or event impacting the community. It should provide enough detail that staff can think about impacts on the community.

To develop the Impact Statement, staff will need to complete three steps:[10]

1. Identify a relevant hazard
2. Identify specific details about the hazard
3. Create an impact statement using these details

Step 1: Identifying a relevant hazard

Note: A list of relevant hazards from the Climate Projections memorandum will be provided to District staff. The memorandum identifies higher-ranking hazards relevant to the District of Taylor.

To select a hazard, staff should identify a risk or event that threatens the community. The hazard should be realistic in that it could occur in the community; have some sort of impact that would result in residents requiring services from the District.

Step 2: Identify Specific Details about the Hazard

After selecting the hazard, staff need to identify details that describe the event. This can be done by answering the following questions:

EXAMPLE:

- What is the hazard? *Wildfire.*
- What is the infrastructure/service area we are considering? *Buildings.*
- What are some specific impacts that might be caused by this event? *Damage to community buildings, impacts to air quality and building air filtration, and compromised access to District buildings.*

[9,3] Guidance on Good Practices in Climate Change Risk Assessment
[10] hrva_forms-step3-hazard_scenario_development-instructions.pdf

URBAN SYSTEMS

Step 3: Recording Impact Statements

An impact statement will contain:[11]

- An identification of the 'someone' or 'something' that will be impacted.
- The specific way it will be impacted.
- The reasons why the impact occurs.

For example, "summer drought" defines a hazard and is not a strong impact statement, but "summer drought causing increased demand on water supply" is an impact statement as it outlines what will occur (increased demand on water supply) because of the hazard (summer drought).[12]

EXAMPLE:

HVAC systems in community buildings require more frequent replacement due to wildfire smoke.

Wildfire proximity may cut off access to buildings that supply critical emergency services.

[2] CRE_Planning-Guide_Final.pdf

APPENDIX C:

LOCALIZED CLIMATE PROJECTIONS

MEMORANDUM

DATE	October 9, 2024	FROM	Ali Mujahid
TO	Tyla Pennell	FILE	3791.0014.01
CC	Aaron Coelho, Kimberley Zackodnick, Cameron Clarke	SUBJECT	District of Taylor - Climate Change Projections

1.0 INTRODUCTION

The District of Taylor (the District) is faced with a warmer, wetter, wilder future climate. Projected climate changes show that the District can expect increased precipitation, hotter temperatures and a greater frequency of extreme weather events. The District is already seeing climate impacts and climate projections put them at an increased risk from climate hazards, whose impacts may stress ecosystems and biodiversity, compromise water resources, negatively impact public health and safety of residents, adversely affect economic development, strain local infrastructure and impact service delivery.

Recognizing this, the District is taking a proactive approach to climate adaptation by preparing for the impacts of climate change and ensuring long-term sustainability by developing a Climate Change Adaptation Plan (CCAP). The CCAP is intended to be a living document that considers climate impacts, identifies and ranks climate risks and builds community resilience by developing and prioritizing adaptation measures.

The first step in developing a CCAP is to understand what climatic changes can be expected and how they may impact the District. This memo details climate projections that describe how the future climate is expected to change for the District of Taylor. These projections will help identify which climate hazards will impact the District's assets, operations, services and the community at large.

This memo contains the following information:

- Data sources for climate projections, the selection of and justification for emissions scenarios and time horizons.
- Regional climate change context for the Northeast region of British Columbia and anticipated impacts.
- Current District climate: climate 'normals' for the District of Taylor and relevant climate indicators.
- Specific climate projections for the District.
- Identification of relevant climate hazards for the climate change risk assessment.

2.0 DATA, EMISSIONS SCENARIO AND TIME HORIZONS

2.1 DATA

Climate data was prepared using the following online tools:

- **Climatedata.ca**[1] - Climatedata.ca provides statistically downscaled climate data for individual General Circulation Models[2] (GCMs) for specific areas of interest with annual, seasonal, and monthly time resolutions.
- **Western University IDF_CC Tool**[3] - Provides local climate change projections for the intensity, duration, and frequency of precipitation events.

Climatedata.ca was used to download and generate summaries of annual and seasonal climate change projections for the District. The IDF_CC Tool was used to generate summaries of projected changes in storm events.

All data in this memo were analyzed based on **Coupled Model Intercomparison Project 6 (CMIP 6).** CMIP6 data are the most current global climate model data available.[4]

2.2 EMISSIONS SCENARIO

An emissions scenario is a plausible representation of the future global development of emission of substances that are potentially radiatively active in the atmosphere, such as greenhouse gases and aerosols.[5] These scenarios are based on assumptions regarding driving forces like demographic and socioeconomic development, or technological change.

Shared Socio-economic Pathways (SSPs) are global scenarios used to characterize possible future development pathways for human societies. These models make assumptions about how population, education, energy use, technology – and more – may change over the next century, and couple them with assumptions about the level of ambition for mitigating climate change.

We have elected to use the SSP5-8.5[6] scenario for this assessment. This scenario means that little is done to reduce GHG emissions over the coming decades. While efforts by many governments are currently being implemented, this scenario offers a "worst-case scenario" for assessment purposes, tempered by using only the median values from the GCM ensemble, and allows for adequate preparedness and adaptation efforts.

[1] https://climatedata.ca/
[2] Global climate models are computer programs that calculate the interactions between the ocean, atmosphere and land using factors such as water vapor, carbon dioxide, heat, and the Earth's rotation as inputs. Climate models project climate - the average weather over a long period of time, e.g., a 30-year period.
[3] https://www.idf-cc-uwo.ca/home
[4] https://climatedata.ca/resource/cmip6-faq/
[5] https://climatedata.ca/glossary/
[6] "SSP5" reflects the Shared Socio-economic Pathway representing a fossil fuel-intensive world and the "8.5" describes 8.5 Watts per square meter of Radiative Forcing resulting from the greenhouse gas emissions in this scenario.

2.3 TIME HORIZONS

The historical data timeframe for this assessment is 1981 – 2010 (baseline). The climate data projections focus on three future climate normal periods:

- 2011 – 2040 (2020s)
- 2041 – 2070 (2050s)
- 2071 – 2100 (2080s)

The 1981-2010 period was used to establish current climate conditions, which forms the climate baseline for the assessment. The three different time periods are used to identify how climate trends are projected to change over the next several decades.

3.0 REGIONAL CONTEXT

To develop a big-picture understanding of how the climate is expected to change in the Northeast region, Fraser Basin Council's Retooling for Climate Change website, the Climate Projections for the BC Northeast Region (2019)[7] and the City of Fort St. John's (FSJ) Climate Change Vulnerability Assessment (2019)[8] reports were consulted. Projections from the reports are mentioned below. The Northeast region can expect the following major climate trends in the future:

- Increased precipitation across all seasons.
- Summers will be considerably hotter.
- Warmer winter temperatures.
- More frequent extreme storm events.

The reports listed the following anticipated impacts from the projected future climate trends:

- Altered flows in rivers, causing water shortages and floods.
- Increased incidence of low-flow periods and drought.
- More intense storms, stronger winds, larger hail, and more lightning strikes, resulting in increased incidence of wildfire.
- Health, well-being and service delivery challenges from heat-related illness, and smoke exposure from wildfires.
- Higher demand for water during longer hotter summers and dry spells may create challenges for water supply.

A summary of these regional projections and possible impacts is shown in ***Figure 1***.

[7] https://www.fraserbasin.bc.ca/_Library/CCAQ/fbc_ne_climatereport_web.pdf
[8] https://www.fraserbasin.bc.ca/_Library/CCAQ/Fort_St_John_Community_Vulnerability_Assessment.pdf

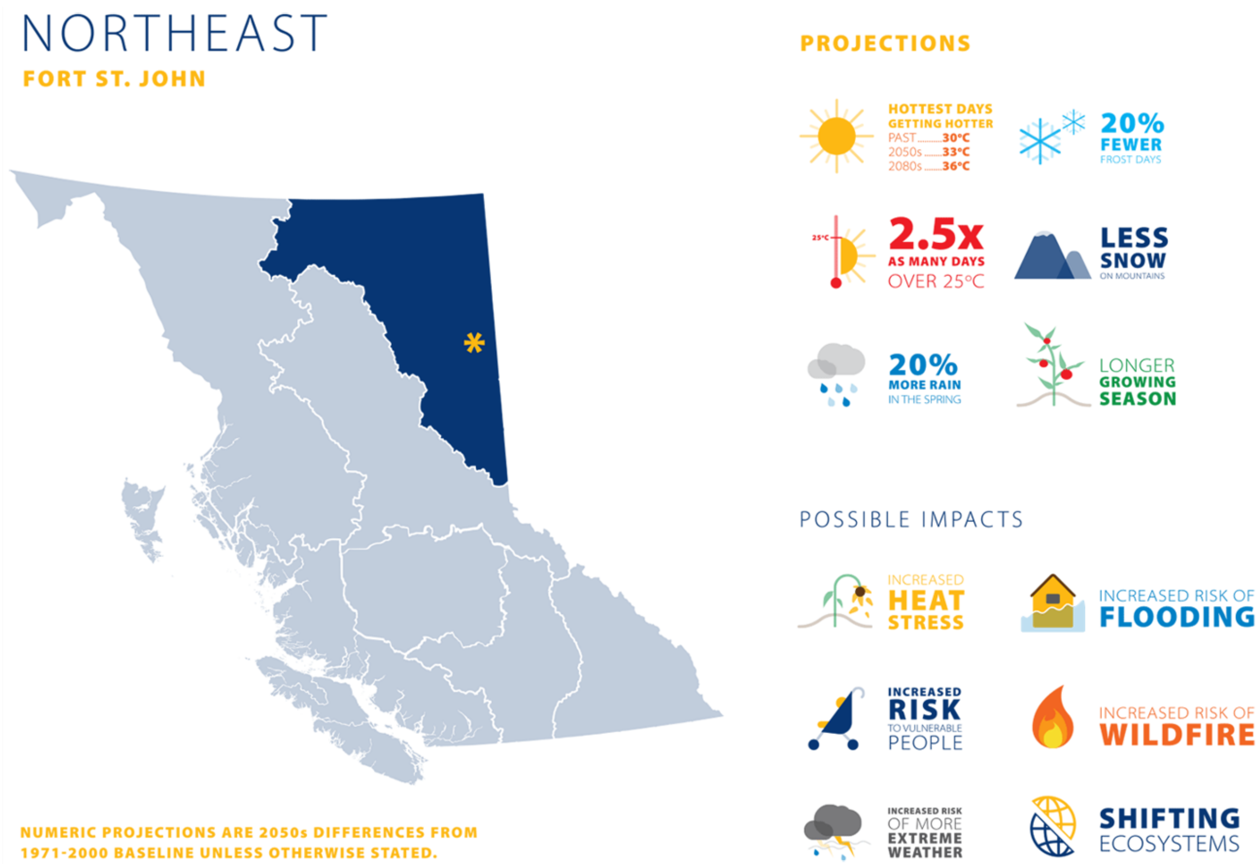


Figure 1: Climate Change Projections & Impacts for BC's Northeast Region[9]

4.0 CURRENT TAYLOR CLIMATE

This section will give an overview of the current climate of the District. **Figure 2** shows the temperature and precipitation normals (average climatic conditions) for the District of Taylor (Station ID: 1183000)[10] from 1981-2010.

[9] https://retooling.ca/climate-change/regional-projections-impacts/

[10] Normals data for the District was taken from the Fort St John A station (ID: 1183000) since the closest weather station to Taylor (Taylor Flats – ID: 1188020) only has precipitation data.

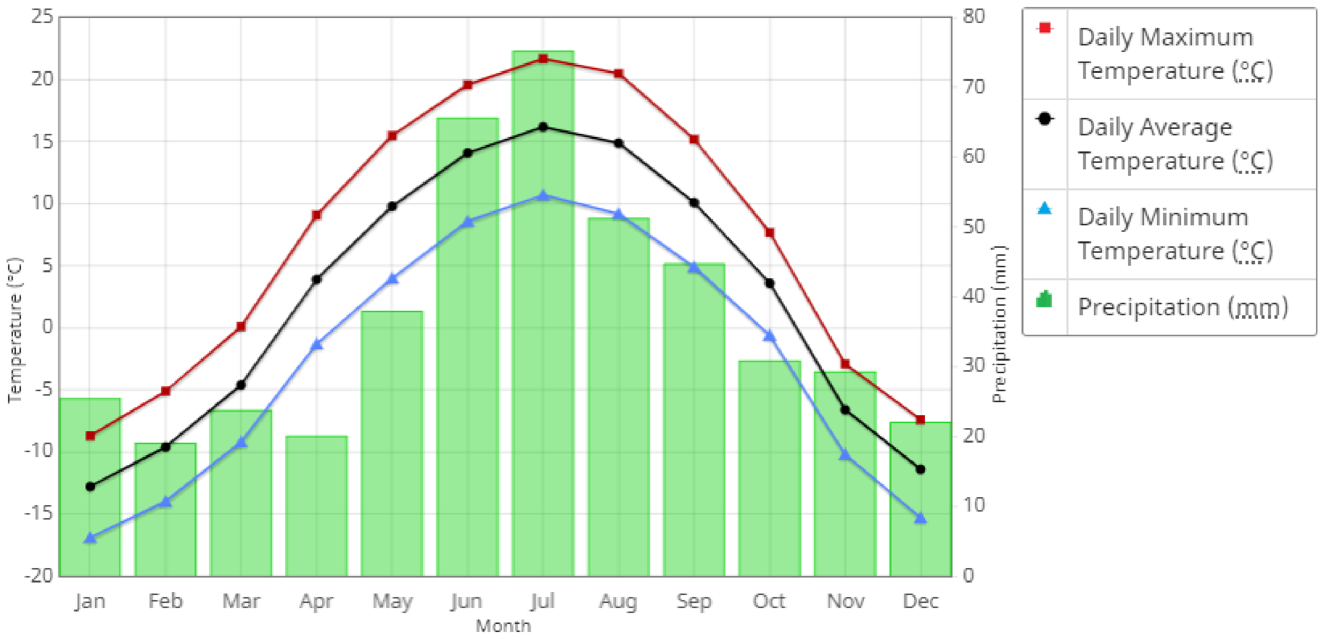


Figure 2: Temperature and Precipitation Graph for 1981 to 2010 Canadian Climate Normals for Taylor[11]

As visible from the figure, the highest daily average temperatures are observed in July and August. The highest mean precipitation is recorded in July. January and December have the lowest average daily temperatures.

5.0 CLIMATE HAZARDS

Climate hazards relevant to the District were identified and refined using the data sources listed above, regional reports and our professional experience. These hazards are expected to be reviewed and further refined, if necessary, during discussions with District staff. Climate projection reports for the BC Northeast region and the City of Fort St. John were reviewed and then cross-checked for accuracy and relevance with the District's temperature and precipitation indicators.

The following hazards were chosen for the assessment:

- Wildfire
- Drought
- Extreme Wind
- Extreme Cold
- Extreme Heat
- Flooding
- Freeze/Thaw Cycles

[11] Canadian Climate Normals 1981-2010 Station Data - Climate - Environment and Climate Change Canada (weather.gc.ca)

5.1 CLIMATE HAZARD INDICATORS

Climate indicators that are expected to influence the frequency and severity of the climate hazards were identified. Climate indicators for the assessment were taken from Climatedata.ca and Western University's IDF_CC Tool.

These indicators were the focus for accessing and summarizing climate change projections for this project. For detailed definitions of climate indicators, please refer to **Appendix A.** The hazards and their relevant climate indicators are as follows:

- **Wildfire:**
  - Mean temperature during the summer season
  - Days with Tmax > 30 °C, > 32 °C
  - Max number of consecutive dry days
  - Total precipitation during the summer season
- **Extreme Heat**
  - Mean temperature during the summer season
  - Days with Tmax > 30 °C, > 32 °C
  - Hottest Day
- **Drought:**
  - Total precipitation during the summer season
  - Mean temperature during the summer season
  - Days with Tmax > 30 °C, > 32 °C
  - Max number of consecutive dry days
- **Flooding:**
  - Wet days >= 10 mm
  - Maximum 1-day Total Precipitation
  - Maximum 5-day Precipitation
  - Precipitation Intensity, Duration and Frequency (IDF)
- **Extreme wind:**
  - No direct indicators
- **Freeze/thaw cycles:**
  - Freeze/thaw cycles
- **Extreme Cold:**
  - Days with Tmin < -15°C, - 25°C
  - Coldest Day

URBAN SYSTEMS

6.0 TEMPERATURE PROJECTIONS

Climate change projections for temperature indicators are summarized in **Table 1**.

Table 1: Temperature Projections for the District of Taylor

Climate Indicator (30 yrs. avg)	Time Horizon						
	Baseline (1981-2010)	2020s (2011-2040)		2050s (2041-2070)		2080s (2071-2100)	
	Temperature (°C)	Temperature (°C)	Change (°C)	Temperature (°C)	Change (°C)	Temperature (°C)	Change (°C)
Annual Mean Temperature	2.3	3.6	1.3	5.4	3.1	7.7	5.4
Spring (Mean)	3	4.1	1.1	5.6	2.6	7.8	4.8
Summer (Mean)	15.2	16.6	1.4	18.2	3.0	21	5.8
Fall (Mean)	3	4.4	1.4	6.3	3.3	8.5	5.5
Winter (Mean)	-12.4	-11	1.4	-8.8	3.6	-6.3	6.1
Hottest Day (° C)	30.5	32	1.5	34	3.5	36.9	6.4
Climate Indicator	# of Days	# of Days	Change	# of Days	Change	# of Days	Change
Days with Tmax > 30 °C	3	6	3	13	10	32	29
Days with Tmax > 32 °C	1	2	1	6	5	20	19
Days with Tmin < -15 °C	69	60	-9	46	-23	29	-40
Days with Tmin < -25 °C	25	18	-7	11	-14	5	-20
Freeze-thaw Cycles	80	73	-7	62	-18	54	-26

The data in **Table 1** indicates the following:

- Annual mean temperature is expected to increase for all seasons and across all future time horizons with temperatures reaching approximately 5 °C above baseline by the end of the century.
- Very hot days (Days with Tmax > 30 °C, > 32 °C) are expected to increase towards the end of the century.
- Very cold days (Days with Tmin < -15°C, - 25°C) are expected to register a decrease by the end of the century but still make up enough annual occurrences to be considered a relevant hazard for this assessment.

- The District can expect maximum temperatures that are hotter than previously experienced. The hottest day is expected to increase to ~37 °C by the end of the century.
- Freeze-thaw cycles decrease during each time horizon up till the end of the century but still make up enough annual occurrences to be considered a relevant hazard for this assessment.

7.0 PRECIPITATION PROJECTIONS

Climate change projections for precipitation indicators are summarized in **Table 2.**

Table 2: Precipitation Projections for the District of Taylor

Climate Indicator	Time Horizon			
	Baseline (1981-2010)	2020s (2011-40)	2050s (2041-2070)	2080s (2071-2100)
Annual Total Precipitation (mm) (% change)	430	440 (+2%)	471 (+10%)	493 (+15%)
Spring (mm) (% change)	82	87 (+6%)	96 (+17%)	104 (+27%)
Summer (mm) (% change)	189	189 (0%)	191 (+1%)	191 (+1%)
Fall (mm) (% change)	96	99 (+3%)	108 (+13%)	120 (+25%)
Winter (mm) (% change)	86	89 (+4%)	96 (+12%)	101 (+17%)
Wet Days >= 10 mm (# of days)	9	9	10 (+1)	11 (+2)
Max no. of consecutive dry days (# of days)	25	26 (+1)	25	25
Max 1-day total precipitation (mm) (% change)	30	31 (+3%)	32 (+7%)	34 (+13%)
Max 5-day Precipitation (mm) (% change)	55	57 (+4%)	59 (+7%)	60 (+9%)

From **Table 2**, the annual total precipitation is projected to increase over the three future time horizons:

- 2% during the 2020s
- 10% by the 2050s
- 15% by the 2080s

Additional trends observed from **Table 2** include:

- Precipitation is projected to increase across all seasons, across all time horizons.
- The largest increases in precipitation towards the end of the century are expected in the spring (+27%), followed by fall (+25%) and winter (+17%).
- The number of wet days >= 10 mm is projected to increase by 2 days by the end of the century

- Maximum 1-day and 5-day precipitation are expected to increase by 13% and 9%, respectively, by the end of the century.

To further understand the projected changes in storm events, the full range of IDF projections using the IDF_CC Tool for the District was assessed. **Table 3** shows the baseline IDF values and **Table 4**, **Table 5** and **Table 6** summarize the projected changes (% change) in IDF values compared to the baseline over the 2020s, 2050s and 2080s respectively.

Table 3: Historical Rainfall Intensity (IDF_CC Tool – District of Taylor)

Duration	2-Yr	5-Yr	10-Yr	20-Yr	25-Yr	50-Yr	100-Yr
1 h (mm)	11.95	17.41	20.96	24.42	25.39	28.64	31.83
2 h (mm)	13.73	19.57	23.68	27.92	29.19	33.51	38
6 h (mm)	20.15	26.24	30.83	35.81	37.37	42.81	48.77
12 h (mm)	27.69	35.67	41.23	46.91	48.6	54.34	60.3
24 h (mm)	36.08	45.68	51.58	57.12	58.58	63.46	68.09

Table 4: Projected Rainfall Intensity for 2020s (2015-2045)

Duration	2-Yr	5-Yr	10-Yr	20-Yr	25-Yr	50-Yr	100-Yr
1 h (%)	7	8	9	10	10	11	13
2 h (%)	7	8	9	10	10	11	13
6 h (%)	7	8	9	10	10	11	13
12 h (%)	7	8	9	10	10	11	13
24 h (%)	7	8	9	10	10	11	13

Table 5: Projected Rainfall Intensity for 2050s (2041-2070)

Duration	2-Yr	5-Yr	10-Yr	20-Yr	25-Yr	50-Yr	100-Yr
1 h (%)	13	13	15	14	13	14	14
2 h (%)	13	13	15	14	13	14	14
6 h (%)	13	13	14	14	13	14	14
12 h (%)	13	13	15	14	13	14	14
24 h (%)	13	13	15	14	13	14	14

Table 6: Projected Rainfall Intensity for 2080s (2071-2100)

Duration	2-Yr	5-Yr	10-Yr	20-Yr	25-Yr	50-Yr	100-Yr
1 h (%)	22	23	25	26	27	29	31
2 h (%)	22	23	25	26	27	29	31
6 h (%)	22	23	25	26	27	29	31
12 h (%)	22	23	25	26	27	29	31
24 h (%)	22	23	25	26	27	29	31

Tables 4, 5 and **6** indicate that the intensity, duration, and frequency of extreme rainfall events are estimated to increase by approximately 13% during the 2020s, 14% during the 2050s and up to 31% by the 2080s respectively.

8.0 WIND

As wind speeds and direction are not provided as an output from GCMs, it is difficult to make exact projections for how wind speeds may change over time.

A study that was prepared for Environment Canada[8] includes the following findings:

- Canada could potentially experience more wind gust events late this century than has been historically experienced.
- The magnitude and frequency of future wind gust events would be generally greater for more severe wind gust events. For example, the percentage increases in the frequency of future hourly wind gust events ≥28 and ≥70 km/h are projected to be approximately 10% and 20%–30%, respectively.
- The corresponding increases for future hourly wind gust events ≥90 km/h are projected to be more than 100%.

Both the Climate Projections for the BC Northeast Region (2019) and FSJ's Climate Change Vulnerability Assessment (2019) reports acknowledge that the region will experience an increased risk of more extreme weather (which includes extreme wind).

9.0 HAZARDS SUMMARY

Table 7 summarizes the climate hazards and how the projections for the climate indicators influence their severity and likelihood.

[8] Cheng, Chad S; Lopes, Edwina; Fu, Chao; Huang, Zhiyong (2014). Possible Impacts of Climate Change on Wind Gusts under Downscaled Future Climate Conditions: Updated for Canada. Journal of Climate. Vol 27: 1255-1270.

Table 7: Summary of Climate Hazards and Projected Changes in Key Climate Indicators

Climate Hazard	Climate Indicator Influence on Severity/Likelihood
Wildfire	Increasing summer temperatures and an increasing frequency of very hot days will contribute to conditions conducive to wildfires.
Extreme Heat	Rising summer temperatures and an increasing number of very hot days indicate an increasing frequency of extreme heat events, especially towards the latter part of the century.
Drought	Rising summer temperatures will increase the likelihood of conditions conducive to drought.
Flooding	Precipitation indicators and IDF curves (intensity, duration and frequency) data show that the intensity, duration and frequency of extreme rainfall events are estimated to increase which may lead to more flooding events.
Extreme Wind	Research indicates an increased frequency of high-speed wind events in the future for the District.
Freeze/Thaw Cycles	GCMs show that while warming weather is causing a decrease in the number of freeze/thaw cycles, they will still comprise enough days per year over future time periods to be considered a relevant hazard.
Extreme Cold	While GCMs show extremely cold weather being less frequent and of lower magnitude, very cold days still comprise enough days per year over future time periods to be considered a relevant hazard

10.0 NEXT STEPS

Climate indicators for Taylor and their projected changes till the end of the century have been analyzed and relevant climate hazards identified. The next step is to complete a full climate change risk assessment to understand which District elements are vulnerable to a changing future climate by determining and assigning likelihood and consequence ratings. These ratings will then be used to calculate risk ratings for all relevant District elements.

The results of the climate change risk assessment will then be considered, and adaptation options developed to enhance the District's climate resiliency.

APPENDIX A:

CLIMATE INDICATOR DEFINITIONS

MEMORANDUM

Climate Indicator	Definition[12]
Annual Maximum Temperature	Maximum temperature describes the warmest temperature of the 24-hour day over a 12-month period. Typically, but not always, the maximum temperatures occur during the day and so this variable is commonly referred to as the daytime high.
Annual Mean Temperature	The average temperature for the 24-hour day over a 12-month period
Annual Minimum Temperature	The coldest temperature of the 24-hour day over a 12-month period. Typically, but not always, the minimum temperature occurs at night and so this variable is commonly referred to as the nighttime low.
Days with Tmax > 30 °C	The number of days where the daytime high temperature is warmer than 30°C.
Days with Tmax > 32 °C	The number of days where the daytime high temperature is warmer than 32°C.
Days with Tmin < -15°C	Describes the number of days where the lowest temperature of the day is colder than -15°C.
Days with Tmin < -25°C	Describes the number of days where the lowest temperature of the day is colder than -25°C.
Freeze/Thaw cycles	A simple count of the days when the air temperature fluctuates between freezing and non-freezing temperatures on the same day.
Hottest Day	Describes the warmest daytime temperature in the selected time period. In general, the hottest day of the year occurs during the summer months.
Max number of consecutive dry days	Describes the longest spell of days where less than 1mm of precipitation falls daily.
Maximum 1-day Total Precipitation	The largest amount of precipitation (rain and snow combined) that falls within a single 24-hour day for the selected time period.
Maximum 5-day Precipitation	The largest amount of precipitation (rain and snow combined) to fall over 5 consecutive days.
Mean temperature during the summer season	Describes the average temperature for the 24-hour day during the summer season
Total precipitation during the summer season	Describes the total amount of precipitation (rain and snow combined) that falls in the summer season.
Wet days >= 10 mm	Describes the number of days where at least 10 mm of precipitation (rain and snow combined) falls in the selected time period.

[12] All definitions taken from Variables Archive — ClimateData.ca

APPENDIX D:

ENGAGEMENT SUMMARY

URBAN SYSTEMS

District of Taylor CCAP

Engagement Summary – Phase 1

DATE	January 16, 2025	FROM	Ali Mujahid
TO	Tyla Pennell	FILE	1770.0083.01
CC	Aaron Coelho, Kimberly Zackodnick	SUBJECT	Phase 1 Engagement Summary – District of Taylor CCAP

1.0 INTRODUCTION

The District of Taylor (the District) is developing a Climate Change Adaptation Plan (CCAP) to increase community resilience to a changing future climate.

As part of this Plan, the District is conducting engagement sessions to develop the knowledge base needed for a practical, actionable and meaningful plan. This memorandum summarizes the results of the first staff workshop and the Phase 1 stakeholder engagement meetings. This information will be utilized to inform the following Phases (2 and 3) of the CCAP.

2.0 STAFF WORKSHOP #1

A staff workshop was held in person at the District of Taylor offices (list of attendees below). This workshop was intended to:

- Confirm and refine climate projections and the list of climate hazards for the climate change risk assessment.
- Gather preliminary information to begin building the District's knowledge base for the CCAP.

The information gathered from this session will be utilized to inform the risk assessment (Phase 2 of the CCAP) as well as provide preliminary information regarding the Districts' existing adaptive capacity, information that will eventually guide the generation of adaptation options to improve the District's climate resilience.

ATTENDEES	TITLE	COMPANY	EMAIL
Ryan Galay	Chief Administrative Officer (Interim)	District of Taylor	rgalay@districtoftaylor.com
Mike Farquharson	Parks and Facilities Manager	District of Taylor	mfarquharson@districtoftaylor.com
Lisa Ford	Financial Services Manager (Interim)	District of Taylor	lford@districtoftaylor.com
Mike Whalley	Deputy Corporate Officer (interim)	District of Taylor	mwhalley@@districtoftaylor.com
Tyla Pennell	Director of Corporate Services	District of Taylor	tpennell@districtoftaylor.com
Larry Ramstad	Golf Professional	District of Taylor	lramstad@districtoftaylor.com
Steve Byford	Director of Protective Services/Fire Chief	District of Taylor	sbyford@districtoftaylor.com

Matthew Weeks	Peace Island Park Manager	District of Taylor	mweeks@districtoftaylor.com
Ryan Nelson	Director of Operations	District of Taylor	rnelson@districtoftaylor.com
Kimberly Zackodnick	P. Engineer	Urban Systems Ltd.	kzackodnick@urbansystems.ca
Cameron Clark	E.I.T	Urban Systems Ltd.	cclark@urbansystems.ca
Ali Mujahid	Climate Change Consultant	Urban Systems Ltd.	amujahid@urbansystems.ca

2.1 STAFF WORKSHOP #1 FORMAT

This workshop was part of a 3-hour, combined engagement session for both the CCAP as well as the District's Community Energy Plan (CEP).

A combined PowerPoint presentation for the CCAP and the CEP was presented to District staff (the full CCAP presentation can be found in **Appendix A**). The presentation touched on project overview, the general process of developing a CCAP, and a summary of climate projections and hazards.

The CCAP portion of the workshop after the presentation was based on providing a brief questionnaire (questions below) to each staff member, after which their answers would be gathered, shared and discussed with the larger group. These answers would then be used to facilitate an open discussion, where staff would provide additional context and elaborate on their answers as well as provide any additional relevant information for the CCAP (for a full list of staff answers and the posters for the open discussion, please see **Appendix A)**.

The following questions were asked during the workshop:

1. How might climate hazards impact your department's service offerings, operations and/or infrastructure? Which hazards are the most concerning?
2. How well-equipped is your department to respond to climate hazards? What are the most obvious gaps in resilience?
3. Will climate hazards increase the demands for your department's services? Do you anticipate a need for new services?
4. From your perspective, what does success look like for this project? What are some key factors that will support implementation?

These questions were designed with the following goals in mind:

- To refine and finalize the list of climate hazards for the risk assessment.
- To understand the current state of climate resilience within District departments.
- To gain a preliminary understanding of how climate hazards could impact District departments.
- To understand what factors will be crucial for project success and to eventually incorporate those into the final adaptation plan.

Meeting notes and staff answers as well as relevant information from the group discussion are presented in the next section.

2.2 STAFF WORKSHOP #1 AND GROUP DISCUSSION MEETING NOTES

Q1: How might climate hazards impact your department's service offerings, operations and/or infrastructure? Which hazards are the most concerning?

- The following climate hazards were identified as concerning by Taylor staff:
  - Extreme Heat (1)
  - Wildfire (2)
  - Extreme Weather (2)
  - Flooding (1)
  - Extreme Wind (1)
  - Freeze/Thaw (1)
  - Erosion (1)
  - Temperature and Precipitation (1)
- Staff identified the following impacts of concern:
  - Buildings shifting and sinking
  - Extreme heat stops grass from growing
  - Weather is a direct determinant of participation in golfing activities
  - Lack of infrastructure to accommodate more extreme weather (e.g. A/C, covered shelters)
  - Increased public interaction on impacts
  - Impacts on outdoor recreational activities
  - Sloughing of roads and hillsides
  - Sidewalk protrusions and cracking due to extreme heat
  - Concerns about access and distribution lines at the river water treatment plant
  - Slope destabilization
  - Increased calls for service
  - Extreme weather events affecting the community
  - Emergency response
  - Council/community communication
  - Resilience, continuity planning and implementation
  - Increase in taxes to upgrade service infrastructure as a result of climate hazards
  - Freeze/Thaw cycles are a concern
  - Golf course turf maintenance
  - Sidewalks and dry walls cracking

  - Buildings sinking

Q2: How well equipped is your department to respond to climate hazards? What are the most obvious gaps in resilience?

Staff identified the following issues that departments are facing and what the state of current resilience is for District assets:

- Operations has some equipment to deal with sloughing issues and repair parts for broken water lines.
- Underequipped and understaffed.
- More reactive than proactive. The obvious gap is dangerous tree removal and fire safety. Tree inspections are done annually – dangerous trees can cause loss of service and closure of sites. Tree removal is taking place, and some brushing is being done around water infrastructure.
- The team is able to adapt quickly, provided they are able to access current and relevant information.
- Internal capacity and education required. Understanding intended direction and response. Need response resources (financial and technical).
- More irrigation is required for Parks and Facilities. Water as a resource.
- Golf course is well equipped to respond – can reschedule events and can directly communicate with customers. The obvious gap would be adapting with short or no notice. The golf course is irrigated by river water, and the rest of the community is irrigated by potable water.
- Future inflow and infiltration issues. Sewer infrastructure is currently at capacity – Lift Station 2 is, and Lift Station 3 improved.
- Generally, well equipped – noticeable gap is forecasting climate-related impacts to terrain, public health and planning.
- Most critical facilities have backup power – Arena does not.
- Lack of staff and capacity across all departments. Deployment of resources from regional operations and backlog.
- Lack of continuity planning and business continuity plans.

Q3: Will climate hazards increase the demands for your department's services? Do you anticipate a need for new services?

- Yes – not new services but increased demand on current services and increasing frequency of requirement of those services.
- May see an increase in phone calls from residents with requests as a result of climate impacts/concerns.
- Yes – more repairs to road, water and sewer infrastructure.
- Demand will increase as temperature rises to be more desirable for outdoor activities. Do not anticipate a need for new services.
- Yes – as the department that interacts with the public on "all" matters, staffing, training and support will be required to increase.

- Lone Wolf Golf Course and Peace Island Park could be open longer.
- Wildfires could increase demands on protective services.
- Increase planning – financial, policy and communications. More enhanced services.
- Possible need for more air-conditioned spaces and cool zones.
- Warmer weather will lead to increased usage metrics for recreation. Extreme weather events may impact terrain usability.
- As temperatures increase, there will be an increase in outdoor activity.

Q4: From your perspective, what does success look like for this project? What are some key factors that will support implementation?

- Golf course: longer season, more customer usage, better playing conditions. Factors supporting implementation: forecasting and infrastructure.
- Actionable plan that supports sustainable growth of our community. Sustainable growth = incorporating climate change processes + minimizing tax increases + multi-service oriented + recognizing impacts and maintaining and enhancing levels of service (keeping up with demand).
- Sufficient resources to accomplish implementation. Key factors supporting implementation: being relevant and meaningful to a majority, integration with other plans, simple and easy to understand.
- Success involves pre-emptive risk identification. Key factors are ensuring we continue to serve our public and ensure resiliency.
- Have a plan to get more money.
- Generational change and overall buy-in.
- Work plan based on milestones. The balance between the final deliverable being a public-facing document and a resource for internal staff.
- Deliverables should be upgradeable, maintainable and data-focused.
- Should educate and build capacity within staff.
- Proactive.
- Understanding current and future situations.
- Identifying measures for critical service delivery and response.
- Building awareness and shared responsibility.
- Actionable measures to support community resilience.
- Being able to allocate funds to support new infrastructure or programs.
- Minimal interruptions to service.
- A plan that considers each hazard's impacts specifically on Taylor and how we can respond.

3.0 STAKEHOLDER ENGAGEMENT

3.1 STAKEHOLDER ENGAGEMENT FORMAT

The list of relevant stakeholders was proposed by the District and refined with their assistance. Thirty-minute engagement discussions (some virtual and some in-person) were held with select staff from the following organizations:

- Cameron Logistics (in-person)
- Fort St. John and District Chamber of Commerce (in-person)
- School Board 60 (in-person)
- Northern Health (virtual)
- City of Fort St. John (virtual)
- Peace River Regional District (virtual)

All stakeholders were presented with the following three questions and their answers were recorded (for a complete list of notes, see **Appendix B**). The three questions were:

- Which climate hazards are the most concerning for your organization? How do you expect them to impact your organization?
- Is climate change a priority for your organization? Has it taken any steps towards building resilience?
- Do you see any synergies between your organization's work and what Taylor is doing? What work do you think would be beneficial for alignment with the District?

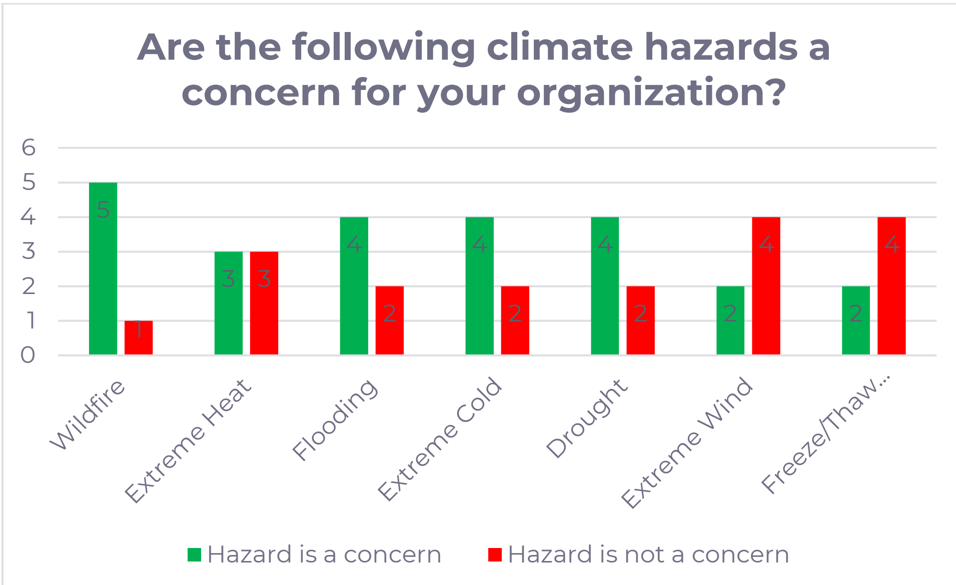
These 3 questions were designed to:

- Understand stakeholder's climate priorities
- Get insight into the state of current climate resilience within those organizations and understand their approach to climate change
- Identify possible efficiencies for the eventual generation of adaptation actions

The information logged from stakeholder engagement is intended to feed into the District of Taylor's climate knowledge base, inform the climate change risk assessment (Phase 2 of the CCAP), guide the direction of the climate adaptation plan and will eventually be used to inform the generation of adaptation actions. It is also intended to be used to ensure that the CCAP is as holistic as possible, to ensure its long-term viability.

3.2 SUMMARY OF ENGAGEMENT RESULTS

Q1: Which climate hazards are the most concerning for your organization? How do you expect them to impact your organization?



Observations

- Wildfire was the climate hazard of greatest concern for stakeholder organizations with 5 out of 6 respondents saying that it is either a concern or the most concerning climate hazard.

  Impacts identified:

  - Business and access disruptions
  - Risk of physical fire damage
  - Evacuations, disruptions and displacement of both the general public and vulnerable populations
  - Increase in service demands (mental health support, increased demand for medication, low staffing levels for emergency management).

- Drought, flood and extreme cold were the climate hazards that stakeholder organizations identified as concerning, with 4 out of 6 respondents saying that their organizations are concerned about them.

  Impacts identified:

  - Concerns about staff safety
  - School and work disruptions
  - Lack of warming facilities

  - Effects on vulnerable populations and service disruptions.

- Extreme heat was considered concerning by 3 out of 6 organizations. However, it was identified as a future concern by several organizations.

  Impacts identified:

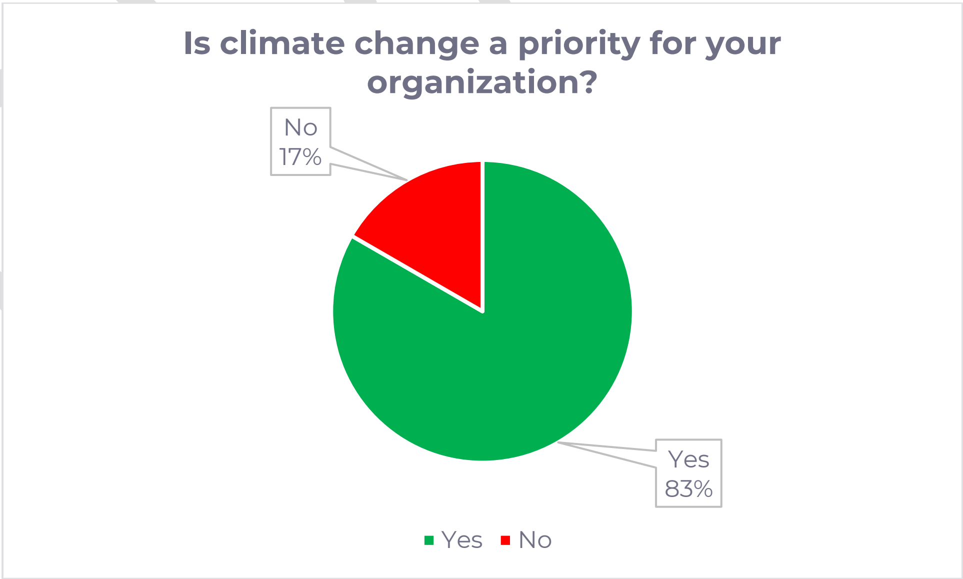
  - Disruptions to the school district's summer activities.
  - Viability of existing infrastructure.
  - Sufficiency of current adaptation plans and early warning systems.
  - Effects on vulnerable populations.
  - Impacts on natural assets.

- Extreme wind and freeze-thaw cycles were identified as concerning by the least number of organizations, 2 out of 6.

  Impacts identified:

  - Safety concerns for staff and the public.
  - Effects on rural communities.
  - Power outages.

Q2: Is climate change a priority for your organization? Has it taken any steps towards building resilience?



Observations

- Climate change was a priority for 5 out of the 6 organizations interviewed as part of stakeholder engagement. The only organization where it was not a direct priority and that had no relevant policies was Cameron River Logistics but despite having no formal policy regarding climate change, they were taking some actions that tended to mitigate some of the effects of climate impacts such as safety and operational requirements for staff in extreme weather.
- The remaining organizations listed climate change as a priority with a majority of them having some sort of policies (4 out of 6) that directly addressed the impacts of a changing climate. These included
  - Climate change policy (School District 60)
  - Wildfire Emergency Plans (School District 60)
  - Strategic Plans that include climate considerations (Northern Health)
  - Climate Change and Health Vulnerability Roadmap (Northern Health - set for release in 2025)
  - Updated maintenance processes (snow and ice removal) – City of Fort St. John
  - Updating existing plans and emergency procedures (Peace River Regional District)

Q3: Do you see any synergies between your organization's work and what Taylor is doing? What work do you think would be beneficial for alignment with the district of Taylor?

Observations

- All the stakeholder organizations acknowledged some synergy between the District's climate resilience work as part of the CCAP and their own priorities. Synergies identified included:

  - General resilience towards a changing climate
  - Business stability and continuity
  - Improvement in the District's quality of life by providing consistent levels of service despite a changing future climate
  - Safety for staff and residents
  - Advocacy and inter-governmental cooperation in resilience efforts
  - Potential for collaboration between stakeholders and the District for shared resiliency planning
- Some organizations also included future work that might be beneficial for mutual resilience alignment such as:
  - Emergency response, management and evacuation policies (School District 60, City of Fort St. John)
  - Capacity building (FSJ & District Chamber of Commerce, City of Fort St. John)
  - Resilience planning (School District 60, Peace River Regional District)
  - Understanding how climate change impacts vulnerable populations (Northern Health)
  - Regional cooperation (Peace River Regional District)

4.0 NEXT STEPS

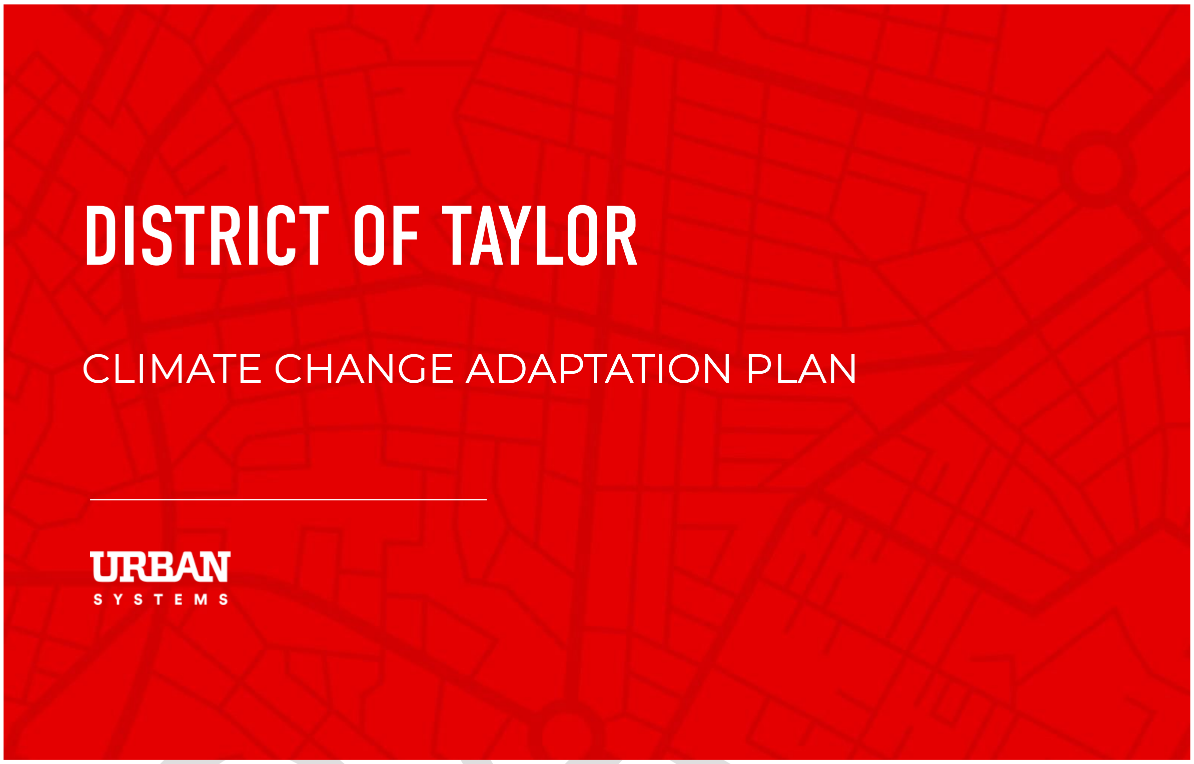
This concludes staff and stakeholder engagement activities for Phase 1 of the CCAP. This information will be used to inform the climate change risk assessment (Phase 2 of the CCAP) being conducted for the District. Phase 2 (Climate Change Risk Assessment) will involve one-on-one discussion sessions with relevant department staff and operators and further develop the knowledge base to log potential climate impacts and provide rationale for the consequence analysis of the risk assessment.

After Phase 2 is complete, stakeholder organizations and staff will be engaged again to present the key findings of the assessment and provide input for the draft CCAP.

APPENDIX A

STAFF WORKSHOP PRESENTATION, ANSWERS & POSTERS

PRESENTATION



INTRODUCTION & PROJECT OVERVIEW

PROPOSED AGENDA

- Introductions
- Project Overview
- General Process
- Climate Projections
- Breakout Interviews
- Group Discussion
- Next Steps

URBAN SYSTEMS

INTRODUCTION & PROJECT OVERVIEW

OBJECTIVES FOR OUR TIME TODAY

- Understand how past climate events have impacted the District
- Discuss current climate -related concerns
- Understand impacts that climate hazards would have on service delivery, operational capacity and the community at large

URBAN SYSTEMS

INTRODUCTION & PROJECT OVERVIEW

VISION

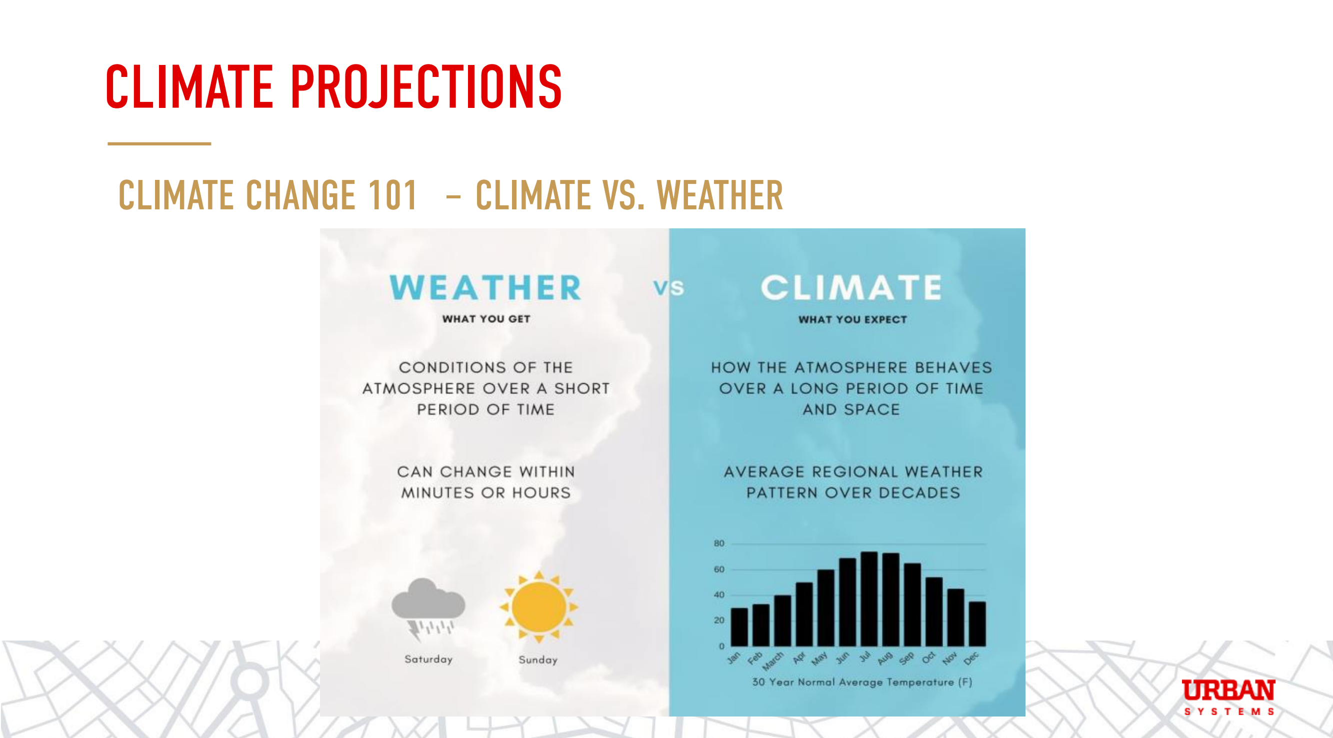
- Proactive approach to climate change – Taylor is already seeing the impacts of a changing climate
- Community wide strategy – equitable & holistic
- Actionable – Implementable – Measurable
- Living document
- Improves community resilience to natural hazards

INTRODUCTION & PROJECT OVERVIEW

HOW IS A CLIMATE CHANGE ADAPTATION PLAN DEVELOPED?

- Understanding what the climate of the future will be? How will it change?
- Considering the impacts of a changing future climate on Taylor – infrastructure, critical service areas, community at large
- Understanding climate concerns
- Conducting a risk assessment
- Developing prioritized adaptation actions


CLIMATE PROJECTIONS


CLIMATE PROJECTIONS
CLIMATE CHANGE 101 – CLIMATE VS. WEATHER
WEATHER
WHAT YOU GET
CONDITIONS OF THE ATMOSPHERE OVER A SHORT PERIOD OF TIME
CAN CHANGE WITHIN MINUTES OR HOURS
Saturday
Sunday
VS
CLIMATE
WHAT YOU EXPECT
HOW THE ATMOSPHERE BEHAVES OVER A LONG PERIOD OF TIME AND SPACE
AVERAGE REGIONAL WEATHER PATTERN OVER DECADES
80
60
40
20
0
Jan
Feb
March
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
30 Year Normal Average Temperature (F)
URBAN SYSTEMS

CLIMATE PROJECTIONS

SUMMARY OF PROJECTED CLIMATE CHANGES FOR TAYLOR

- Warmer temperatures – across all seasons
- Hotter temperatures than previously experienced
- More days over 30 °C
- Warmer winters
- Increased precipitation – across all seasons
- More extreme weather events

URBAN SYSTEMS

CLIMATE PROJECTIONS

RELEVANT CLIMATE HAZARDS

- Wildfire
- Drought
- Extreme Heat
- Flooding
- Extreme Wind
- Freeze/thaw Cycles
- Extreme Cold

URBAN SYSTEMS

GROUP ACTIVITY - INTERVIEWS

GUIDELINES

- This activity is going to last 35 minutes
- Please break off into groups of 2
- You will be provided interview sheets with questions
- Please take 10 minutes to ask your colleague the 4 questions on the interview sheet and record their answers
- Switch places after 10 minutes, have the interviewer become the interviewee!

URBAN SYSTEMS

GROUP ACTIVITY - INTERVIEWS

INTERVIEW QUESTIONS

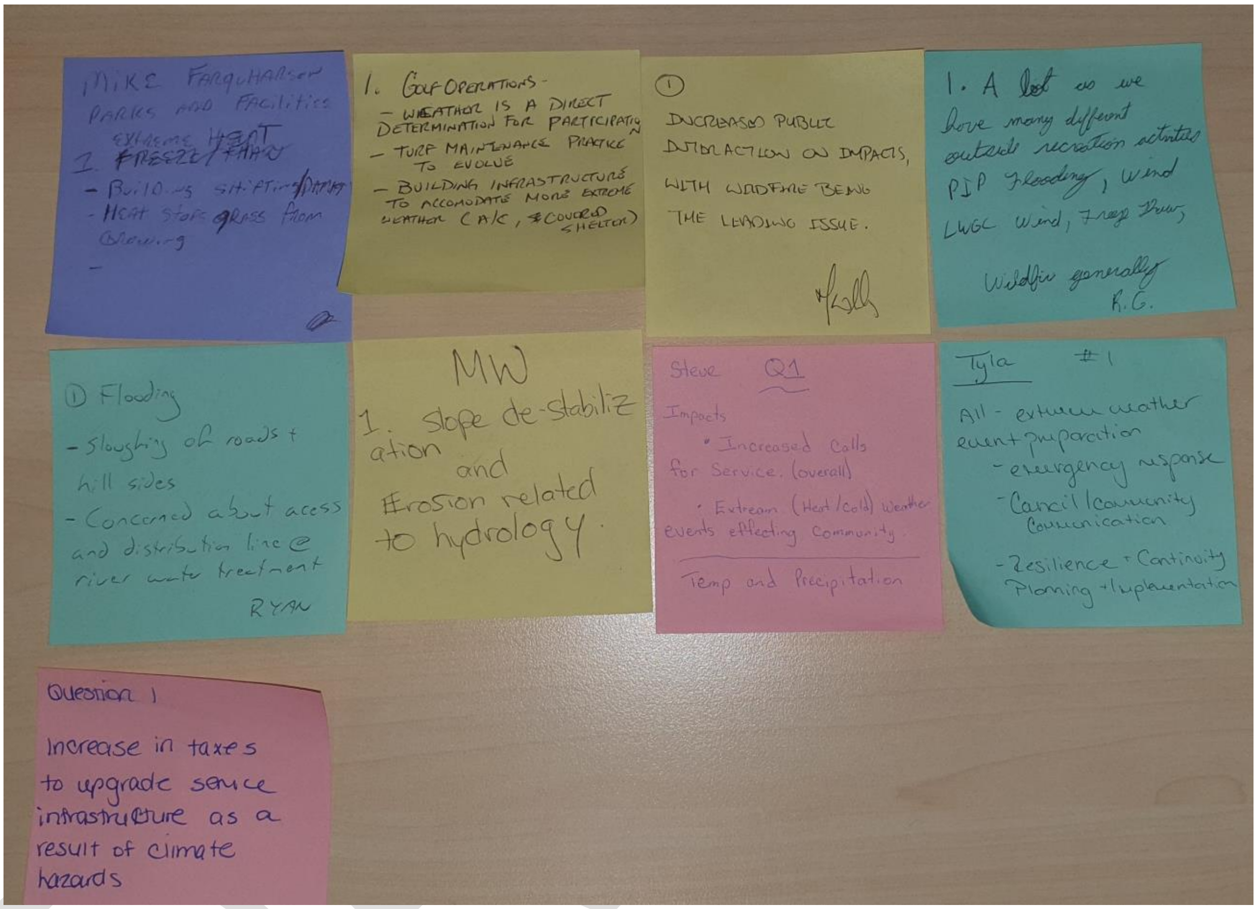
- Q1: How might climate hazards impact your department's service offerings, operations and/or infrastructure? Which hazards are the most concerning?
- Q2: How well equipped is your department to respond to climate hazards? What are the most obvious gaps in resilience?
- Q3: Will climate hazards increase the demands for your department's services? Do you anticipate a need for new services?
- Q4: From your perspective, what does success look like for this project? What are some key factors that will support implementation?


NEXT STEPS/QUESTIONS

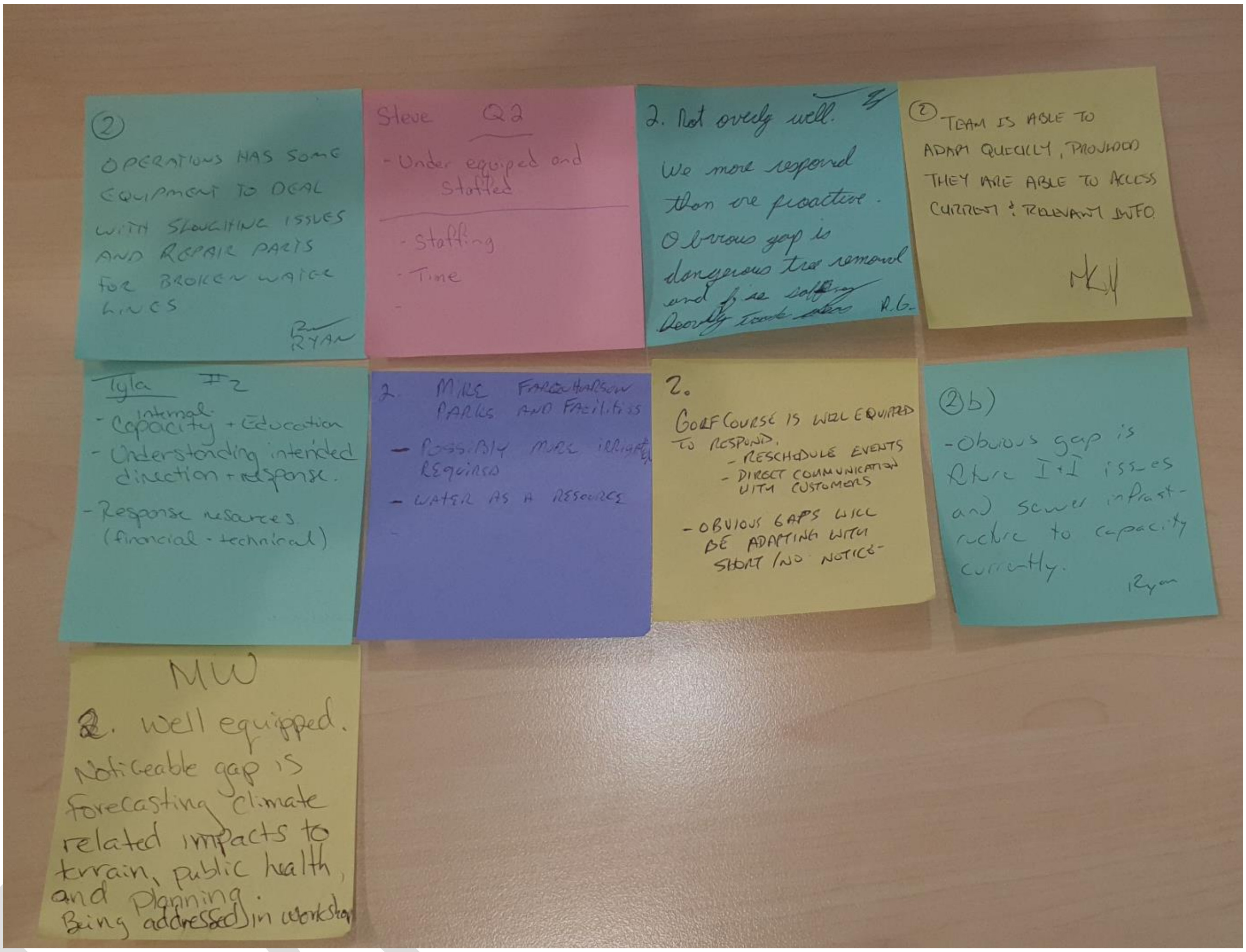

THANK YOU!

STAFF ANSWERS & GROUP DISCUSSION POSTERS

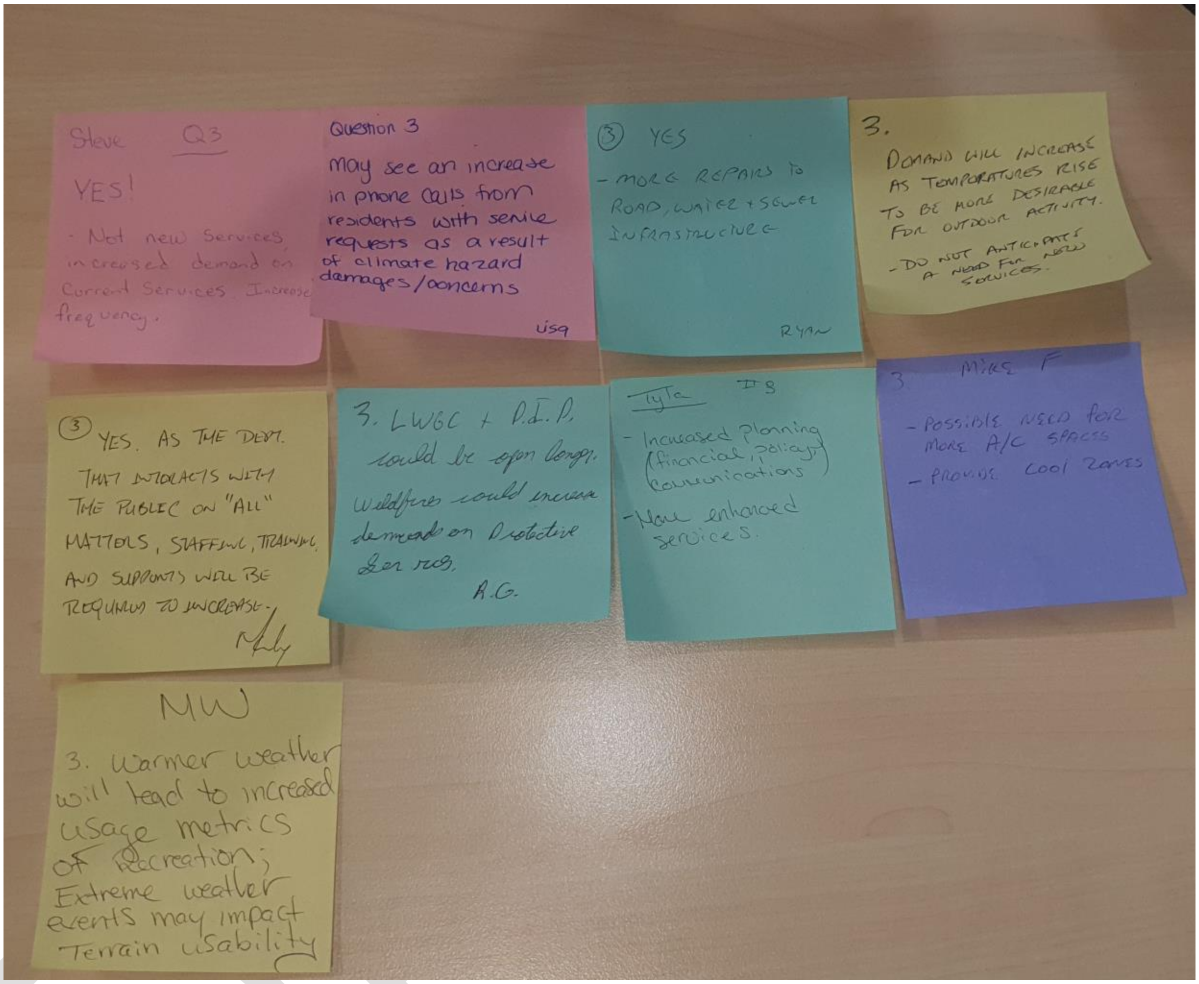
1. **How might climate hazards impact your department's service offerings, operations and/or infrastructure? Which hazards are most concerning?**



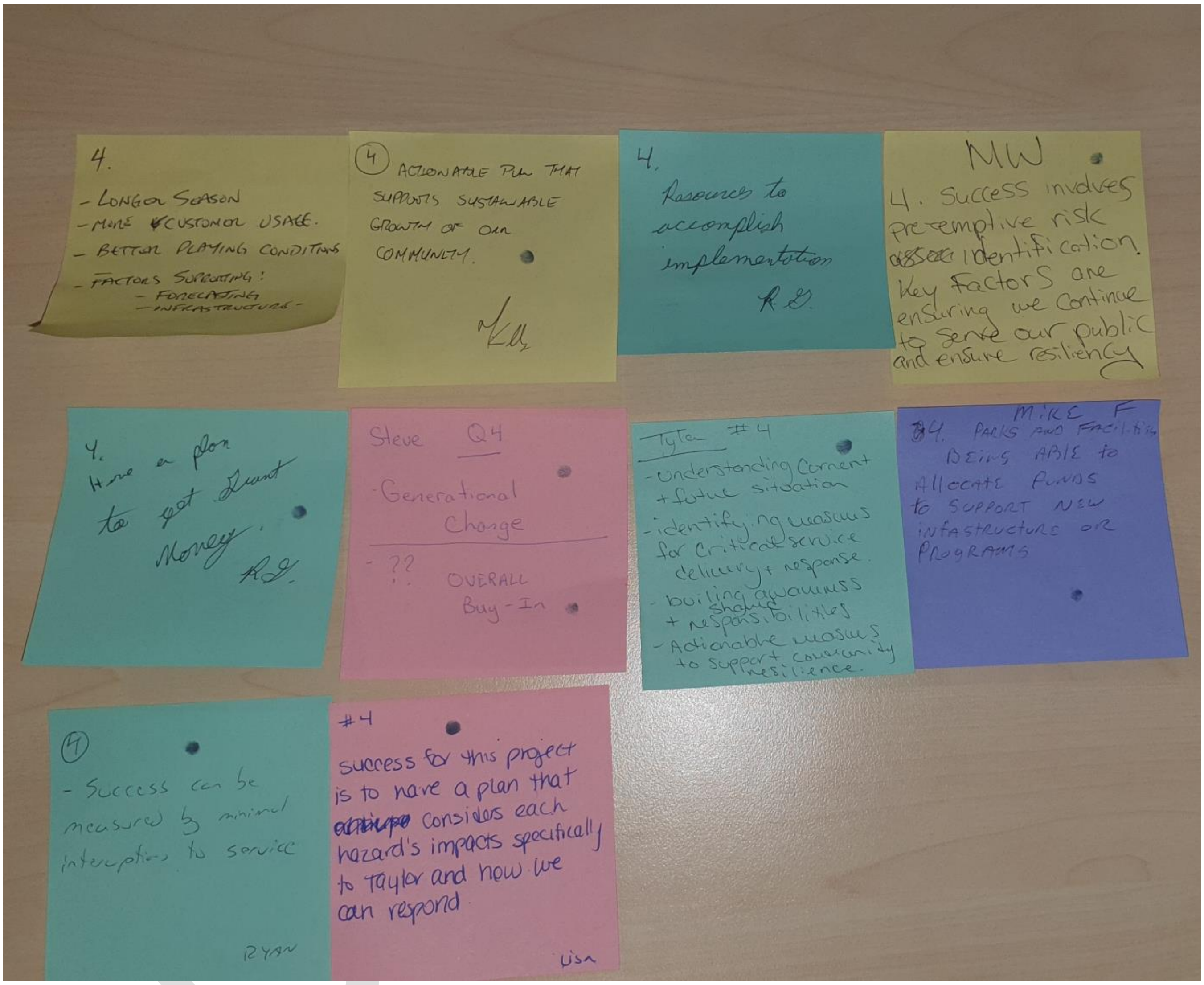
2. How well-equipped is your department to respond to climate hazards? What are the most obvious gaps in resilience?

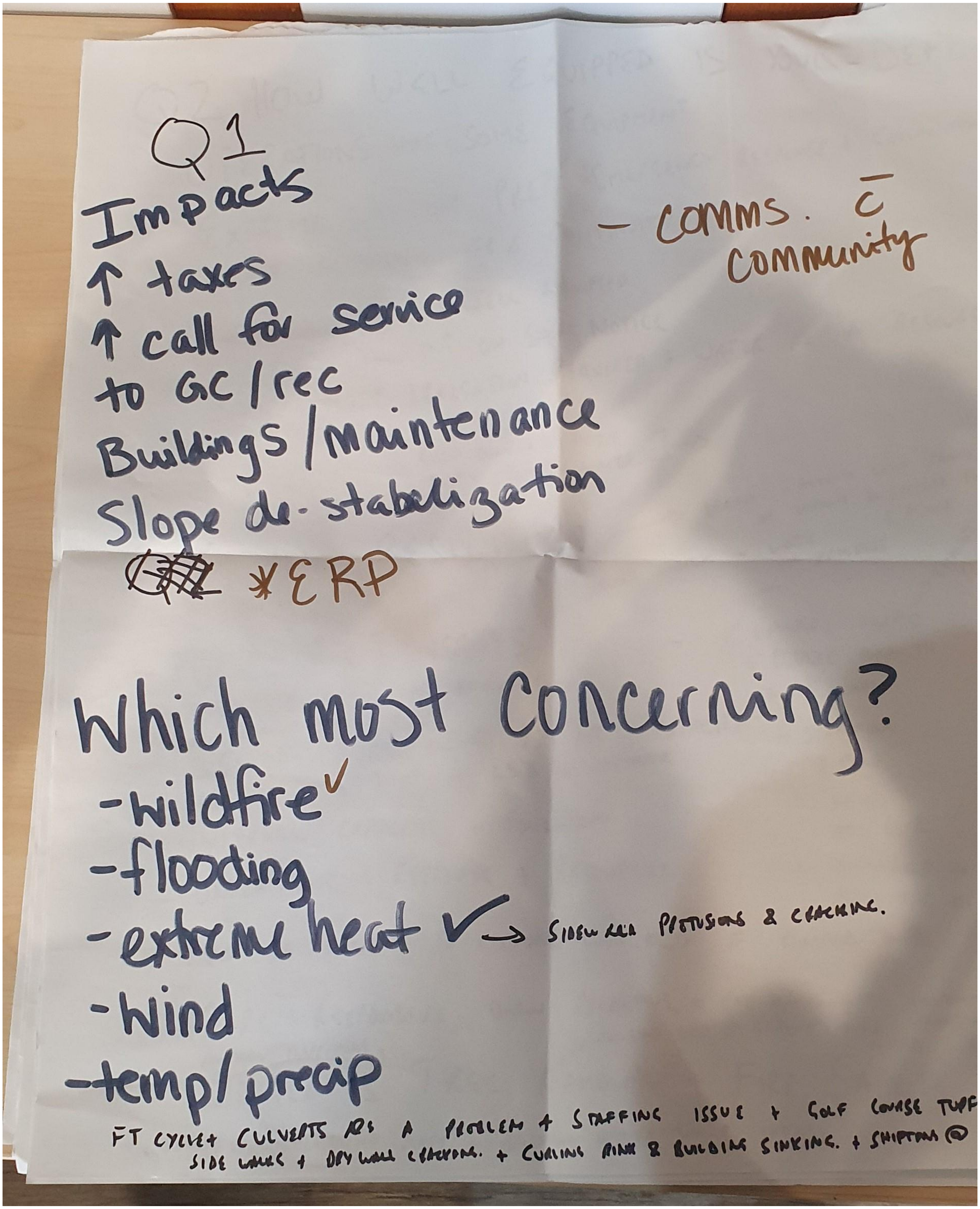


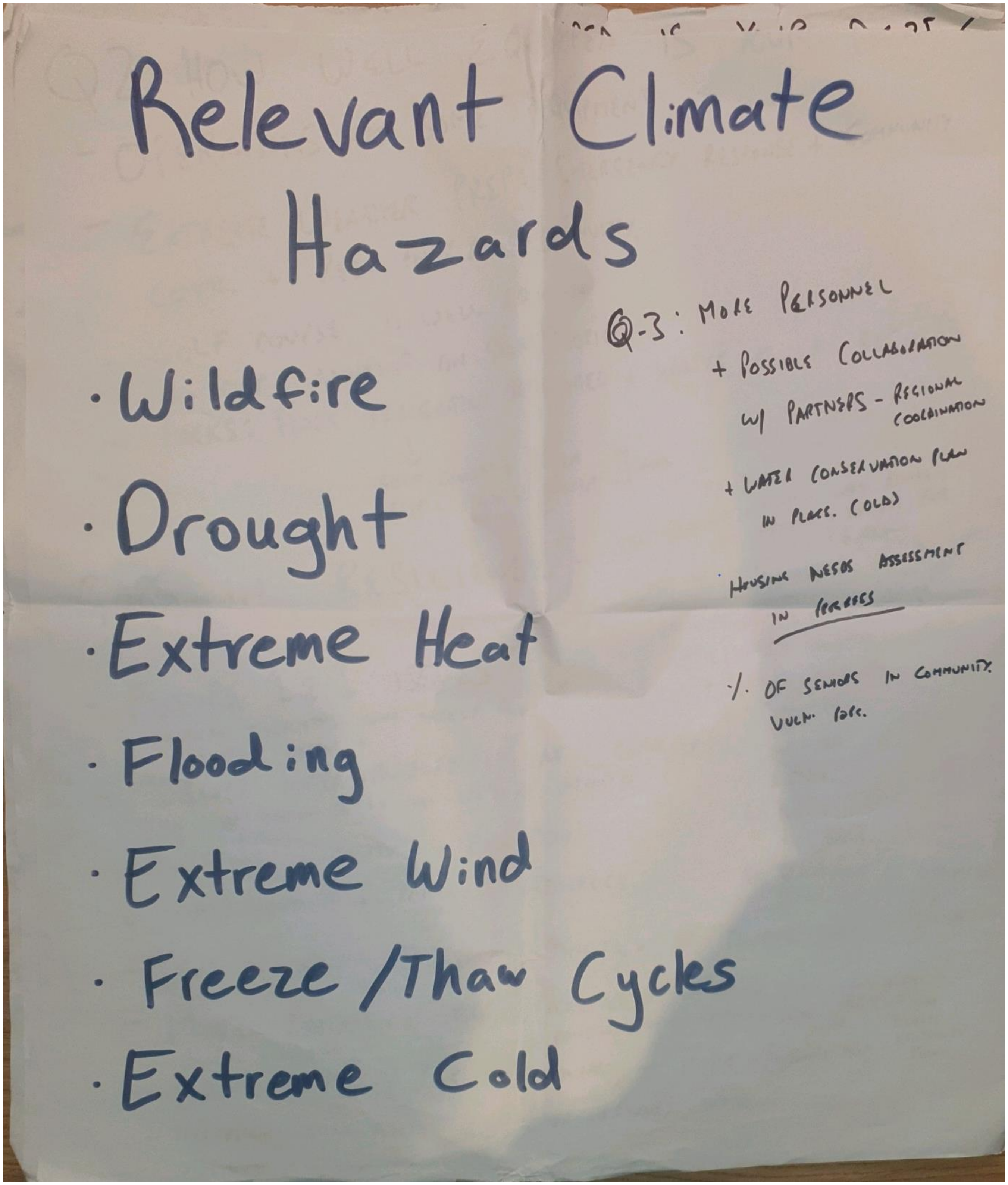
3. Will climate hazards increase the demand for your services? Do you anticipate a need for new services?

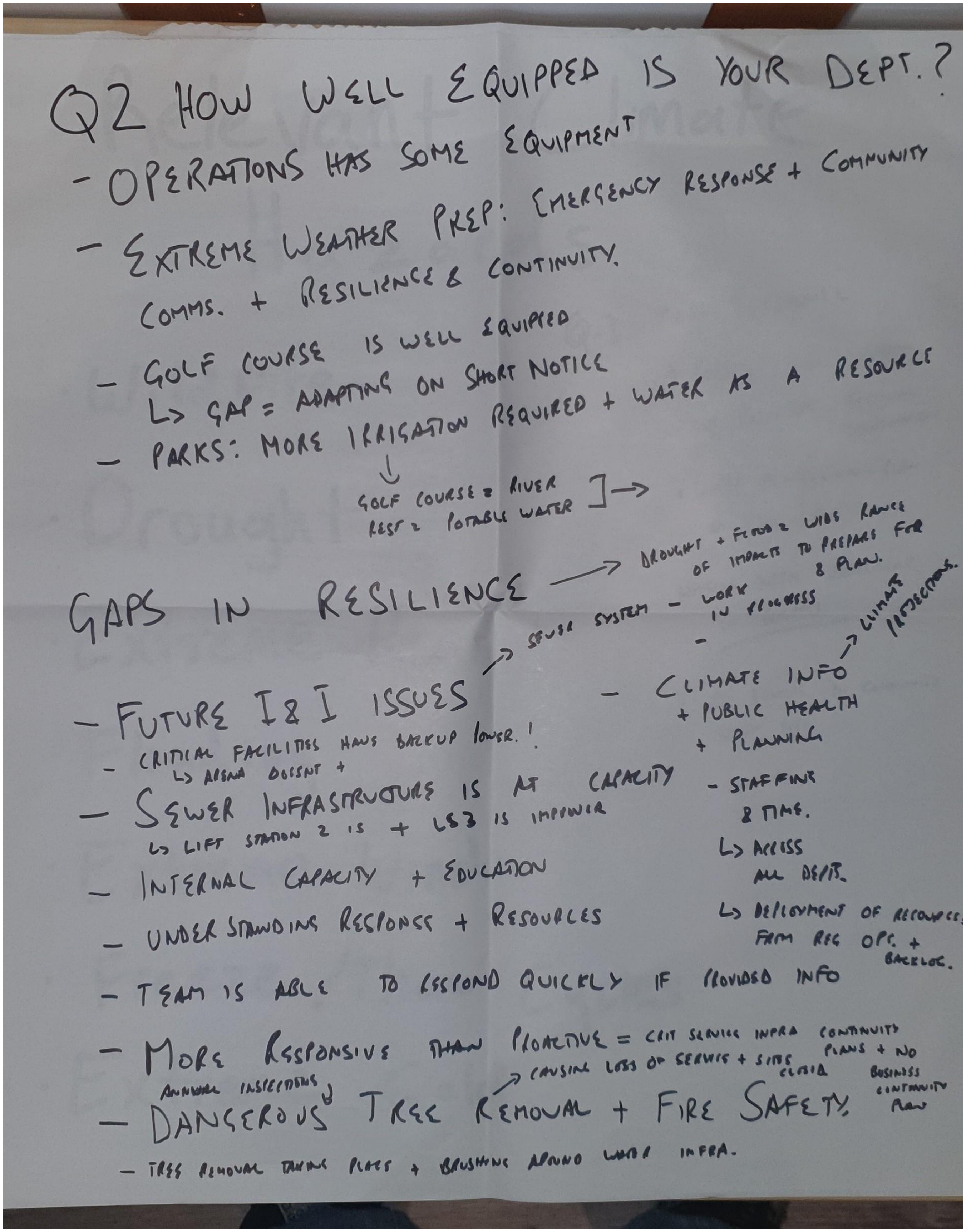


4. From your perspective, what does success look like for this project? What are the key factors that will support implementation?




Q1
Impacts
↑ taxes
↑ call for service
to GC / rec
Buildings / maintenance
Slope de-stabalization
*ERP
- comms. c̄ community
Which most concerning?
-wildfire ✓
-flooding
-extreme heat ✓ → SIDEWALK PROTUSIONS & CRACKING.
-wind
-temp/precip
FT CYCLE + CULVERTS AS A PROBLEM + STAFFING ISSUE + GOLF COURSE TURF
+ SHIFTING @ SIDE WALKS + DRY WALL CRACKING. + CURLING RINK & BUILDING SINKING.


Relevant Climate Hazards
· Wildfire
· Drought
· Extreme Heat
· Flooding
· Extreme Wind
· Freeze /Thaw Cycles
· Extreme Cold
Q-3: MORE PERSONNEL
+ POSSIBLE COLLABORATION W/ PARTNERS - REGIONAL COORDINATION
+ WATER CONSERVATION PLAN IN PLACE. (OLD)
HOUSING NEEDS ASSESSMENT IN PROGRESS
% OF SENIORS IN COMMUNITY
VULN. POP.



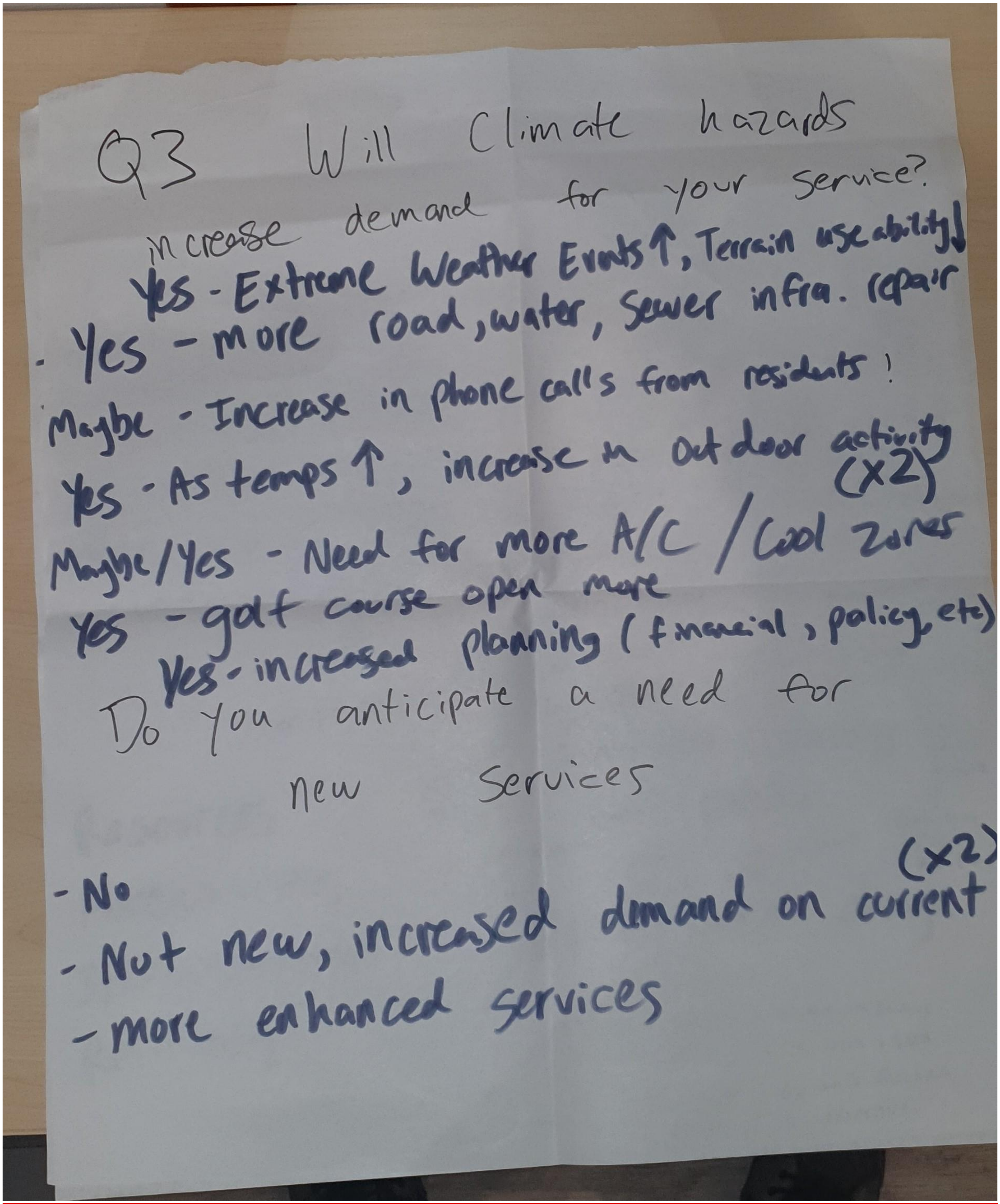
Q2 HOW WELL EQUIPPED IS YOUR DEPT.?

- OPERATIONS HAS SOME EQUIPMENT
- EXTREME WEATHER PREP: EMERGENCY RESPONSE + COMMUNITY COMMS. + RESILIENCE & CONTINUITY.
- GOLF COURSE IS WELL EQUIPPED
  - ↳ GAP = ADAPTING ON SHORT NOTICE
- PARKS: MORE IRRIGATION REQUIRED + WATER AS A RESOURCE
  - ↓ GOLF COURSE = RIVER / REST = POTABLE WATER] →

GAPS IN RESILIENCE → DROUGHT + FLOOD = WIDE RANGE OF IMPACTS TO PREPARE FOR & PLAN.

- FUTURE I&I ISSUES → SEWER SYSTEM – WORK IN PROGRESS
- CRITICAL FACILITIES HAVE BACKUP POWER!
  - ↳ ARENA DOESN'T +
- SEWER INFRASTRUCTURE IS AT CAPACITY
  - ↳ LIFT STATION 2 IS + LS3 IS IMPROVED
- INTERNAL CAPACITY + EDUCATION
- UNDERSTANDING RESPONSE + RESOURCES
- TEAM IS ABLE TO RESPOND QUICKLY IF PROVIDED INFO
- MORE RESPONSIVE THAN PROACTIVE = CRIT SERVICE INFRA CONTINUITY PLANS + NO BUSINESS CONTINUITY PLAN
- DANGEROUS TREE REMOVAL + FIRE SAFETY → CAUSING LOSS OF SERVICE + SITES CLOSED
  - ANNUAL INSPECTIONS
- TREE REMOVAL TAKING PLACE + BRUSHING AROUND WATER INFRA.

- CLIMATE INFO → CLIMATE PROJECTIONS.
  + PUBLIC HEALTH
  + PLANNING
- STAFFING & TIME.
  - ↳ ACROSS ALL DEPTS.
  - ↳ DEPLOYMENT OF RESOURCES FROM REG OPS. + BACKLOG.



Q3 Will Climate hazards increase demand for your service?

Yes - Extreme Weather Events ↑, Terrain useability ↓

- Yes - more road, water, sewer infra. repair

Maybe - Increase in phone call's from residents!

Yes - As temps ↑, increase in outdoor activity (x2)

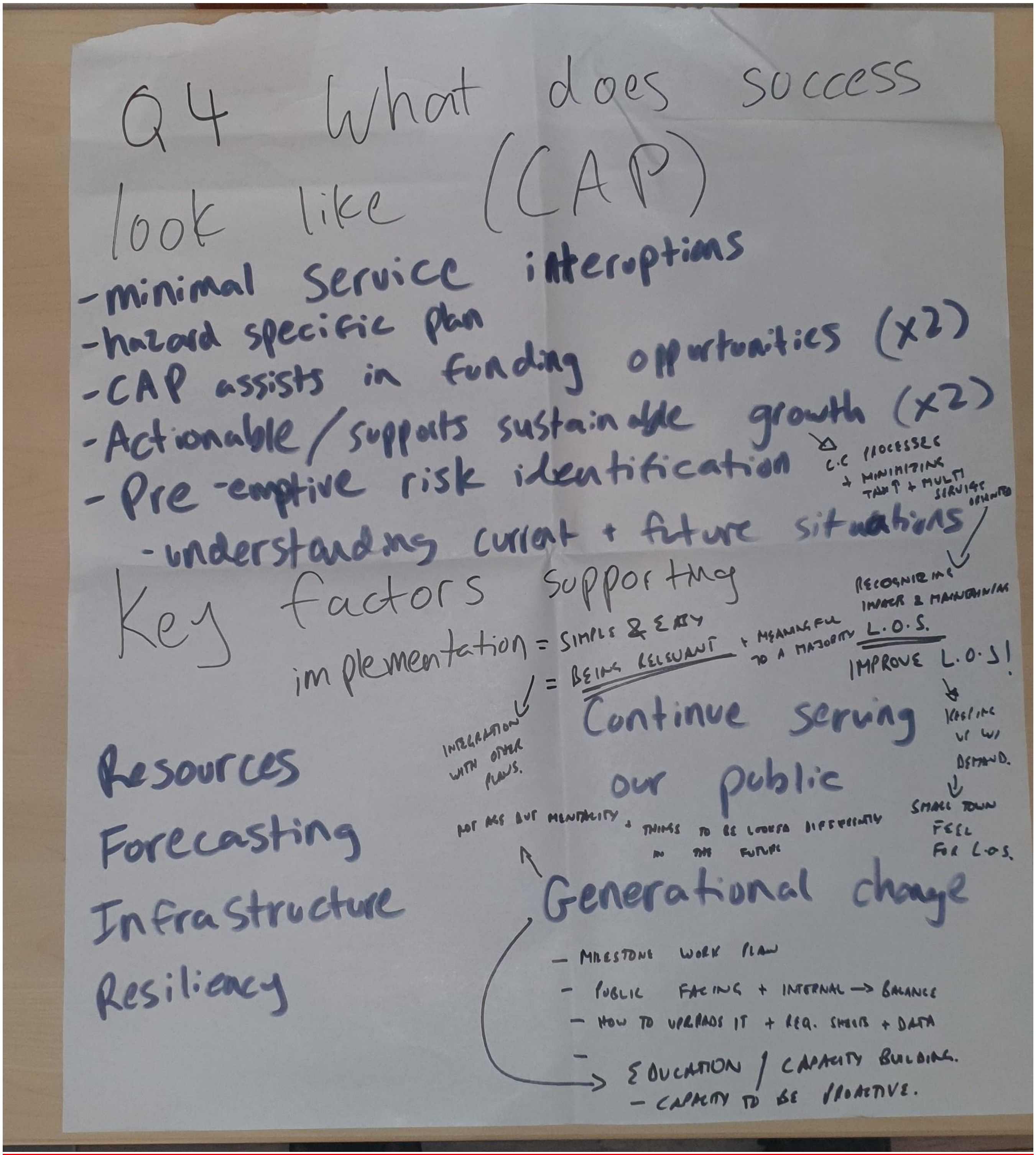
Maybe/Yes - Need for more A/C / Cool zones

Yes - golf course open more

Yes - increased planning (financial, policy, etc)

Do you anticipate a need for new services

- No (x2)
- Not new, increased demand on current
- more enhanced services


Q4 What does success look like (CAP)
-minimal service interuptions
-hazard specific plan
-CAP assists in funding opportunities (x2)
-Actionable / supports sustainable growth (x2)
-Pre-emptive risk identification
-understanding current + future situations
Key factors supporting implementation = SIMPLE & EASY
= BEING RELEVANT + MEANINGFUL TO A MAJORITY
INTEGRATION WITH OTHER PLANS.
Continue serving our public
RECOGNIZING INFRA & MAINTAINING L.O.S.
IMPROVE L.O.S!
KEEPING UP W/ DEMAND.
SMALL TOWN FEEL FOR L.O.S.
Resources
Forecasting
Infrastructure
Resiliency
Generational change
- MILESTONE WORK PLAN
- PUBLIC FACING + INTERNAL → BALANCE
- HOW TO UPGRADE IT + REQ. SKILLS + DATA
EDUCATION / CAPACITY BUILDING.
- CAPACITY TO BE PROACTIVE.

APPENDIX B

STAKEHOLDER ENGAGEMENT 1: MEETING NOTES

Interviewee:	Andrew Moore - President	**Organization:**	Cameron River Logistics (CRL) – 16th Oct, 2024

1. **Which climate hazards are the most concerning for your organization? How do you expect them to impact your organization?**
   - Wildfire: 60,000 cubic meters of logs – fire damage is a concern
     - Jasper fire impacted bush customers
     - In 2024, the fire was only 1.5 km away from the yard
   - Extreme Heat: not a huge concern yet
   - Drought: not a concern
   - Flooding: Surface flooding in 2018 – had surface run-off, the yard flooded, drainage got blocked and culvert was blocked off.
   - Extreme Wind: Not really an issue – some poles fell over 10 years ago
   - Extreme cold: is a concern, worried about employee safety and equipment
   - Freeze/Thaw Cycles: Yes – concerns about employee safety and equipment
2. **Is climate change a priority for your organization? Has it taken any steps towards building resilience?**
   - Not a priority. Mostly deal with safety and operations issues. Organizational risk assessments deal with short term effects. No real policy on climate change or the environment.
3. **Do you see any synergies between your organization's work and what Taylor is doing? What work do you think would be beneficial for alignment with the District?**
   - General resilience
   - Financial sense
   - Quality of life for the community
   - Continuing operations
   - Safety

General Notes:

- CRL ships bulk commodities
- Logs come in by truck and ship them through rail
- Silica sand: comes in by rail and is shipped out by trucks

Interviewee:	Tiffany Hetenyi – Executive Director	**Organization:**	FSJ & District Chamber – 16th Oct, 2024

1. **Which climate hazards are the most concerning for your organization? How do you expect them to impact your organization?**
   - Wildfire: Lots of deadfall – yes, is a concern
   - Water Levels: Site C Dam is contracting water levels above Taylor – no effects yet but has potential in the future
   - Drought: 2 years of drought
   - Flooding: No flooding in Taylor
   - Extreme Heat: Taylor has its own climate – often 10C warmer than the hills. Has had hot summers but no temperatures that were of particular concern
   - Extreme Cold: Yes – a lot of the industry works outside, pipe works, have to ensure that workers have proper gear and equipment
   - Extreme Wind: Power outages every couple of years (max was for a couple of weeks). Power flickers often which causes boilers to shut down which impacts businesses
2. **Is climate change a priority for your organization? Has it taken any steps towards building resilience?**
   - Yes – rules changed for industry. There is a lack of resources for how you do that so any leadership offers will help. No steps taken so far.
3. **Do you see any synergies between your organization's work and what Taylor is doing? What work do you think would be beneficial for alignment with the District?**
   - Yes – part of advocacy and working with government
   - Generally, a climate resilient Taylor is good for business and sustainability. Resiliency means less disruptions for businesses
   - Recognizing what is impacting Taylor and how to deal with it will be beneficial

General Notes:

- Organizational climate change mandate is helping businesses prepare for evacuation and ensure they have the right insurance in place as well as communications

Interviewees:	Angela Telford – Secretary Treasure	**Organization:**	School Board 60 – 16th Oct, 2024
	Ilie Murica – Director of Facilities		

1. **Which climate hazards are the most concerning for your organization? How do you expect them to impact your organization?**

- Wildfire
- Extreme Cold – have a criterion for bus routes
- Extreme Heat – becoming a concern – offices have AC, have work safe plans
- Landslides – not a huge concern, one boiler is on the side of a hill

2. **Is climate change a priority for your organization? Has it taken any steps towards building resilience?**

- Yes – School board has a policy for climate change
- It is a priority but there is lack of implementation
- Advanced air filters (from COVID) – will help during wildfire events
- Smoke days do not cause shutdowns
- Comprehensive wildfire plans in place
- Have monitoring systems for all schools
- Evacuation plans in place

3. **Do you see any synergies between your organization's work and what Taylor is doing? What work do you think would be beneficial for alignment with the District?**

- Resilience planning and building resilience
- Proactive approach instead of reactive
- School buses for evacuation and helping vulnerable populations

General Notes:

- Diesel generators need to be phased out
- Natural gas for HVAC systems
- Power outages: few times a year
- 24 schools and 2 sites (current and facilities building)
- Current generators are about 20-30 years old
- HVAC systems are being retrofitted (air handling and duct systems)

Interviewees:	Erin Powers – Healthy Communities Lead for the Northeast	**Organization:**	Northern Health – 4th Nov, 2024
	Jade Yehia – Climate & Health Lead		

1. **Which climate hazards are the most concerning for your organization? How do you expect them to impact your organization?**

- **Wildfire:**
  - Acute impacts of evacuation, disruption and displacement as well as the regional impacts around wildfire smoke. Wildfire is a top-of-mind impact.
  - Trickle down effect of evacuations – mental health aspects, accessing medications in a different community (heard a lot of stories about those), how can Northern Health (NH) support those people
  - Impacts on priority populations (vulnerable populations, traumatized individuals, older adults, people with chronic illnesses – displacement is incredibly disruptive).
  - Children face the brunt of wildfire smoke impacts or those with underlying asthma/chronic obstructive pulmonary disease (COPD). Signatures in the health data really show that during wildfire events, it impacts those going to the ER to deal with respiratory health issues.
  - Unhoused population is a major consideration - typically cannot access clean air shelters (don't think there is one in Taylor)
  - Northern Health is focusing on infants this year.
  - **Impacts**: Interface with the public - we see signatures around influx into ERs for stress, disruption and displacement, those seeking supports from an acute response perspective.
  - After the event: seeking out mental health supports, transportation disruptions, concern about staffing (low staff levels in most areas) – when a wildfire happens, they also have to think about their safety and family, and it also impacts their service.

- **Extreme Heat:**
  - Priority for Northern Health (NH) – some extreme heat but not as top of mind.
  - 2021 was an eye opener.
  - BC Heat Alert Response System was very responsive
  - Adaptation - NH is helping to support the early warning system but also working with communities to help build community resilience - supporting check-ins, cooling centres etc.

- **Drought:**
  - Priority for NH.
  - NH is looking at ways to lean into that.
  - Health wise: potential water sources could be impacted. Is water supply guaranteed? Industry aspect since they use a lot of water. Who is the priority here? People or Industry?
  - Protecting some of those water sources – Site C.
  - Seeing the impact loud and clear
  - Emergency Response and Contingency Planning has a requirement to update plans and include drought considerations.
  - How can NH support the development of those plans.
  - Impacts to NH sites as well - we are seeing health infrastructure where sites need to be kept up and operational.

  - Really top of mind hazard for NH and the region.
  - NH is also looking at additional means of retention and storage for water.

- **Flooding:**
  - NH is working on climate projections to look at flooding.
  - Saw huge disruption in services during high precipitation events.
  - Supply chain issues with medicines and equipment

- **Extreme Wind:**
  - Safety issue and health component – trees coming down.
  - What happens when trees are aging or close to infrastructure
  - Need to be mindful of impacts on tele-health and on our power grid especially in a rural context: when there is a power outage, it takes a long time (multiple days sometimes)
  - Access to health facilities and medical professionals.
  - Can disconnect whole communities
  - Supply chain issues

- **Extreme Cold:**
  - Priority for NH.
  - Specifically thinking about the unhoused population. Whose responsibility is it? Municipal? Health?
  - Housing is a huge determinant of health and having poor housing infrastructure or aging infrastructure is a big impactor on health and well-being
  - NH advocating for additional housing improvements. What are the impacts on people who don't have housing?

2. Is climate change a priority for your organization? Has it taken any steps towards building resilience?

- Clearly, yes. NH has a strategic plan and climate change is a strategic priority in that.
- Set to be released in 2025 – Climate and Sustainability Roadmap – NH as a whole
- Climate Change and Health Vulnerability Adaptation project - how climate change is affecting health outcomes
- Want to analyze additional hazards
- Have hired a climate scientist and regularly have interns/students to support that work

3. Do you see any synergies between your organization's work and what Taylor is doing? What work do you think would be beneficial for alignment with the District?

- Collaboration between NH and Taylor CCAP = going into community and talking about priorities
- Linking people together
- One of NH's goals is working closer with community groups
- Determinants of health are being challenged through climate change. We need a holistic, inclusive, collaborative approach to address baseline, health determinants and fill gaps

General Notes:

- Healthy Communities team spearheads review of larger policy docs when they come to Northern Health
- Sometimes NH is part of steering committees and helps co-facilitate development goals from the very early stages to the adoption – OCPs and Bylaws and accessibility plans etc.
- Can provide feedback into the draft CCAP Taylor plan too
- Jade's role is interim – for one year
- Can bring literature research to bear
- Northern Health is also undertaking a climate and sustainability roadmap - room for alignment with Taylor

MEMORANDUM

URBAN SYSTEMS

Interviewee:	Jeremy Garner - Director of Public Works and Utilities	Organization:	City of Fort St. John – 14th Nov, 2024

1. **Which climate hazards are the most concerning for your organization? How do you expect them to impact your organization?**

   - **Wildfire:** Wildfire is a low priority hazard for FSJ. It's surrounded by open fields, so the probability of wildfire proximity is low.

   - **Extreme Heat:** Hazard of concern. Impacts vulnerable populations and natural assets – need to change landscaping, consider water conservation and storage. FSJ also has to adjust vegetation so they can handle extreme conditions. Results in increased power usage. Also results in increased transit usage since people don't like to walk during extreme heat events.

   - **Drought:** Good source of water from the Peace river, not too concerned about the water source. FSJ is concerned about pumping and treatment concerns during drought conditions – some systems might need to be expanded within the City.

   - **Flooding:** Is of some concern since FSJ is anticipating greater precipitation in the future and needs to invest in storm management strategies. River flooding is not a concern. Biggest impact is the discharge into Fish creek which could result in significant erosion

   - **Extreme Wind:** Have had some extreme wind events - affects trees, houses and infrastructure. Couple of baseball diamonds blown over, some garbage cans, roof got lifted off, trees come down.

   - **Extreme Cold:** Affects vulnerable populations, can't get much snow/ice removal in extreme cold events, energy usage goes up.

   - **Freeze/Thaw Cycles:** Over the last couple of years have seen significant freeze/thaw cycles, especially during January freshets – a ton of snow melts. FSJ has seen an increase in winter road maintenance – more sand and salt required. Need to open up frozen catch basins during these events. Some of our traditional snow removal systems don't move when there are rain on snow events so we have to curtail those.

2. **Is climate change a priority for your organization? Has it taken any steps towards building resilience?**

   - Yes – adapting to it is a priority. FSJ has looked at some of its construction methods and some of their fleet – started purchasing EVs and hybrids. Also looking at some of their processes, specifically snow and ice removal. FSJ tends to reference those climate projections (2019) quite a bit.

URBAN SYSTEMS

3. **Do you see any synergies between your organization's work and what Taylor is doing? What work do you think would be beneficial for alignment with the District?**

- Yes - both FSJ and Taylor are swimming in the same pond essentially. Slightly different microclimate for Taylor but generally speaking a vast majority of climate hazards are similar.

Regionally, have to look at Peace River Regional District (PRRD) on a few strategies

- Stormwater management - creeks that come off the top [so if there is flooding up top, that comes down]
- Land use
- Solid waste management (PRRD uses the same landfill)
- Regional industrial development is linked

General Notes

- Considering really long-term stuff – transit, cost of arenas, rinks, and reducing costs
- Opportunity for considering regional water supply

Interviewee:	Jenna Shaw – Protective Services Coordinator	Organization:	Peace River Regional District – 15th Nov, 2024
	Gina Saunders – Emergency Management Coordinator		

1. **Which climate hazards are the most concerning for your organization? How do you expect them to impact your organization?**

- **Wildfire:** Highest priority. In 2023 over 60% of PRRD was on fire at one point. PRRD had to arrange for evacuations, fires affected livestock, industry (PRRD has a strong logging industry). Oil and gas companies pulled out of the area which had economic effects, unemployment, impacted small areas and revenues and donations. PRRD has undertaken evacuations in the past – search and rescue and RCMP went from door to door. Expect wildfire to be a rising concern for vulnerable populations as PRRD sees more transient people.
- **Extreme Heat:** Historically, PRRD has not dealt with that much. In 2023 there were 2 weeks above 40 C. Some municipalities had to set up cooling centers. Extreme heat is part of PRRD's preplanning for future climate.
- **Drought:** 2023 ended in drought level 5 for PRRD. Area did not get the snowpack needed this year but did get some rain – as a result some areas are now at drought level 3 and 4. There are concerns with livestock not getting the water that they need. Citizens in rural areas order their water from municipalities (City of Dawson Creek). Community pastures had to be delayed because there was not enough feed for the animals which caused prices to go up. PRRD hasn't put out any regulations regarding water conservation yet.
- **Flooding:** Relatively lower concern hazard. PRRD has had issues with flooding in the near past. 2016 saw heavy flooding – roads were washed away, rural residents were stranded, flooding in creeks separated a town, traffic and emergency services were impacted. However, it was more of a municipal problem since it happened in their jurisdiction – PRRD played a support role. Site C dam is filling its reservoir which has led to some concerns that in case of a dam breach, communities could experience serious flooding.
- **Extreme Wind:** Already pretty windy. Historically haven't seen winds at the level. Sometimes causes power outages but these are short – not for more than a couple of hours.
- **Extreme Cold:** Normally not an issue. Minor concerns with vehicles refusing to start etc. but overall the area is pretty resilient to extreme cold. Historically, if it gets very cold, PRRD has set up warming centers.
- **Freeze/Thaw Cycles:** Not a concern.

2. **Is climate change a priority for your organization? Has it taken any steps towards building resilience?**

- It is a priority for PRRD. The District is expecting more severe events in the future. Saw that in 2023 – EOC was up and running for 6 months which was unprecedented for PRRD. The District is working with EDMA funding to update their plans and collaborate with neighbouring municipalities and First Nations communities. Each jurisdiction will have their own response plans, but PRRD is also working on a regional plan and one for each electoral area.

3. **Do you see any synergies between your organization's work and what Taylor is doing? What work do you think would be beneficial for alignment with the District?**

   - Everyone in the region has the same story to tell and willing to work together to create that resiliency. It would be worth having a conversation about it with Taylor. Possible potential for collaboration.

General Notes:

- Banks along PRRD's river ways are prone to sloughing and landslides. A couple of years ago there was a landslide on the Murray river - no residences were damaged, but it changed the path of the river. Landslides happen rarely within the PRRD – they're more of a consideration than an actual hazard.
- Used to get huge amounts of snowfall which could strand residents – happened a couple of years ago. Residents living along rural roads were snowed in and had to be helicoptered out.

Interviewee:	Jennifer Decker – Director of Development Services	**Organization:**	City of Fort St. John – 4th Dec, 2024

1. **Which climate hazards are the most concerning for your organization? How do you expect them to impact your organization?**

- Wildfire:
  - FSJ already seeing effects of nearby wildfires.
  - Direct fire damage is not a top-of-mind concern
  - Community access, emergency services and evacuations are a concern
  - Not a whole lot of roads in and out of the community
  - Smoke is a concern – had a serious incident one summer (4-5 years ago) and have seen it periodically since
- Extreme Heat:
  - Yes – haven't had to contemplate this before.
  - Most of FSJ buildings are not equipped with air conditioning
  - 2 brand new elementary schools do not have air conditioning
  - During summer, daycare centers operate from schools – had to shut down in the summer due to extreme heat
  - Vulnerable populations are at risk
  - Climate concern has been raised with Fraser Basin Council.
- Drought:
  - Is a concern but FSJ has been fortunate with their water supply
  - Ongoing drought would be a concern
  - FSJ is already looking at improvements at water supply
  - Bigger concern would be water for agriculture and industrial use
  - If FSJ experienced serious growth, it would impact water supply
  - FSJ did water conservation work done some years ago
  - Now FSJ gets water through the Peace river, has made improvements to storage facilities along with more improvements planned
- Flooding:
  - No flooding risk from water bodies but do have risk from extreme rain events
  - Lot of work done to the storm management system and to protect low lying areas of the community.
  - Some vulnerabilities with Coulie.
  - Have experienced sloughing in some areas
  - Bylaws updated to include 1 in 200-year storms.
- Extreme Wind:
  - Power outages may be a concern but overall, not a huge problem for FSJ.
- Extreme Cold:
  - FSJ is used to dealing with extreme cold and has measures in place – water and sewer lines are buried very deep for e.g.
  - Shorter seasons to get projects done – challenged because of the cold.
  - Vulnerable populations (unhoused) are at risk from extreme cold. Social services are taxed for provisions for shelters.

- Freeze/Thaw Cycles: Pose challenges – pipes and roads heaving, water main breaks, sidewalks and potholes – hard and costly on infrastructure and crews have to keep up with damage.

2. **Is climate change a priority for your organization? Has it taken any steps towards building resilience?**

   - It is – part of the Frasier Basin Council assessment – upgraded pipe sizes as part of it. Continuing to deal with it and being part of it.

3. **Do you see any synergies between your organization's work and what Taylor is doing? What work do you think would be beneficial for alignment with the District?**

   - Emergency response and management
   - Involvement with the PRRD plan
   - Frasier Basin Council just received funding from FCM to validate and update the 2019 vulnerability assessments - could be some opportunities there

District of Taylor CAP

Engagement Summary – Phase 3

DATE	November 3, 2025	FROM	Ali Mujahid
TO	Tyla Pennell	FILE	1770.0083.01
CC	Lisa Ford	SUBJECT	Phase 3 Engagement Summary – District of Taylor CAP

1.0 INTRODUCTION

The District of Taylor (the District) is developing a Climate Change Adaptation Plan (CAP) to increase community resilience to a changing future climate.

As in Phase 1, a workshop with District staff was held to review the results of the risk assessment, finalize risk ratings and begin generating adaptation options for the highest rated risks. District partners such as Fort St. John, Cameron Logistics and Peace River Regional District were also consulted in Phase 1 to understand broader concerns and priorities regarding climate change adaptation.

Building on the engagement conducted for Phase 1, Phase 3 engagement also had targeted interview sessions with the same partners. Similarly, 2 in-person staff workshops were held with Taylor staff. This report summarizes the findings of Phase 3 engagement for Taylor's CAP.

2.0 STAFF WORKSHOP #2

A staff workshop was held in person, over 2 days, at the District of Taylor offices (list of attendees below).

This workshop was intended to:

- Review and confirm the highest-rated risks from the risk assessment
- Begin development of adaptation actions for those risks.
- Review adaptation prioritization framework

The information from this workshop was used to incorporate any remaining feedback, finalize risk ratings, review and add adaptation actions and review the prioritization framework developed for aiding staff decision making.

ATTENDEES	TITLE	COMPANY	EMAIL
Ryan Galay	Chief Administrative Officer (Interim)	District of Taylor	rgalay@districtoftaylor.com
Mike Farquharson	Parks and Facilities Manager	District of Taylor	mfarquharson@districtoftaylor.com
Lisa Ford	Financial Services Manager (Interim)	District of Taylor	lford@districtoftaylor.com
Mike Whalley	Deputy Corporate Officer (interim)	District of Taylor	mwhalley@@districtoftaylor.com
Tyla Pennell	Director of Corporate Services	District of Taylor	tpennell@districtoftaylor.com

URBAN SYSTEMS

Steve Byford	Director of Protective Services/Fire Chief	District of Taylor	sbyford@districtoftaylor.com
Ryan Nelson	Director of Operations	District of Taylor	rnelson@districtoftaylor.com
Kimberly Zackodnick	P. Engineer	Urban Systems Ltd.	kzackodnick@urbansystems.ca
Ali Mujahid	Climate Change Consultant	Urban Systems Ltd.	amujahid@urbansystems.ca

2.1 STAFF WORKSHOP #2 FORMAT & OUTCOMES

An in-person workshop at the Taylor offices was held on the 8th and 9th of September 2025. The workshop was split over 2 days, with 3-hour working sessions each afternoon.

A PowerPoint presentation for the CAP was presented, and the risks rated "Medium" and higher were reviewed by staff. Following the workshop, the risk register was updated:

- 3 risk statements and associated risk ratings were deleted
- 6 risk statements had their wording and/or consequence ratings edited
- 2 risk statements were added to the register.

The second day of the workshop focused more on presenting the adaptation prioritization framework developed for any adaptation actions. To support discussion, the following questions were asked of staff:

- What general metadata does the team require for adaptation option prioritization? What would be most useful?
- How do we want to define cost?
- How do we want to define the time frame?
- How will this tool best support the overall decision-making process?
- How to best incorporate funding and grant programs into the risk register?

Staff feedback necessitated the following changes to the prioritization framework:

- The adaptation rating scale was modified.
- 1 prioritization criterion was removed from the framework
- Timeframe range was edited
- A total score for prioritization was added
- Project rationale/Key assumptions criterion added
- Department Lead criterion added
- Potential Funding opportunities added

Taylor staff also conducted a comprehensive review of the adaptation options and edited, removed or suggested new adaptation options.

3.0 PARTNER ENGAGEMENT #2

3.1 PARTNER ENGAGEMENT FORMAT

In parallel, building on the engagement conducted for Phase 1, Phase 3 engagement had targeted interview sessions with the same partners. The intent of Phase 3 engagement was to share back the highest rated risks coming out of Taylor's climate change risk assessment, understand partners' current climate priorities and to discuss any scope for future alignment to address those risks, in collaboration with the District. Furthermore, the interview sessions also discussed any problems or obstacles that they have faced on their own resilience journeys to see if any lessons could be applied to Taylor's unique context.

The same partners consulted for Phase 1 were approached for 1-hour interviews. Due to scheduling constraints, some of these engagement sessions were held in person, and the rest were conducted virtually. The following partners were consulted for Phase 3.

- Fort St. John & District Chamber – 8th September 2025 (in-person)
- Northern Health – 8th September 2025 (virtual)
- School Board 60 – 25th September 2025 (virtual)
- Peace River Regional District – 24th October 2025

3.2 SUMMARY OF ENGAGEMENT RESULTS

This section will summarize findings from the stakeholder engagement sessions.

Wildfire

- Wildfire continues to be one of the top hazards of concern for stakeholders. Issues identified include:
- Wildfire fuel is not being cleared properly because of a very long turnaround period (500+ days). General lack of streamlining of permits for forestry.
- Different rules for oil and gas companies compared to forestry firms. Instead of working in tandem to conduct clearing, they have their own rules. Oil fields/sites just burn logs, which sometimes leads to incidents of wildfires (Fort Nelson or Kelly Lake).
- Taylor is not developing fire breaks
- Northern Health has conducted workshops under the province's Do It Yourself Clean Air Workshop initiative. They've gone into communities and talked to people being affected by wildfires.
- The mental health aspect of wildfires is becoming a focus.

- The need for clean air filtration is being discussed with various partners. Multiple stakeholders mentioned air filtration as a concern - the lack of efficiency/ease of contamination of HEPA filters, and how they cannot stop smoke particles.
- The cascading consequences of wildfires – evacuations, livestock and industry being affected, unemployment, economic consequences and vulnerable populations being excessively impacted are expected to ramp up in the coming years.

Drought

- Some stakeholders expressed concern that there was not enough being done to combat drought. Low levels in the Peace River due to a lack of snowpack have led communities to assess whether water can be pulled from the Peace River. There is work being done to evaluate whether the water from fracking activities can be turned into potable water.
- The Northern Health Roadmap initiative has guidance on the benefits of connecting operators and providers of water to coordinate during drought conditions. Programs under consideration include having bulk haulers and the benefits of long-term planning to combat drought.
- More facilities recognize the need to conserve water and are working on how to become more efficient.
- There is considerable literature on safe water storage that can act as a starting resource.
- Despite drought being more prevalent, some stakeholders still do not have regulations for water conservation yet.
- Stakeholders are beginning to see the impacts of drought on livestock and agriculture – not enough water for animals and delaying of community pastures due to lack of feed, leading to economic impacts.
- Citizens in rural areas have had to order their water from municipalities.

Emergency Communication & Evacuation

- Emergency evacuation was also a topic of concern amongst several stakeholders
- Lack of effective, timely communication and the resultant confusion were issues identified in previous evacuations.
- Some stakeholders have developed multiple evacuation plans for different climate hazards.
- Stakeholders have already seen coordination between Taylor and neighbouring jurisdictions for firefighting (Fish Creek fire).
- There is a need for Taylor to refine its current plans and strategic documents
- Both Taylor and Fort St. John are advocating for the Ministry of Transport and Transit for a new bridge.
- More communication between Fort St. John and Taylor was identified as a possible future avenue. Consideration should be given to FSJ and Taylor having similar evacuation and emergency processes.

- The need for better early warning systems was a recurring theme – multiple stakeholders highlighted the need for more effective systems. These are a priority for Northern Health, which works closely with Emergency Management BC and adds a public health lens to its messaging.
- Getting the requisite information to the general population is a concern shared by Taylor as well as multiple stakeholders. This is an area for improvement.
- There is a concern that most initiatives in this field start off well but then seem to peter out because of a lack of follow-up and initiative.
- The School Board has several education initiatives for students.
- There is a growing understanding that extreme weather events will be more frequent and possibly more severe in the future. The PRRD saw its Emergency Operations Center run for an unprecedented 6 months during 2023. The District is utilizing their Emergency Disaster Management Act funding to update its plans and collaborate with neighbouring municipalities and First Nations communities. Each jurisdiction will have its own response plans, but a regional plan as well as one for each electoral area is being developed.
- Multiple stakeholders stress the need for jurisdictions to work together to create resiliency.

Extreme Heat

- Northern Health is already discussing the need for cooling centers with its partners and is looking to provide actionable advice to interested communities.
- Schools in the District are without air conditioning – HVAC systems are being updated. Schools are utilizing cooler spaces like the library or cafeteria during extreme heat conditions. Solar gain is a problem in school facilities with large windows.
- New builds are considering having adequate shade and tree cover and using STEP 5 of the building code.
- Extreme heat is part of the PRRD's future plans, despite not being a historic concern. They have already seen some municipalities set up cooling centers during extreme heat conditions.

General Concerns and Comments

- Almost every stakeholder interviewed stressed the need for greater, more effective communication between jurisdictions and the need for collaboration.
- Lack of recycling and disposal facilities for wind towers and associated equipment. Currently, there is no provincial landfill to deal with wind turbine equipment or solar panels.
- Getting policies in front of UBCM is a problem due to the cumbersome process and redundancy of work.
- Vulnerable populations are a focus for Northern Health because of the disproportionate impacts they suffer due to climate change. Northern Health is concentrating on improving its warning systems and increasing check-ins.

APPENDIX A

STAFF WORKSHOP #2 PRESENTATION

DISTRICT OF TAYLOR

CLIMATE CHANGE ADAPTATION PLAN
Staff Workshop # 2

URBAN SYSTEMS

PROJECT ROADMAP

Project Phases	Progress
PHASE 1:Understanding the local context & primary concerns	COMPLETE
PHASE 2:Conduct a vulnerability and risk assessment	COMPLETE
PHASE 3:Develop Climate Change Adaptation Plan	IN PROCESS

URBAN SYSTEMS

PROJECT PROGRESS SO FAR

- Localized climate projections
- Engagement: stakeholders, staff and Indigenous engagement
- Risk Assessment & Risk Register
- Developing preliminary adaptation options & finalizing prioritization framework ⟵ WE ARE HERE

URBAN SYSTEMS

WHAT WE HEARD PREVIOUSLY

- Underequipped and understaffed
- More reactive than proactive
- Teams need current and relevant climate data
- Internal capacity and education required
- CAP needs to be an actionable plan
- Identifies measures to ensure critical service delivery and response

URBAN SYSTEMS

WORKSHOP OBJECTIVES

- Review and generate new adaptation options – discuss order
- Review adaptation prioritization framework
- Understand Taylor's decision-making process and how the CAP can fit into existing processes
- How will these processes get implemented?
- What are some of the barriers to implementation?

RISK ASSESSMENT RESULTS

Total Risks- 149

- No high risks in the 2020s, 7 high risks in the 2050s, 9 high risks in the 2080s
- 18% of total risks are rated medium in the 2020s, which grow to 28% in the 2050s and to 46% in the 2080s.
- Majority of risks during all future time periods are rated 'Low' (82% in the 20s, 67% in the 50s and 48% in the 80s.

Risks by Climate Hazard

- Wildfire was the hazard with the highest number of risks during all time periods, followed by flooding and extreme wind.
- High risks in all future time periods were divided between flooding (2) and wildfire (5) in the 2050s and across extreme heat (1), extreme wind (1), flooding (2) and wildfire (5) in the 2080s.

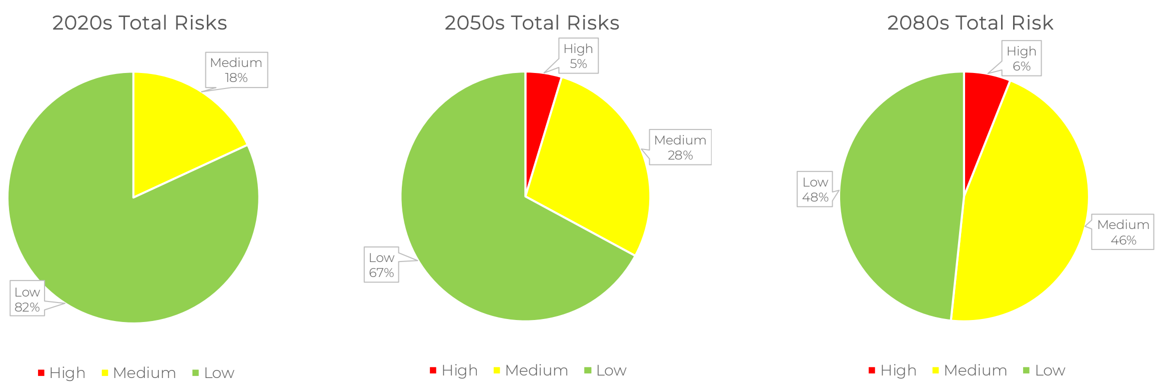
RISK ASSESSMENT RESULTS

Risks by Asset

- Parks and Public spaces was the asset with the greatest number of total risks (23), followed by Peace Island Park (15), Water System (15), Sanitary System (14), Roadway Infrastructure (14) and Natural Assets (14)
- The Water System accrued the greatest number of high risks by the 2080s (3), followed by the Sanitary System (2) and Roadway Infrastructure (2).
- Parking lots are the least vulnerable of Taylor's assets with only 4 total risks by the 2080s, none of them rated 'High'.

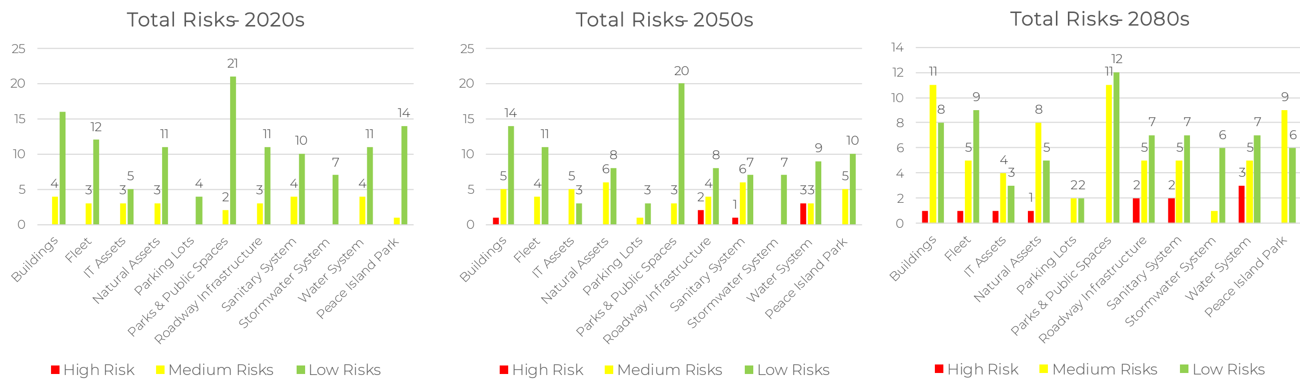
RISK ASSESSMENT RESULTS

All risks across all time periods



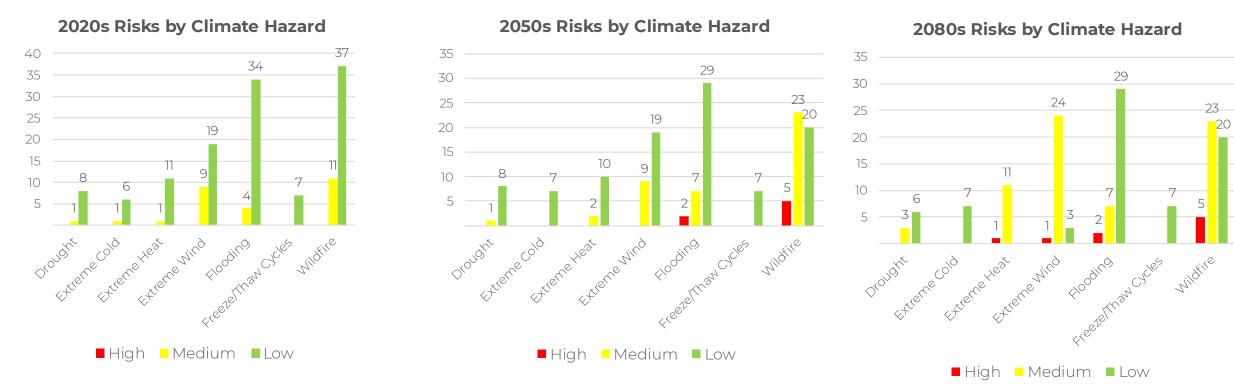
RISK ASSESSMENT RESULTS

Risks by Asset



RISK ASSESSMENT RESULTS

Risks by Climate Hazard



ADAPTATION ACTIONS REVIEW

DRAFT ADAPTATION PRIORITIZATION FRAMEWORK

Priority Criteria	Definition	1	2	3
Cost	Monetary Cost of implementation of the adaptation action	$	$$	$$$
Capacity	The existing ability of the District to implement the adaptation action	No capacity to implement the action due to minimal staff training, limited technical infrastructure, and limited administrative capacity.	Limited capacity to implement the action due to insufficient staff training, inadequate technical infrastructure, and insufficient administrative capacity.	Adequate or high capacity to implement the action due to highly trained staff, advanced technical infrastructure, and robust administrative capacity.
Timeframe	The amount of time for the District to implement the adaptation action	2 to 3 years	3 to 5 years	5 to 10 years
Equity		The action will bring meaningful improvements to the lives of some community members.	The action will bring meaningful improvements to the lives of many community members.	The action will bring meaningful improvements to the lives of majority community members.
Co-benefits	Whether the implementation of the adaptation action by the District will result in positive side effects	No co-benefits.	Some co-benefits. Limited impact on individuals or sectors, and/or moderate relevance to core services.	Multiple co-benefits. Numerous impacts on individuals or sectors, and/or high relevance to core services.
Strategic Alignment	Is this adaptation action in alignment with other District projects, initiatives, strategies or plans?	NO		YES
Alignment With Council Goals	Is this adaptation action in alignment with one or more Council goals?	NO		YES

SOME QUESTIONS TO CONSIDER

- What metadata does the team require for adaptation options? What would be most useful?
- Do we want scales/numerical ratings or just prioritization criteria?
- Do we want to include time frame? If so, how would the team like time horizons defined?
- How do we want to define cost?
- How does this tool best support the overall decision-making process?
- What are 'high impact' items? Low hanging fruit? Greatest contribution to resilience? Easily funded?
- How do we best incorporate funding and grant programs into the tool?


THANK YOU