



# GHG Planning: You have set your target, now what?



WEBINAR | Wednesday, June 22, 2022

The background of the slide is a solid green color with a subtle, out-of-focus texture of grass blades. A single, sharp grass blade runs vertically from the top to the bottom of the frame, slightly to the right of the center. The text "Land acknowledgement" is centered horizontally and vertically in a white, sans-serif font.

# Land acknowledgement

# Introduction to your presenters



**Robert Greenwald**  
President



**Lizz Hodgson**  
Energy Engineer



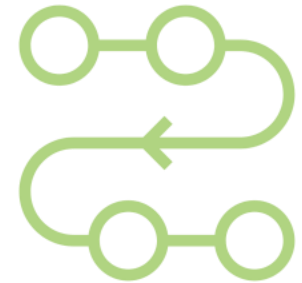
**Julianne Pickrell-Barr**  
Climate Action Specialist



**Sam Thomas**  
Principal, Branch Manager

# Desired webinar **outcomes**

- Increase understanding of key GHG emission reduction **planning steps** and **key considerations**
- Learn from what **other organizations** have done
- **Inspire you to act** towards developing a robust GHG emissions reduction plan



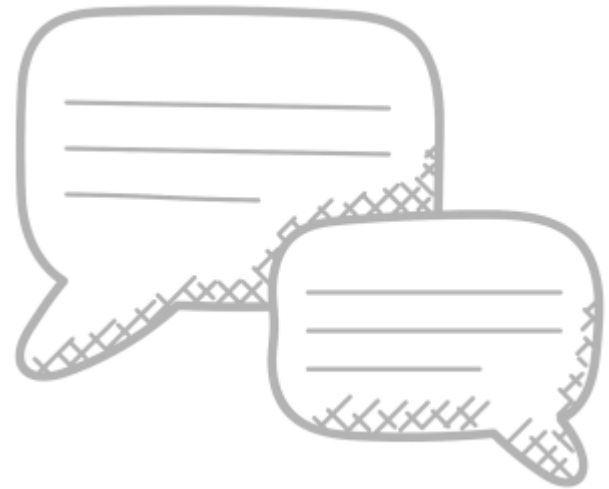


# Agenda

1. Introduction
2. The Why – Setting the Context
3. The How – Planning and Engagement Process and Framework
4. Case Studies
5. Lessons Learned

# Facilitated chat box

- Please enter your questions and comments throughout the presentation
- We will do our best to address them in Q&A sessions





# Introduction

## About Prism Engineering



# Our Prism Team

BC's leader in helping  
organizations save energy.

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From design to implementation,  
we provide energy management, electrical and  
mechanical engineering, utility monitoring and  
sustainability consulting to help our clients create a  
greener, more energy efficient world.



# What makes us different?

- Depth and breadth of experience and expertise
- Diversity of team members
- Accuracy, quality and reputation of work
- Unique innovative solutions



# Previous sessions



View presentation slides in our Resource Library:  
[www.prismengineering.com/resources](http://www.prismengineering.com/resources)

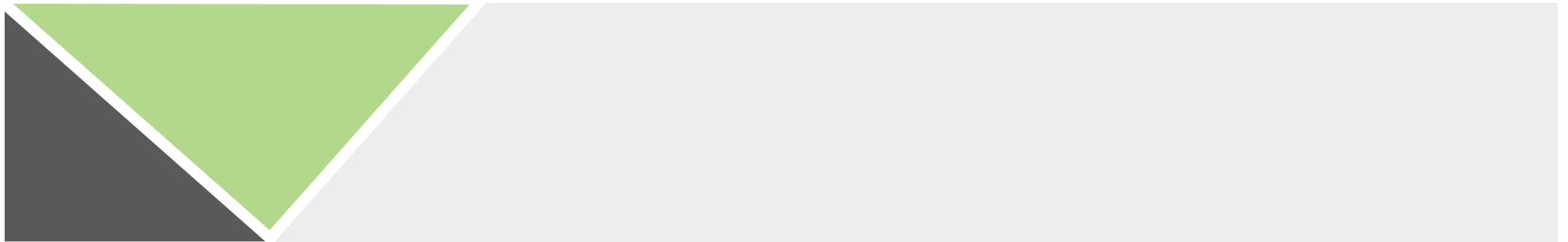
An aerial photograph of a large, irregularly shaped lake surrounded by dense green forests. In the background, there are rolling hills and mountains under a sky with scattered white clouds. The entire image has a green color overlay.

# Part 1: The Why

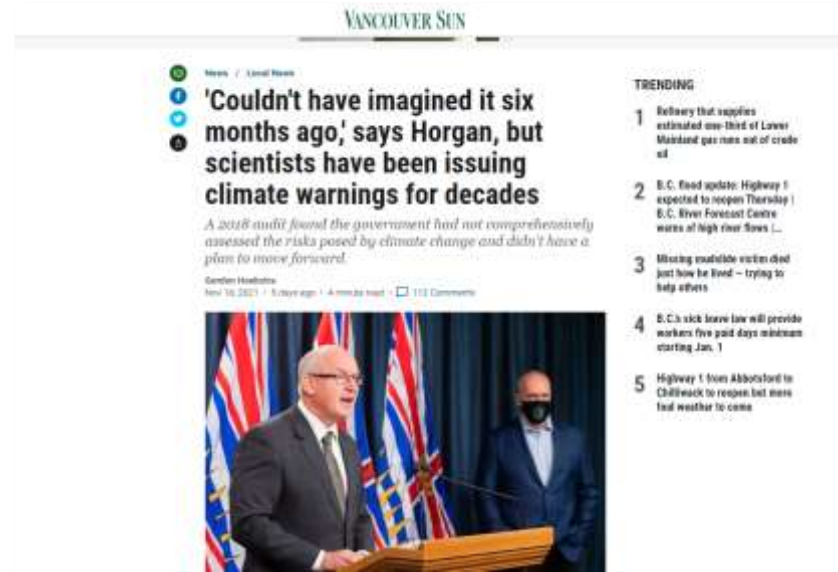
## Setting the context



# CLIMATE CHANGE



# The climate is changing



# Growing recognition of the need for action



Source: Wikimedia Commons

# Global commitment



Keep global temperature increase  
to well below 2 degrees Celsius

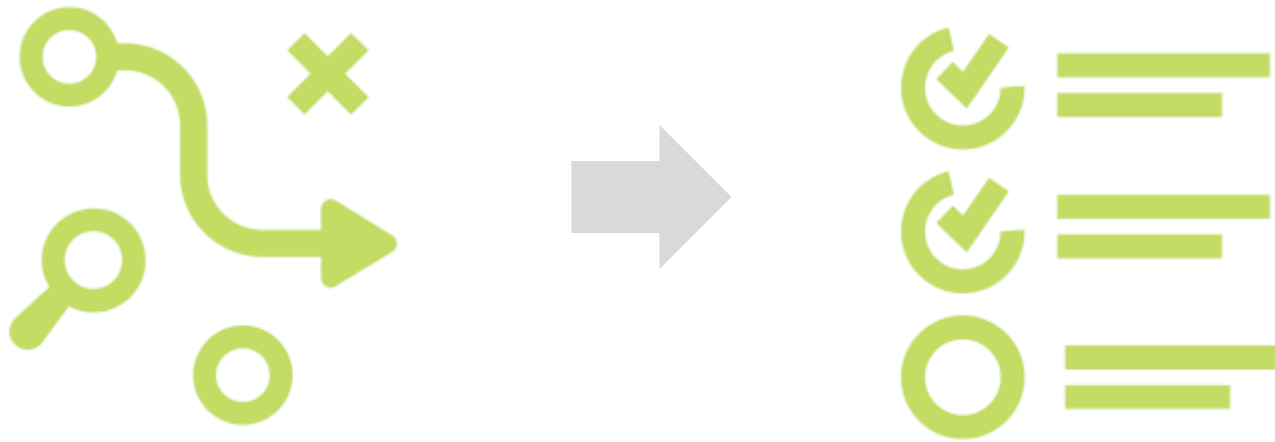


# GHG Emissions targets



- Canada
- BC
- Municipalities
- Corporations & Businesses

# From targets to action



# Canada's climate action plans



# CleanBC Plan



## Better Buildings

Helping you conserve energy and making your home healthier and more comfortable.



## Reducing Pollution From Industry

Making B.C. industries the cleanest in the world to support good jobs, be more efficient, and use cleaner energy



## Cleaner Transportation

Making electric cars more affordable, investing in charging stations, and shifting to renewable fuels.



## Reducing Emissions From Waste

Diverting waste from landfills and reducing polluting emissions.



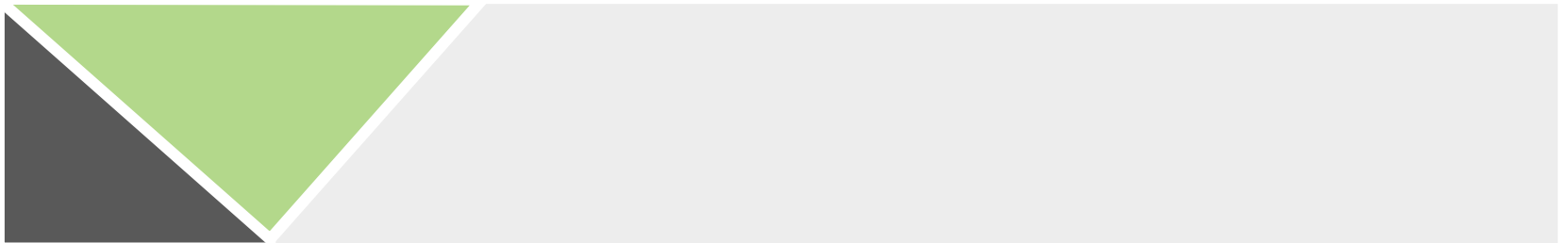
## Clean Energy Jobs

Making B.C. cleaner will create good jobs that support families and sustain our communities.





# **BENEFITS AND RISKS**



# Benefit and risk categories

- Financial
- Operational & Social



# Financial risks

- Price Increases
  - Utility
  - Fuel
- Carbon Tax
- Carbon Offsets (Public Sector)



# Operational & social risks







**What are some of the benefits of reducing GHG emissions?**

① Start presenting to display the poll results on this slide.

# Financial benefits

- Decreased utility & fuel costs
- Carbon credit revenue
- Emission reduction funding
  - Rebates & grants



# Operational & social benefits

- Employee recruitment and retention
- Environmental and health benefits
- Equity – environmental social justice
- Brand impacts



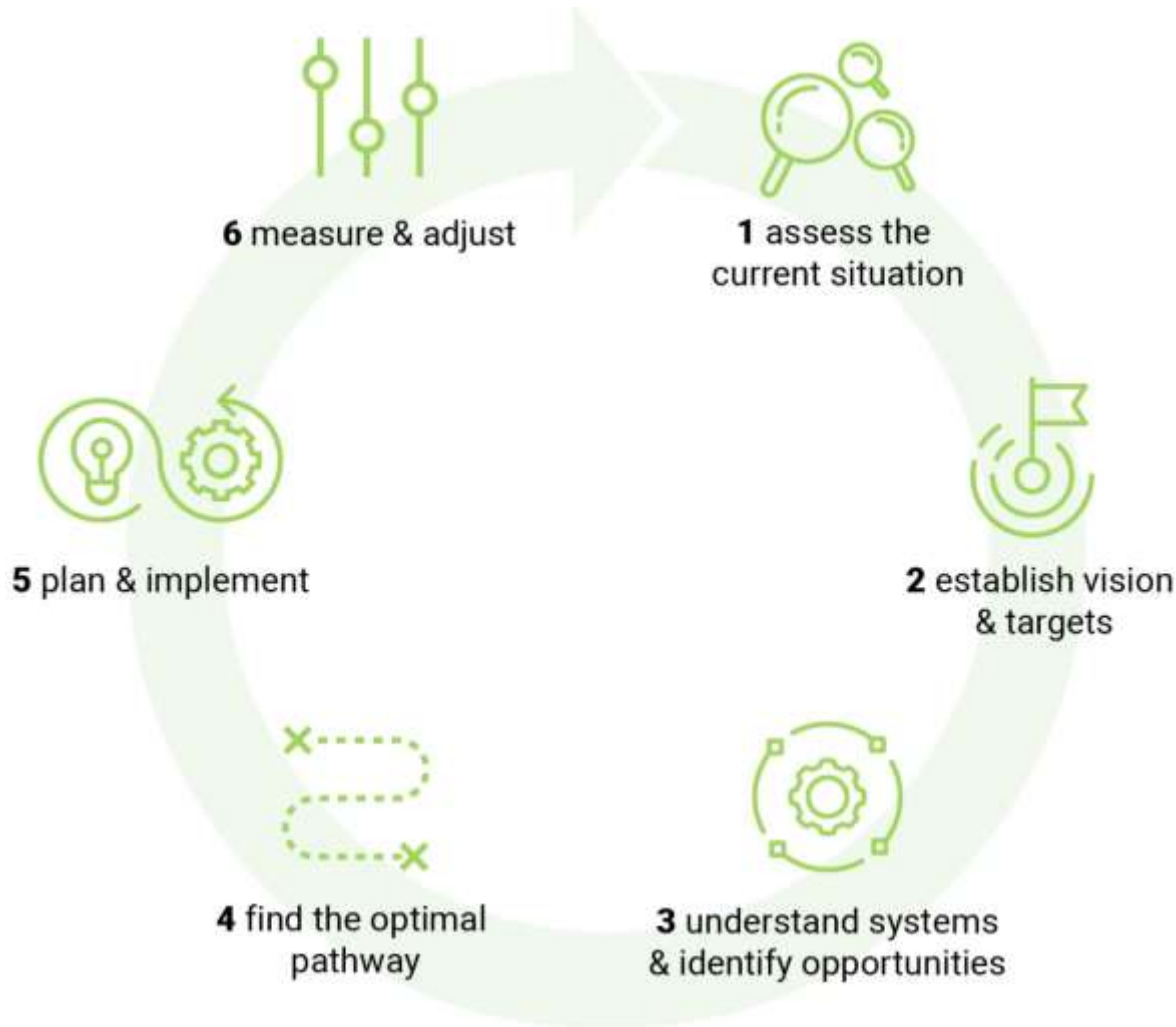


# Part 2: The How

## Steps to GHG Planning



# Steps to GHG Planning





# **1. Assess the current situation**

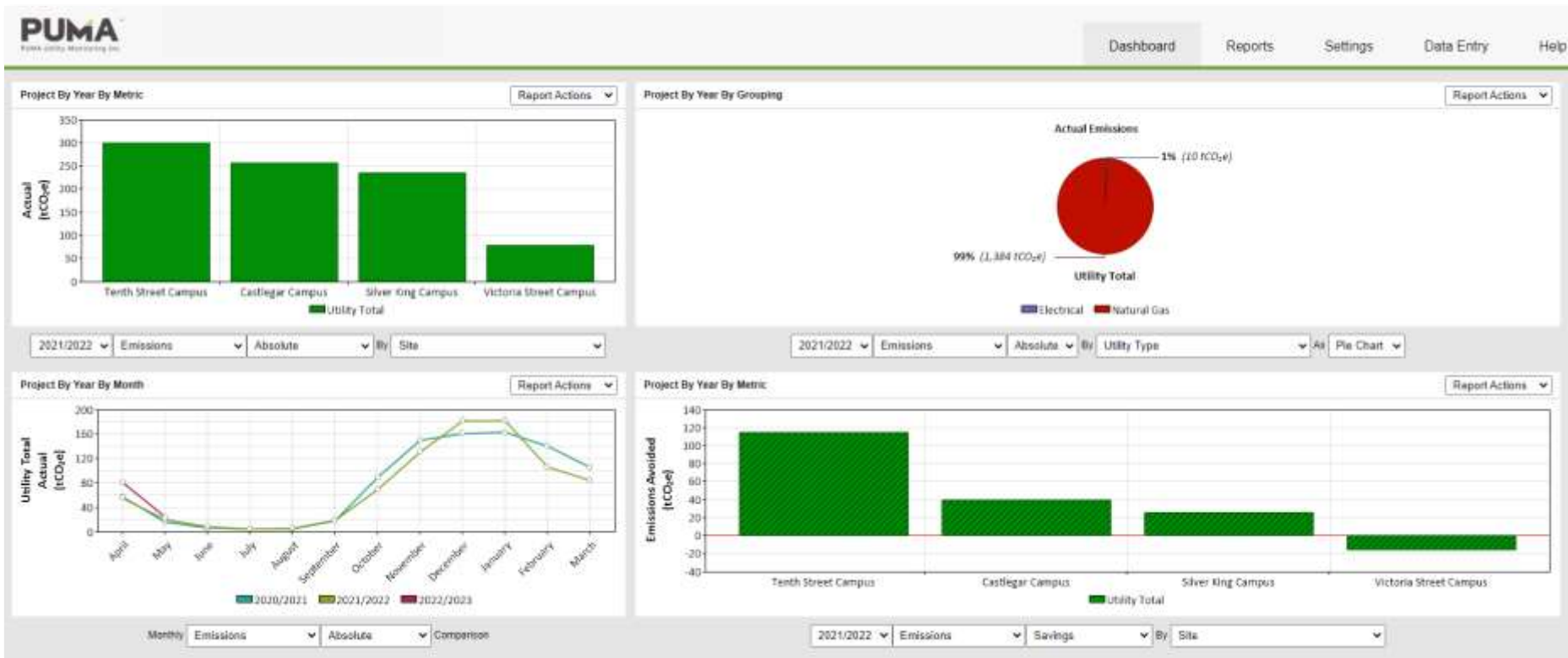
# Where to begin?

A. Internal Review

B. External Scan

C. Engage People

# Using the right data







## **2. Establish vision & targets**

# Visioning workshop



# Approach to targets



- Top down
- Bottom up
- Both!



**Does your organization have a  
GHG emissions reduction  
target?**

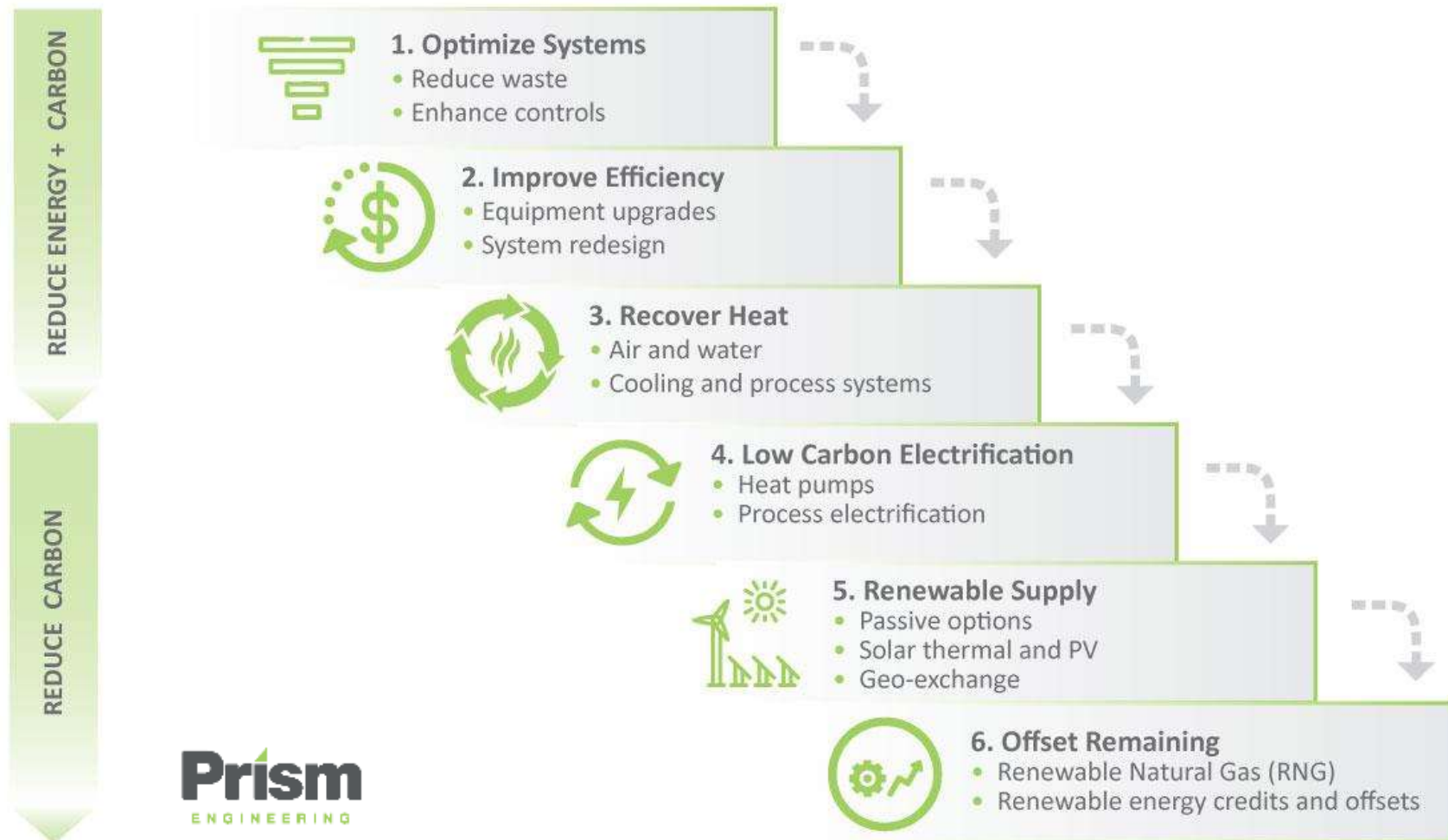
ⓘ Start presenting to display the poll results on this slide.

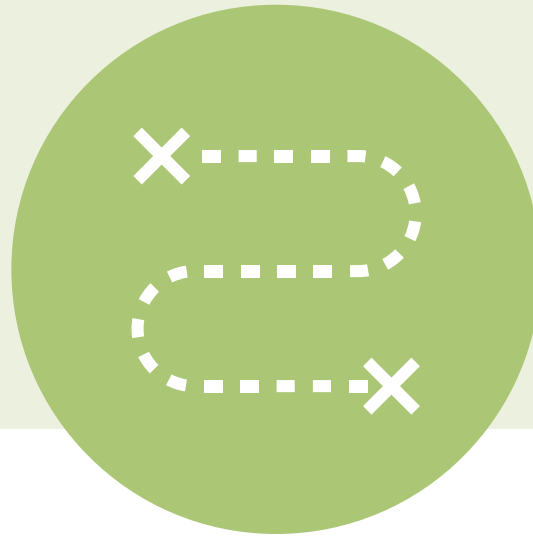




### **3. Understand systems & identify projects**

# Prism's pathway to net zero





**4. Find the optimal  
pathway**

# Pathway Example

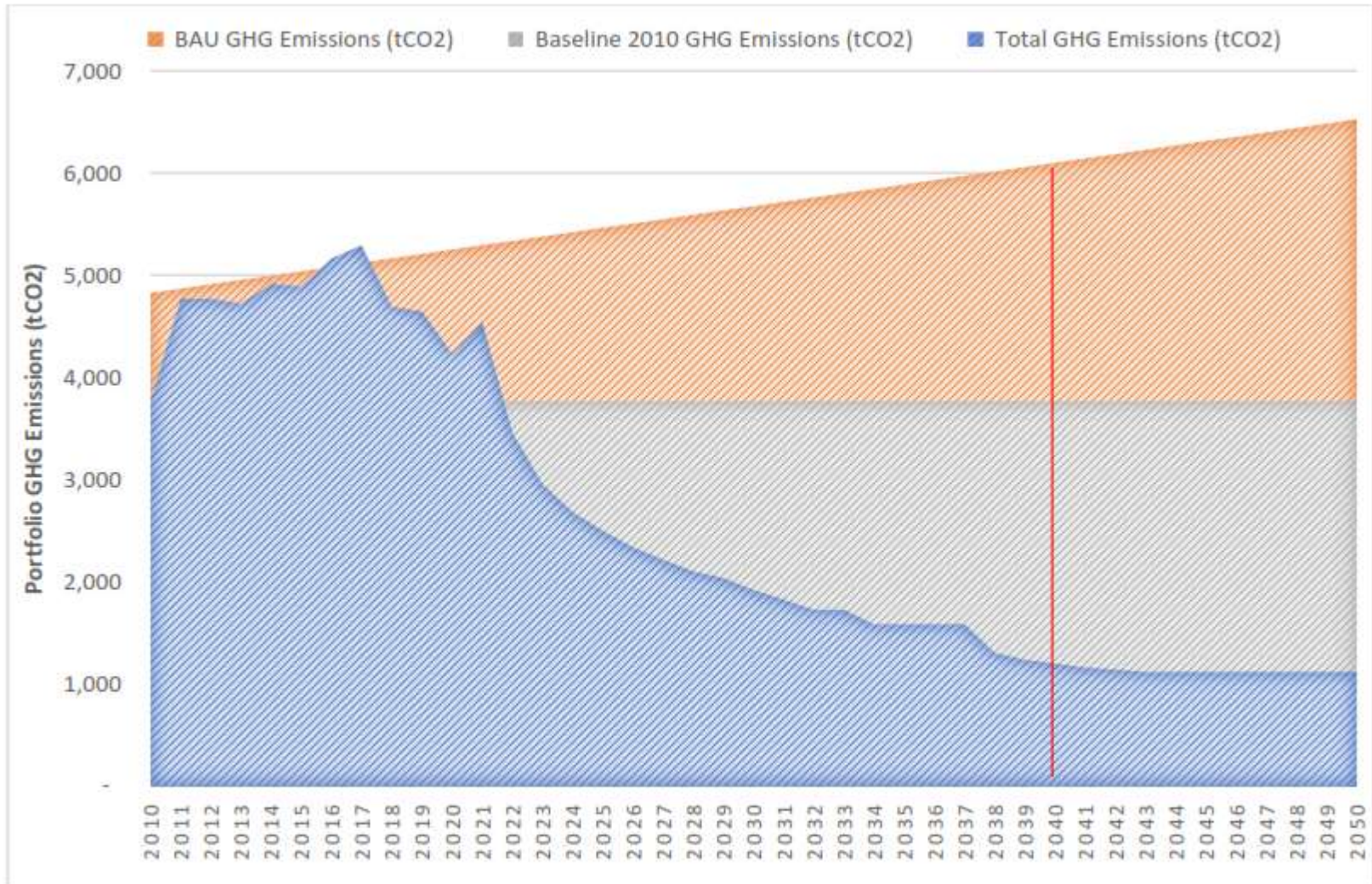


Figure 4: Carbon Pathway B: GHG Cost-Impact Basis



## **5. Plan & implement**



# Strategic approach to implementation

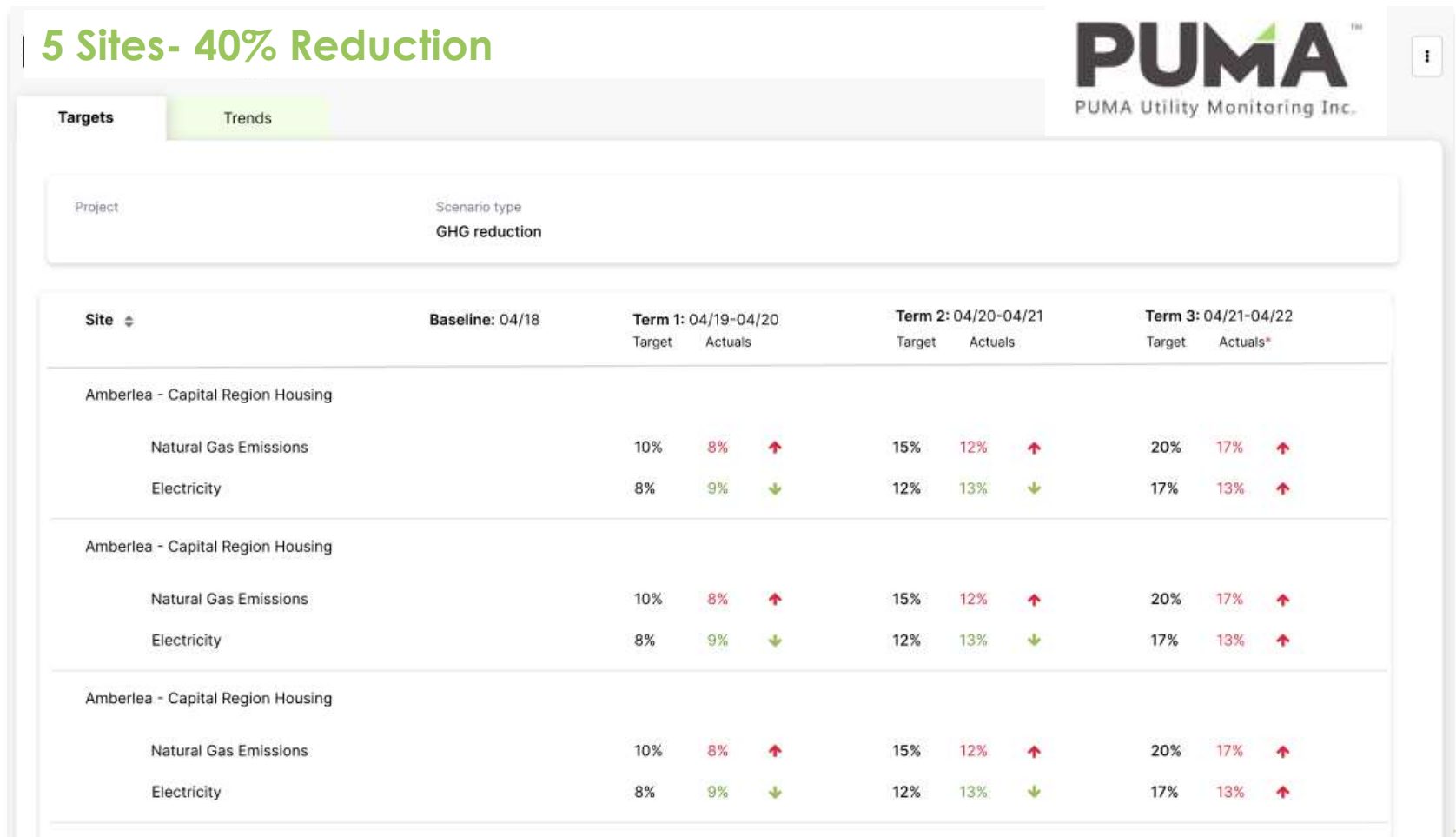
- Involve people, again!
- Planning
- Implementation considerations



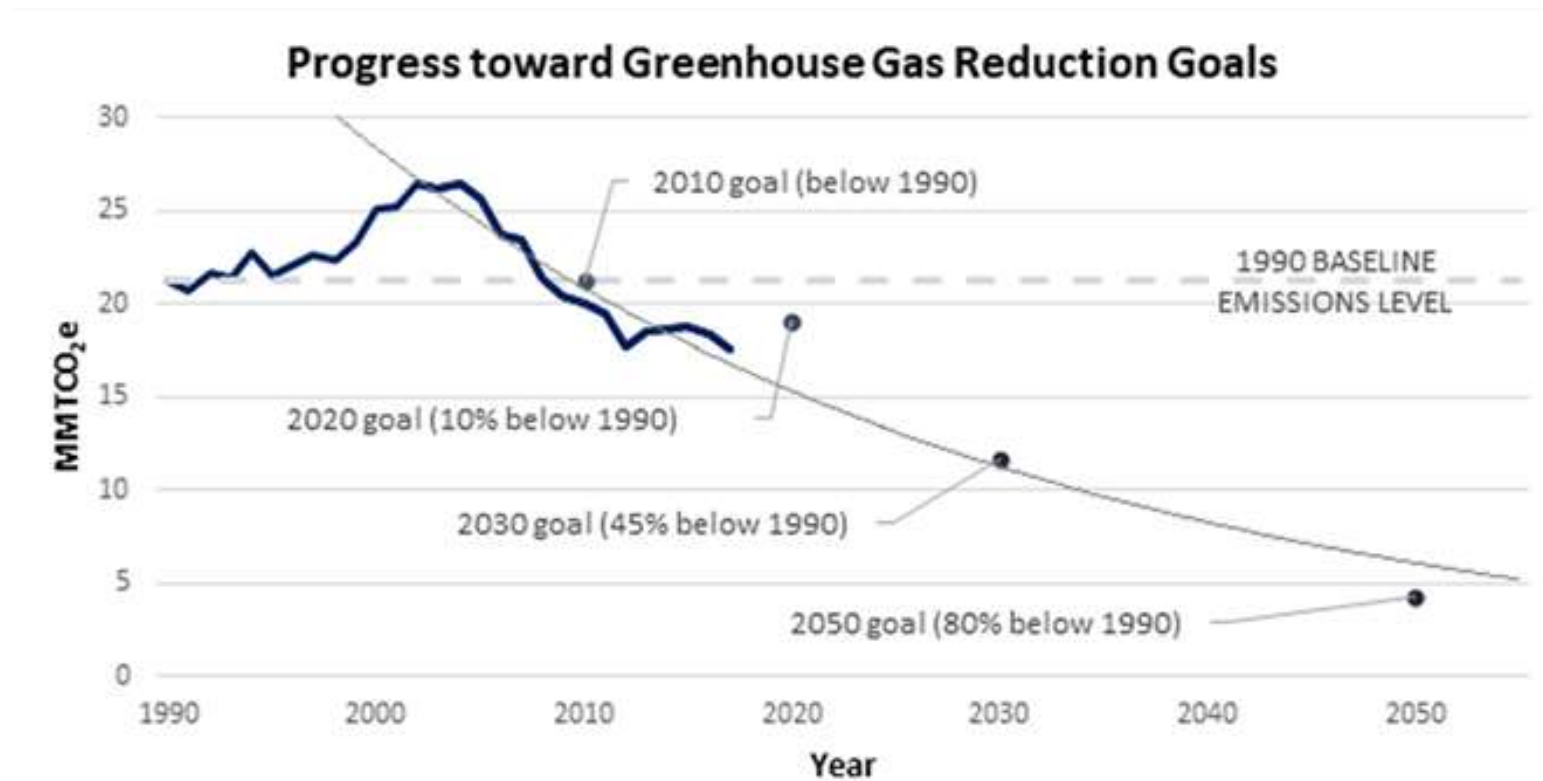


## **6. Measure & adjust**

# Progress towards targets



# Progress towards targets



Source: Maine.gov

# Q & A







# Part 3: Case Studies

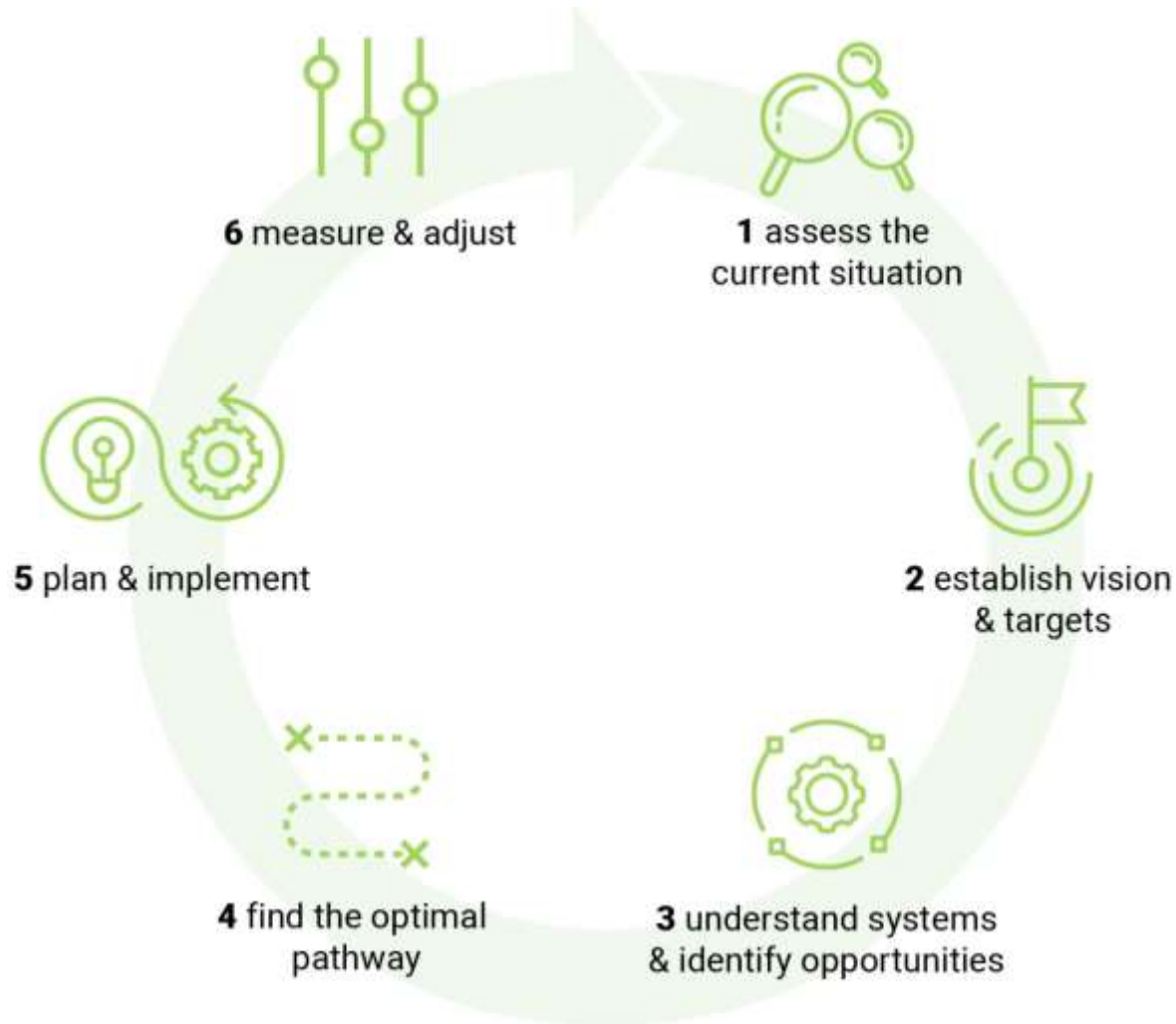
1. City of Abbotsford
2. City of Burnaby



**City of Abbotsford**



# Overview



# GHG Planning: Establish Profile & Reporting Framework



**1** assess the  
current situation

- Collection of present and historical baseline utility data using PUMA
- Estimation of historical data

## **Outcomes:**

- Established 2007 baseline and 2020 emissions profile
- Developed City policy for reporting emissions post CARIP
- Identified emission reporting/accounting gaps

Framework for Emissions  
Tracking and Reporting



### **Methodology & Framework for Emission Tracking and Reporting**

Tracking and Reporting Scope

GHG Emission Factors

Gap Analysis

Existing Portfolio

Estimation of Missing or Incomplete Data



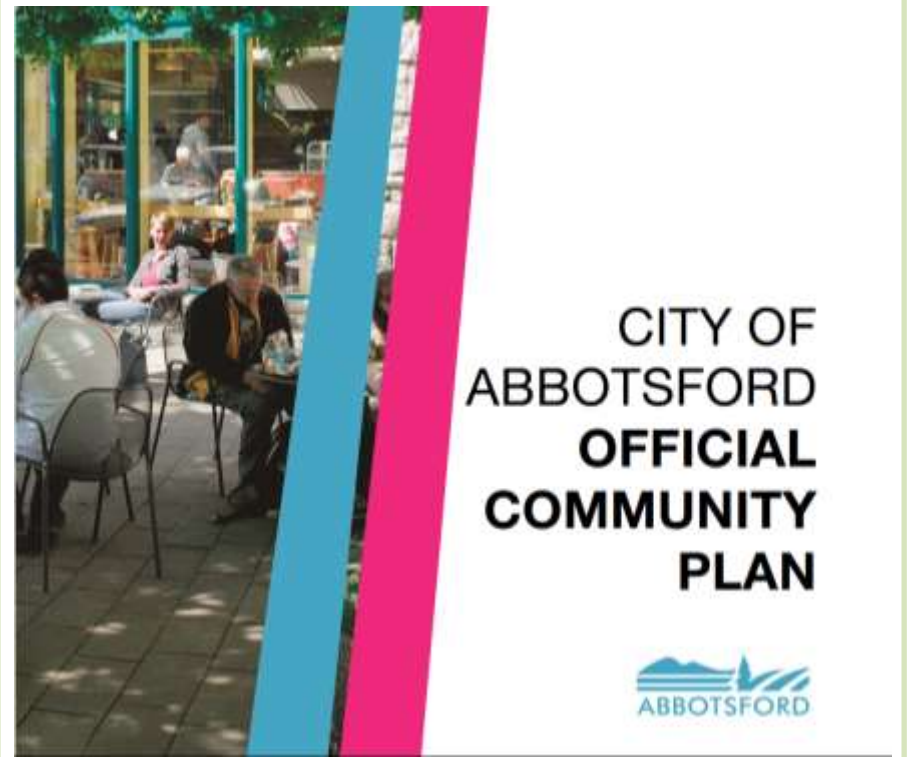
# GHG Planning: Official Community Plan



2 establish vision  
& targets

Greenhouse Gas Emission  
Reduction Target:

- 20% reduction by 2025
- 40% reduction by 2040
- below 2007 level





# GHG Planning: GHG Emissions Model



**3** understand systems  
& identify projects



**4** find the optimal  
pathway

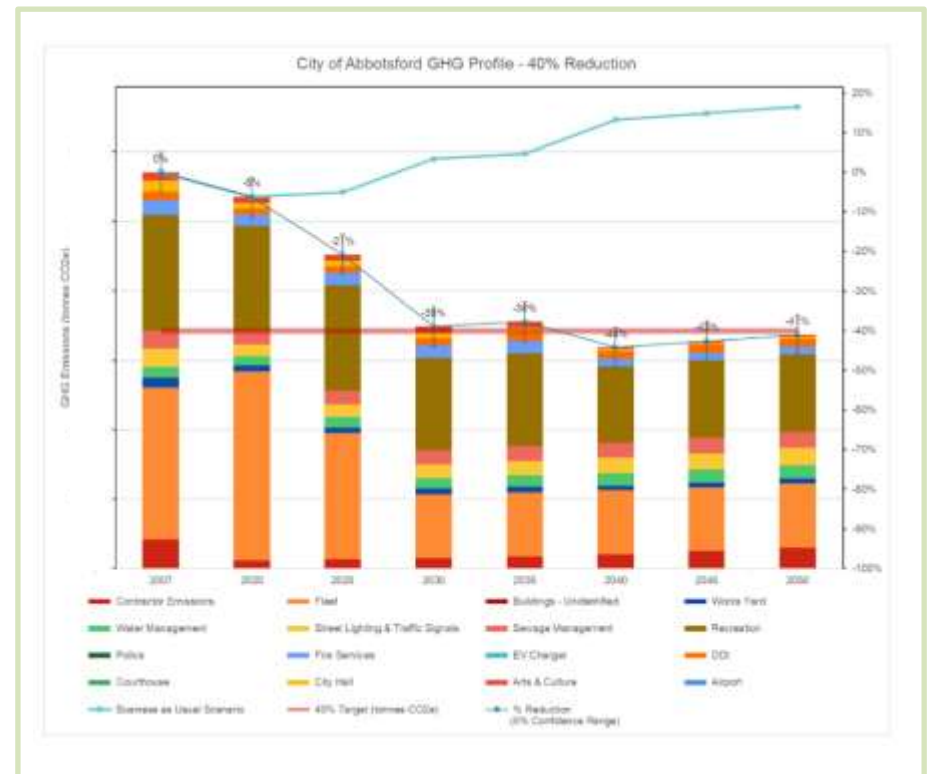
## GHG Emissions Model

Impacts on GHG model:

- Emission reduction projects
- Population & Service growth
- Technology changes
- Escalation of GHG emission costs

## Outcomes:

Identification of pathways to 40%  
GHG emission reduction



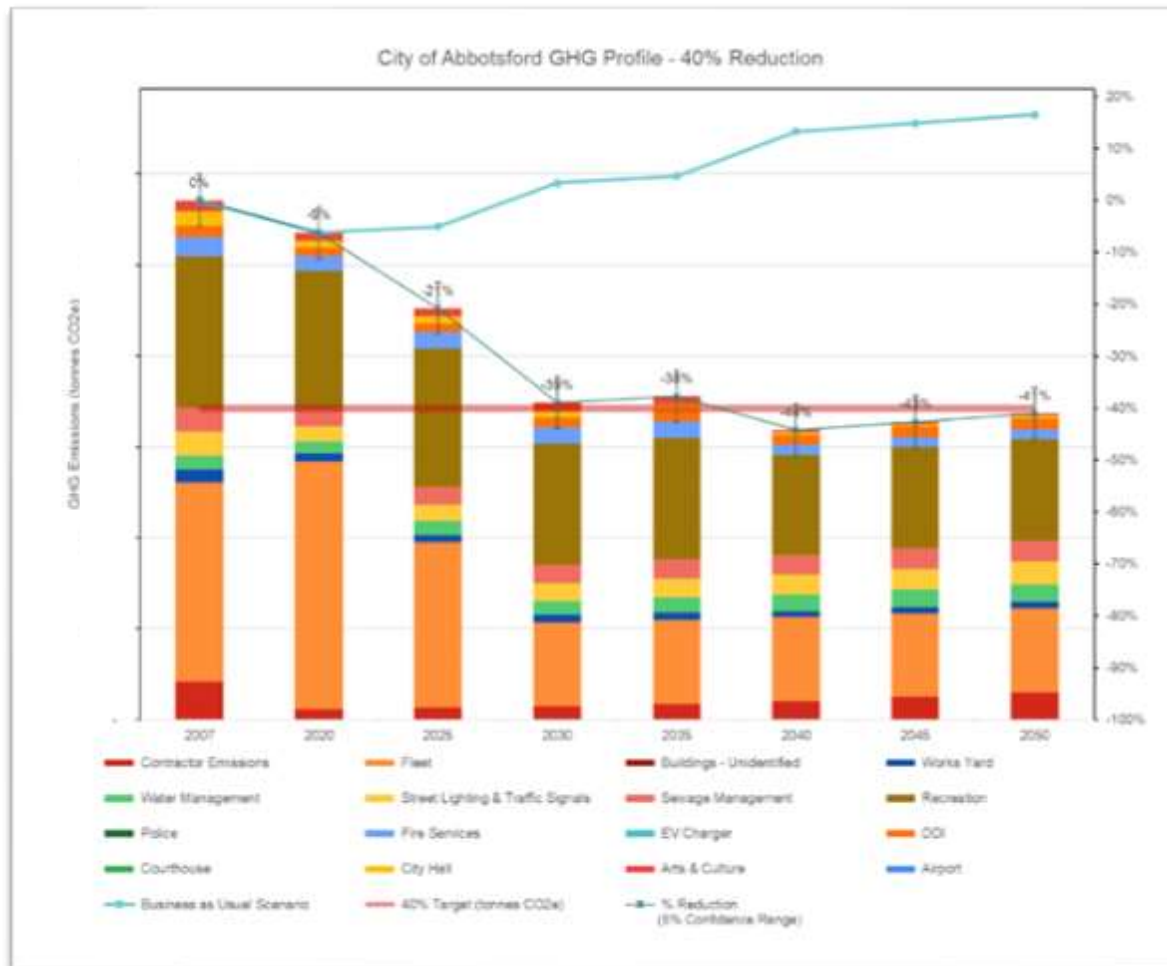
# GHG Planning: GHG Emissions Model



**3** understand systems  
& identify projects



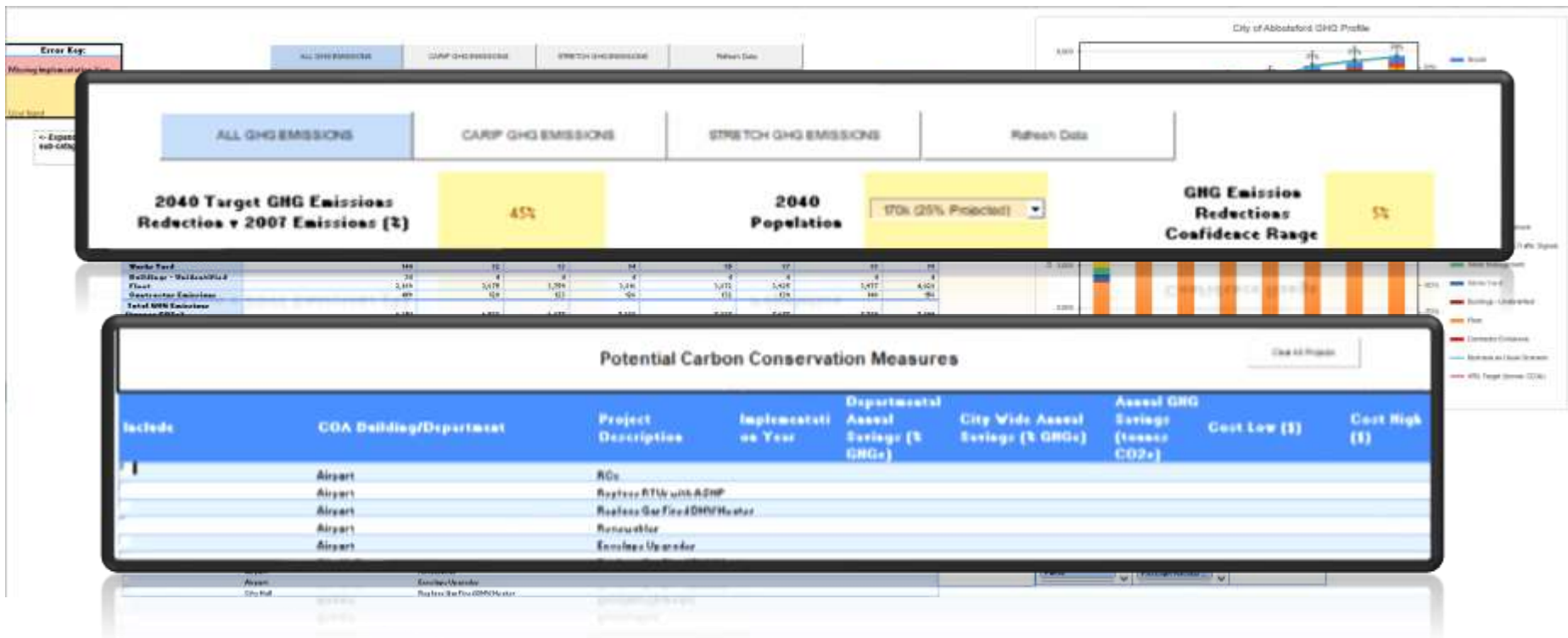
**4** find the optimal  
pathway



# GHG Planning: Summary



4 find the optimal pathway



# GHG Planning: Engage Stakeholders, Develop Policy



5 plan & implement

## Outcomes:

City Council Approval

- Funding
- Organizational alignment

Corporate Policies Developed

- New Construction
- Asset Planning



## COUNCIL REPORT

Executive Committee

Report No. ENG 014-2022

Date: June 07, 2022

File No: 5280-01

To: Mayor and Council  
From: Luisa Jones, Acting Director, Environmental Services  
Subject: Green Civic Building Strategy

### RECOMMENDATION

THAT Council approve the Green Civic Buildings Strategy, comprised of the Green Buildings Framework and the Green Buildings Policy, as guiding documents for corporate climate action.

## GREEN BUILDINGS FRAMEWORK

## GHG Emissions Targets

Official Community Plan (OCP) Targets:



## What we do

Our Climate Action Framework focuses on three key strategies:

## Use less energy &amp; resources



## Reduce GHG emissions



## Use renewable energy



## How we drive corporate change

Everyone has a part to play to make a difference on climate action.



## The results we seek

Our Climate Action Framework strives for a wide range of positive outcomes:

## Buildings &amp; Infrastructure Improvement

Renewed and improved assets  
Energy efficiency  
GHG reduction

## Corporate Excellence

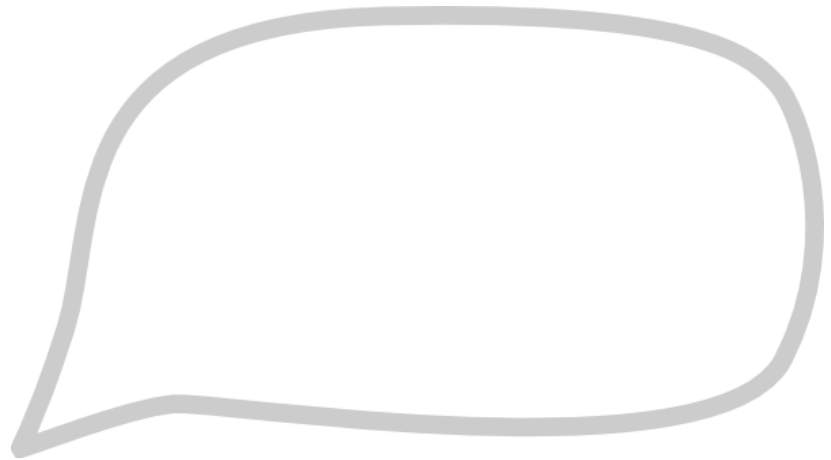
Develop financial resilience  
Build strategic partnerships  
Maximize external funding  
Meeting climate action targets

## Environmental Stewardship

Fewer extreme weather events  
Cleaner airshed  
Achieve climate resiliency



# Q & A

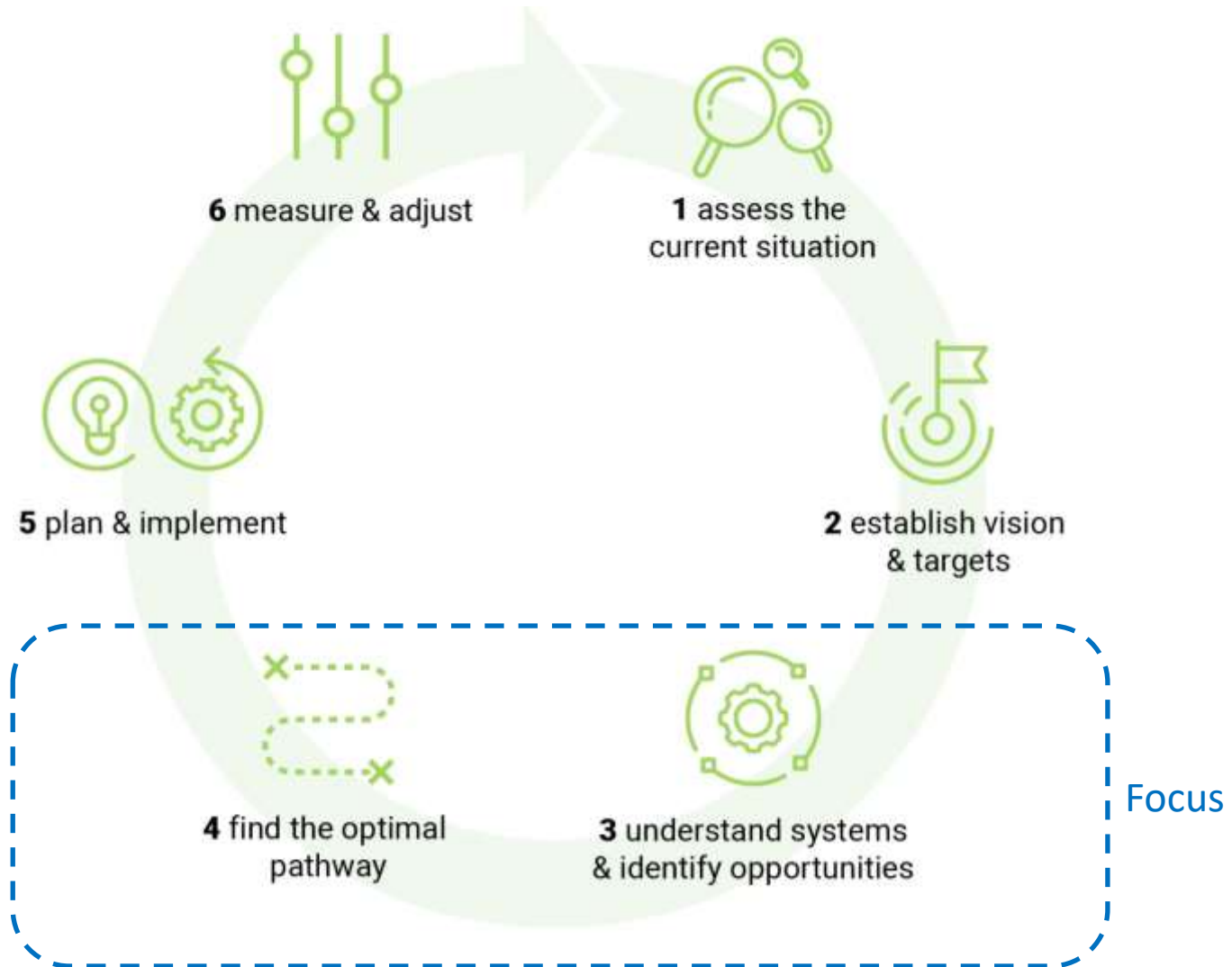




# City of Burnaby



# Overview



# List of Opportunities

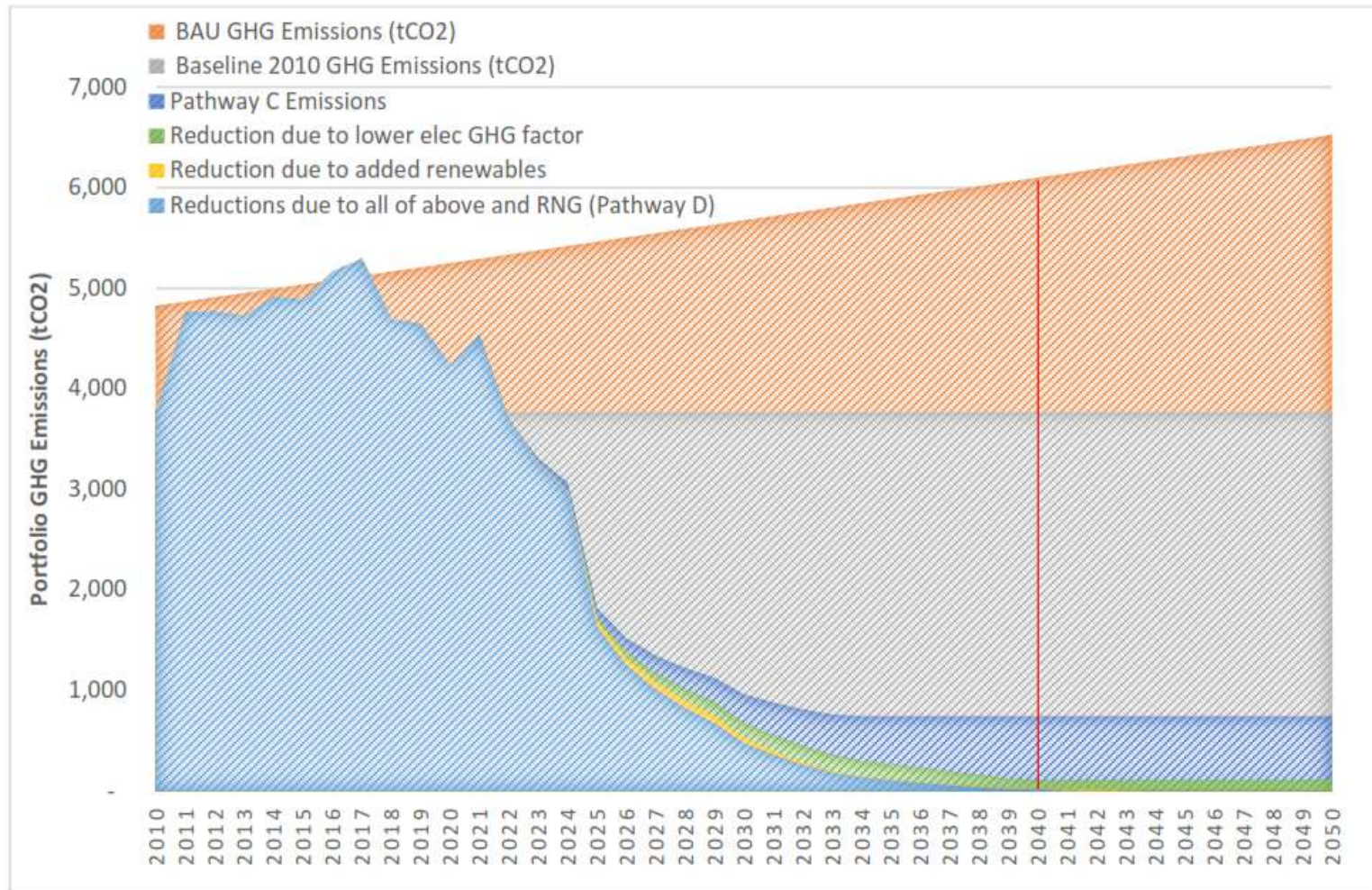
Building Number	Building Name	Measure ID	Existing Condition	Proposed Measure	Existing Equipment Installation	Electrical Savings (kWh)	Electrical Demand	Fuel Savings (G)	Energy Savings (\$/Yr.)	Budget Retrofit Cost (\$)	GHG Emissions Reduction	Investment Per Ton Reduced (\$/ton)
1	Anderson House	E-CRM-1B	Atmospheric gas-fired boiler is used to supply heat to the hydronic heating system.	DEEP CARBON REDUCTION MEASURE: Install air-to-water heat pump and modify radiators	2012	-12,754	-6	197	\$410	\$45,000	9.31	\$4,800
1	Anderson House	E-CRM-2	Gaps in insulation, single glazed windows and other envelope deficiencies contribute to envelope heating losses and cold air infiltration.	Repair envelope deficiencies as appropriate.	No Date - High Replacement Urgency	0	0	22	\$227	\$10,000	1.11	\$9,000
1	Anderson House	G-CRM-1a	Atmospheric gas-fired boiler is used to supply heat to the hydronic heating system.	INTERIM MEASURE: Install condensing boiler	2012	0	0	21	\$217	\$15,000	1.06	\$14,100
2	Still Creek Works Yard-Ops Bldg/Storage Bldg/Truck Wash	E-CRM-1	(2) 83KW Natural Gas fired boilers providing backup and supplementary heat for air source heat pump in operations building.	Utilizing electric backup boilers for supplementary heat	2014	-82,940	70	375	-\$7,196	\$483,799	15.36	\$31,498
2	Still Creek Works Yard-Ops Bldg/Storage Bldg/Truck Wash	E-CRM-2	Operations and Truck Wash buildings have natural gas fired domestic hot water heaters	Install electric air source heat pump domestic hot water heaters	2014	-9,220	130	85	-\$4,400	\$169,620	3.90	\$43,493
2	Still Creek Works Yard-Ops Bldg/Storage Bldg/Truck	E-CRM-5	No renewable energy generation on site	Install Solar PV on roof(s) of the building(s) at the facility	N/A	225,720	-	-	\$21,737	\$648,000	9.03	\$71,761
2	Still Creek Works Yard-Ops Bldg/Storage Bldg/Truck	E-CRM-6A	Gas fired MUA-SB-01 provides heat for Storage Building	Install Packaged Heat Pump Makeup Air Unit	2014	-10,265	170	120	-\$5,509	\$285,268	5.57	\$51,216
2	Still Creek Works Yard-Ops Bldg/Storage Bldg/Truck	E-CRM-6B	Gas Fired Unit heaters provide heat in the Storage and Truck Wash	Install electric unit heaters	2014	-17,935	290	85	-\$10,413	\$191,272	3.52	\$54,339
3	Alan Emmott Centre	E-CRM-6	Gas fired MAU-1 provides heat for the building	Install Packaged Heat Pump Makeup Air Unit	2002	-290	30	5	-\$957	\$57,705	0.24	\$240,439
4	Bby. Art Gallery - Gallery	E-CRM-1	High efficiency natural gas condensing boiler to provide heating to the building. Cooling, ventilation and humidity control is provided by air handling units with DX cooling and electric reheats.	Install a VRF heat pump system to provide heating and cooling to the building.	No Date - Low Replacement Urgency	- 38,600	-	540	\$811	\$70,000	26.54	\$2,600
5	Bby. Lake Rowing Pavilion	E-CRM-1	Natural gas fired domestic hot water heating tank used to supply washrooms and kitchen.	Incorporate a residential on-demand electric water heater in place of the existing natural gas heating tank.	2013	- 16,867	- 9	76	-\$1,333	\$1,800	3.11	\$600
5	Bby. Lake Rowing Pavilion	E-CRM-2	Two 60 MBH Natural Gas Unit Heaters currently provide heating to boat and equipment storage.	Replace with two equivalent electric unit heaters.	2020	- 22,066	- 9	99	-\$1,744	\$9,300	4.06	\$2,300
5	Bby. Lake Rowing Pavilion	E-CRM-3b	Two air handling units currently use gas-fired heating. Cooling is provided to the main hall by two	Replace air handling units with an air source heat pump sized to meet building heating requirements. Existing	2016	- 51,219	- 19	565	-\$651	\$130,000	26.10	\$5,000

# Pathway Scenarios

Pathway	Description	Result
		(% reduction in GHG emissions over 2010 base period levels)
<b>Pathway A</b>	<b>Asset Life Basis</b> This pathway prioritizes implementing CRMs that involve replacement of equipment with the lowest remaining asset life first.	<b>38%</b>
<b>Pathway B</b>	<b>GHG Cost-Impact Basis</b> This pathway prioritizes implementing CRMs that have the highest benefit (tons CO <sub>2</sub> e/year emission reduction) per dollar invested first.	<b>68%</b>
<b>Pathway C</b>	<b>Blended</b> This pathway applies a weighting factor to the modelled elements of Pathway A and B to prioritize CRMs that offer benefits both on an asset life and GHG cost-impact basis.	<b>68%</b>
<b>Pathway D</b>	<b>Net Zero by 2040</b> This pathway builds on Pathway C, and adds the elements required to achieve the City's goal of Net Zero emissions by 2040.	<b>84% (Standard 1)</b> <b>89% (Standard 2)*</b> <b>100% (Stretch)* – Net Zero</b>



# Pathway D – Net Zero

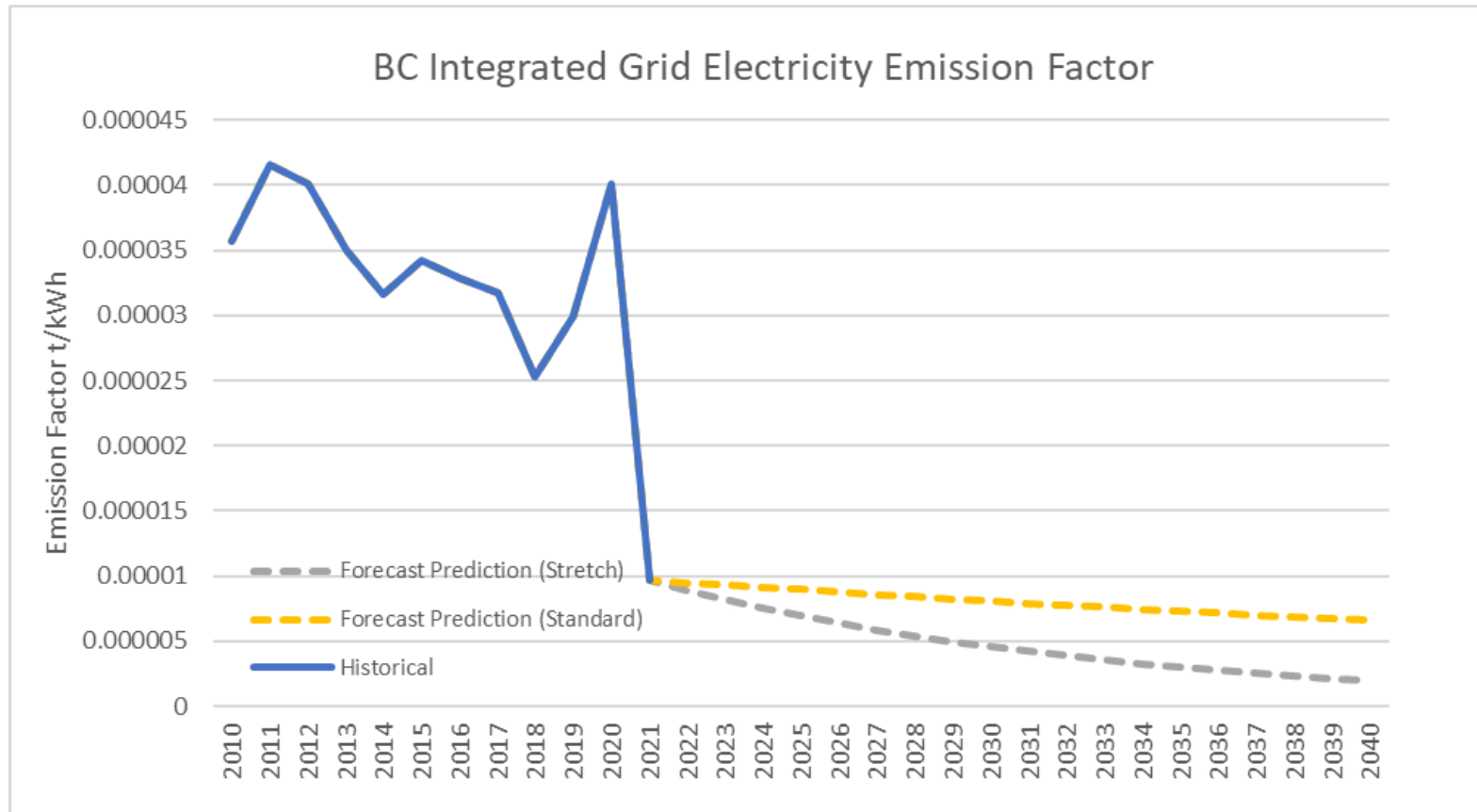




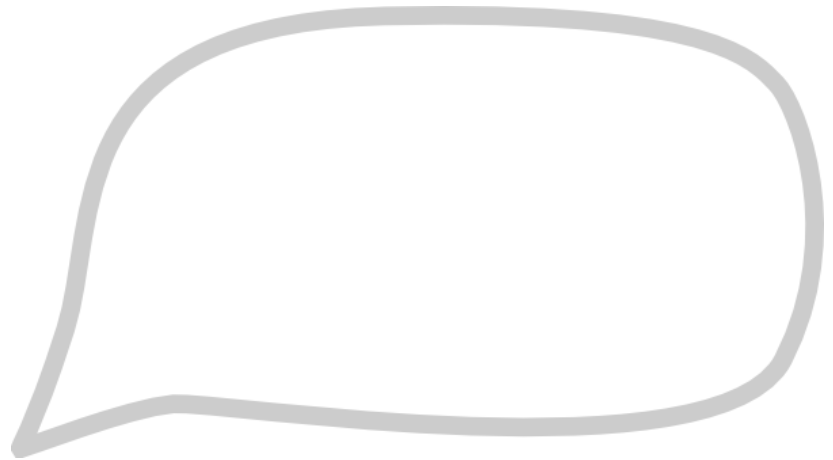
# Sensitivity analysis

- Pathways modelling is sensitive to numerous inputs which are important to test and understand.
  - Retrofit costs and savings
  - Electricity emission factors
  - Carbon tax
  - Asset disposals and investments
  - Available supply of renewables such as RNG
  - Disruptive changes in future technologies
  - Others...

# Critical model inputs



# Q & A



The background image is a photograph of a modern interior space, possibly a lounge or office area, with a green tint. It features large windows on the left side, looking out onto a dense forest of trees. In the foreground, there are several indoor plants, including a large leafy plant and some tall, thin grass-like plants. The overall atmosphere is bright and natural.

# Part 4: Lessons learned



Go back to step  
1 if needed



Top-down +  
bottom-up  
for targets



Timing is key:  
sooner is better



Engage people



Ensure modelling  
inputs are well  
understood



Don't let perfect  
be the enemy of  
good - *Voltaire*



# Thank you.

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