



Hamilton Community Energy + Emissions Plan Implementation (cont'd) + Financials

Community Stakeholder Advisory Committee

March 17, 2021

SSG

whatIf?



Welcome, Introductions, Technical Details

In the chat:

- Name
- Affiliation/Company
- What are you looking forward to most with the warm weather?



Agenda

March 17, 2021

9:30 am EST

Introduction

10 minutes

Implementation Forms Summary
+ Discussion

30 minutes

Break

10 minutes

Financial Analysis Results
+ Discussion

30 minutes

Financial Analysis Q + A

15 minutes

Next Steps

5 minutes



Meeting Objectives

1. Inform the SAC about:
 - a. implementation feedback received to date; and
 - b. the net-zero pathway financial analysis results.

1. Inform the SAC about their next major consultation - reviewing the Draft CEEP



Where Are We?



HAMILTON'S

COMMUNITY ENERGY AND EMISSIONS PLAN

HOW THE PLAN WILL BE DEVELOPED

1



Data Collection

Energy use and emissions data will be gathered from across the City.

2



Baseline & Business-as-Planned Scenario

A detailed baseline energy and emissions map of the city is developed first. Then energy and emissions are projected for the city through 2050. This is called a 'business-as-planned' scenario.

3



Identifying Actions

Actions will be considered for modeling and inclusion in the plan. Actions could include increased energy efficiency, use of renewable energy, sustainable transportation and green building practices, among others. Public consultation will assist in identifying priority actions.

4



Modelling the Future

After technical review and public engagement, a short list of low-carbon actions will be developed for future scenario modelling.

5



Developing the Plan

A final scenario and its associated actions will be developed into a draft Plan. Details of how these actions should be implemented will be developed. Public engagement on the draft plan will occur.

6



Final Plan

The final draft plan will be presented to City Council for approval.

Since Our Last Meeting

Project Work:

1. Completed financial modelling
2. Working on implementation framework and Draft Plan

Engagement:

1. Implementation Google Forms collected from Stakeholders and City Staff.
2. Workshops
3. Public Webinar on January 28th.
4. Online public engagement campaign concluded on February 15th.



Implementation Feedback Summary

Feedback Received

- 20 Google Forms (filled out by individuals + groups)
- 39 public survey responses
- Formal submission from BACCC
- City departmental review (*ongoing*)

How this Feedback will be Incorporated

1. Must **enable net-zero** target
2. Must **support vision, goals + principles**
3. Ideally **leverage existing**:
 - City **programs**
 - Industry + business **initiatives**
4. Informed by **best practices** from other jurisdictions

Review of Visions, Goals, Principles

- Increases **energy resilience**
- Improves economic **prosperity *for all***
- Builds on **industrial** base
- Supports public **health + wellbeing**
- **Community**-led
- Bolster Hamilton's **green spaces**

Major Themes of Implementation Feedback

- **Financing:** Low-interest loans + green bonds
- **Funding:** City (esp. tax credits), provincial, federal
- Reduce **red tape**
- Put in place **regulations + targets**
- Awareness/ **education** /training
- Innovative community **partnerships**
- **Lobbying**

New Building Codes & Standards

Carrots*:

- Ease of permitting
- Tax credits
- Incentives (enhance utility programs)
- PACE financing

Building Retrofits

Sticks:

- Building standards, incl. DE-ready reqs.
 - 87% of public survey resp. supported this
- Require home energy certificates
- Renovation permit requirements

* All carrots should be linked to GHG emissions and not only energy reductions

Building Retrofits: Where to start?

- Consider **BACCC as a partner** in designing a program
- Establish a:
 - **1-stop shop** (portal) for residents/businesses
 - **Network** of retrofit providers
- Consider targeting:
 - Downtown core, taking advantage of current DE HUB
 - City housing + City-owned facilities
 - Those who need it the most (i.e. living in energy poverty)

Building Retrofits

Major Co-Benefits

- Local jobs
- Help alleviate energy poverty

Outstanding Questions

- How to make program financially attractive for residents? esp. low-income residents?
 - Why choose energy/GHG vs. aesthetic retrofit?
- How to address landlord/tenant incentive split?

Decarbonize + Expand District Energy

Key Policies

- Req. DE-ready buildings
- Set a target for DE expansion
- Education/awareness
- Permit streamlining (incl. easements)
- Tax credits
- Start with City assets

Outstanding Questions

- Who gets the carbon credits?
- Who will own + maintain the infrastructure?
- Cost to end users?
- Who will oversee this effort?

→ see Chamber of Commerce's 11 policies

Decarbonize + Expand District Energy

Major Co-Benefits

- Would establish Hamilton as a leader in the field
- May attract new industry + business to the City
- Economic development
- Energy security + flexibility

Industrial Process Efficiency: Key First Steps

- **Funding** for clean technology R+D, implementation
- Enhance **incentive** programs (Enbridge)
- Harmonize **corporate sustainability plans** w' net-zero by 2050
- Establish an **industry network** of best practice
- Increase uptake of **ISO 50001** - international energy use standard
- City to **lobby** Province + Feds to support industrial innovation
- City to adopt **green procurement** policy

Renewable Energy (Rooftop & Community Scale)

How?

- Streamline electrical connection
- Tax credits
- Community solar programs
- City of Hamilton Corporate Energy Policy

Where?

- Brownfields
- Municipal landfill (solar)
- Rural Hamilton: solar + wind
- Rooftops of industry
- 79% of survey resp. supported neighbourhood level installations

Transportation

- Decarbonize commercial fleets:
 - Goods movement strategy needed
- Include active transportation infrastructure:
 - Most popular among public survey respondents (89%)
- Switching to EVs:
 - 2nd most likely action survey respondents likely to take (66%)
- Enable work-from-home:
 - Ensure high-speed internet connectivity

Waste to Energy

- Consider opportunities to provide RNG/biogas to neighbouring businesses/industry
- Separating waste: Most likely action survey respondents likely to take (74%)

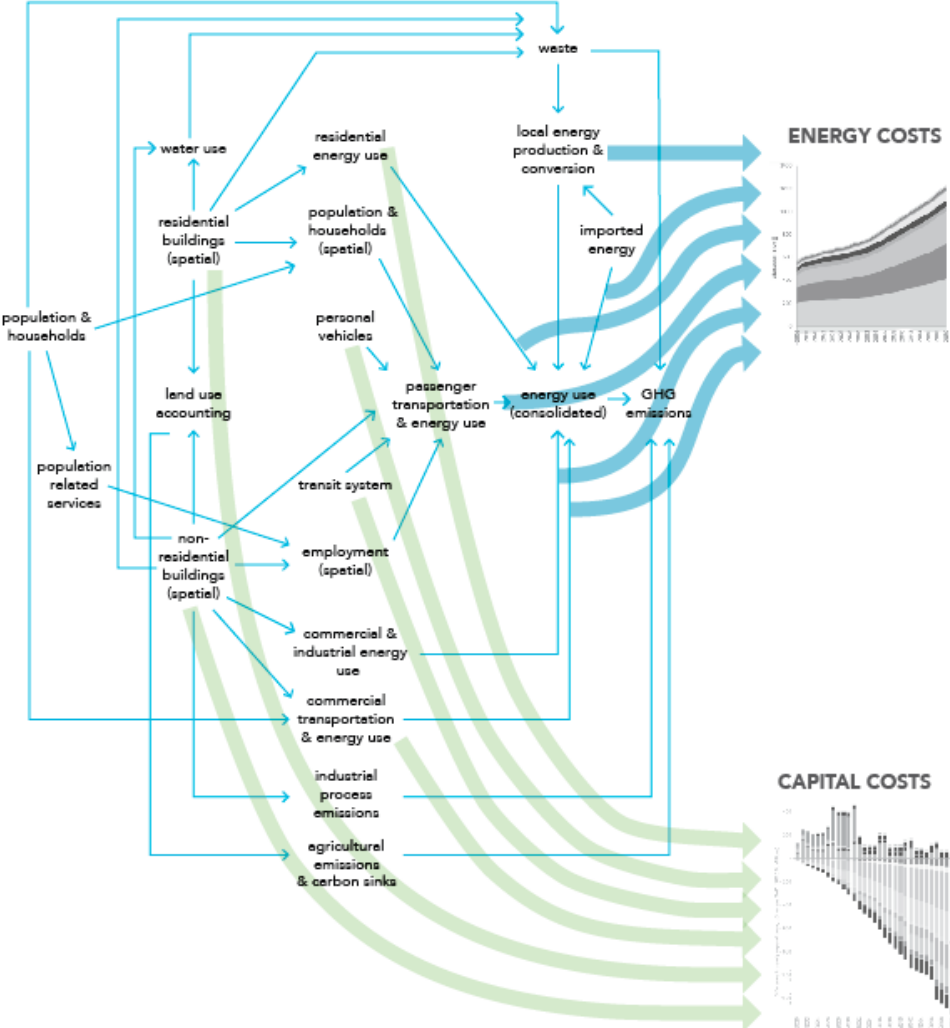
Tree planting/ rewilding

- 84% of public survey respondents favoured this action
- Consider partnering with local Conservations Authorities
- Build on Hamilton's Urban Forest Strategy

10 minute break...

Community Financial Analysis

CityInSight Financial modelling flow



Key Terms

Amortization or annualization of investments - Refers to the process of paying off capital expenditures (debt) through regular principal and interest payments over time.

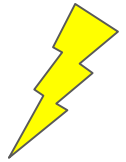
Present Value - The value of some future amount (revenue or expense) when discounted to the present at a specified discount rate.

Net Present Value - the difference between the present value of cash inflows and the present value of cash outflows over a period of time.

Real Discount Rate - expresses the time value of money. It can represent the opportunity cost of capital, or the internal rate of return required by an investor.

Financial Analysis Overview

Key Assumptions



Future fuel prices



Carbon pricing rates



Price of goods & technology

Dimensions of analysis

Capital Expenditures

Net Present Value Analysis

Community Cash Flow

Key Outputs

Future Employment & Economic Development

Community Savings

Community Revenues

Financial analysis -- some key conclusions

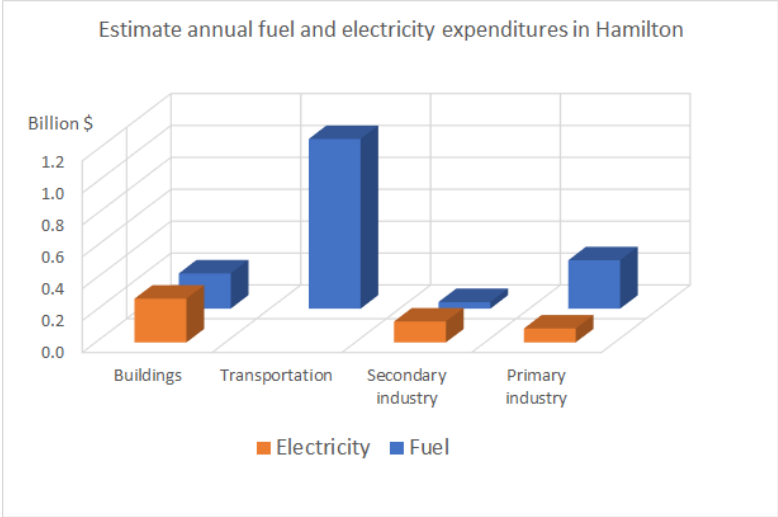
\$8.4 billion in local investment over 30 years

Positive return on investment

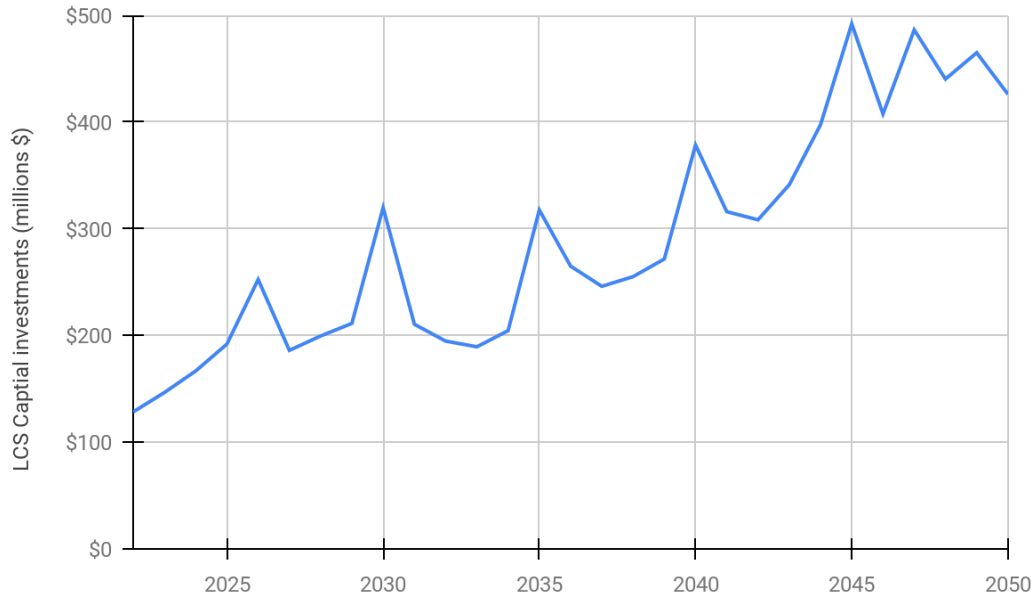
53,000 job-years of employment

Context

- Hamilton GDP ~ **\$37 billion per year**
- Current annual expenditures on fuel and electricity: **\$2.1-2.4 billion per year** (\$1.7 billion if heavy industry is excluded). \$1.7 billion per year is \$33 million per week.
- Annual investment in buildings alone in Hamilton: **\$3.6 billion per year**



Incremental investment (all sources) in the low-carbon scenario (LCS) for Hamilton

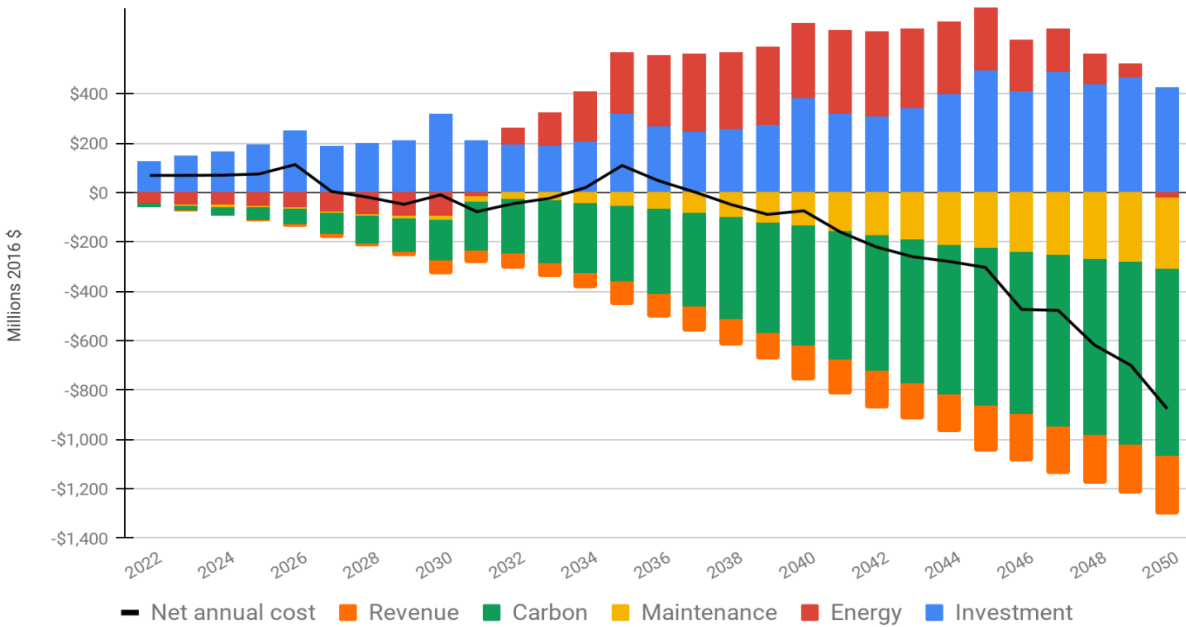


- The cumulative incremental investments to implement the LCS in Hamilton over the 30 year period from 2021-2050 total \$8.4 billion, before discounting, or an average of \$280 million per year.
- To put this in context, investment in buildings alone in Hamilton is over \$3.5 billion per year, and total annual capital expenditures in Hamilton are at least twice that amount, or \$7 billion per year.

** Estimates of incremental capital investments in the industrial sector include only the low carbon investments for secondary manufacturing; the capital investments for emission reductions in the steel industry have not been estimated in this analysis.*

Hamilton LCS investments and offsetting revenue and savings, 2021-2050

Year-Over-Year Low-carbon Scenario Investment and Returns

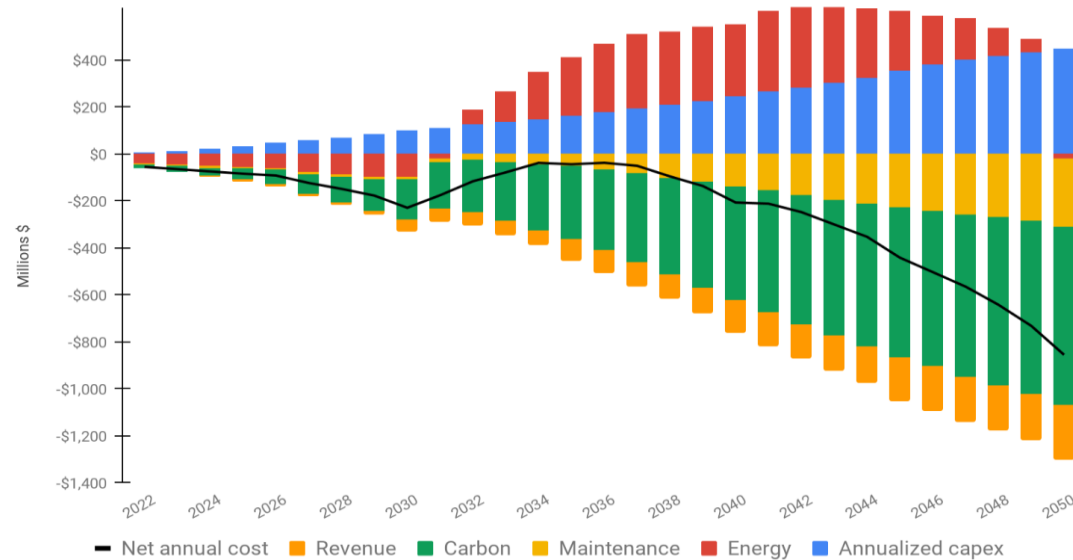


- Annual capital expenditures are offset by savings and revenue, and the annual net return is positive and grows continuously from 2037 forward.
- The net increase in energy costs from carbon-free alternatives (RNG, hydrogen) are more than offset by carbon savings.
- Capital expenditures on low carbon options between now and 2050 continue to yield savings and revenues in the post-2050 period.

* Costs positive, revenue and savings negative. The investments to achieve emission reductions in the steel plant are not included.

The low carbon transition is a major, capital intensive undertaking but pays for itself through carbon and energy cost savings, reduced maintenance costs and new sources of revenue from local energy generation, and without including the value of the many social, public health and other collateral benefits.

Year-Over-Year Low-carbon Scenario Investment and Returns, with capex annualized

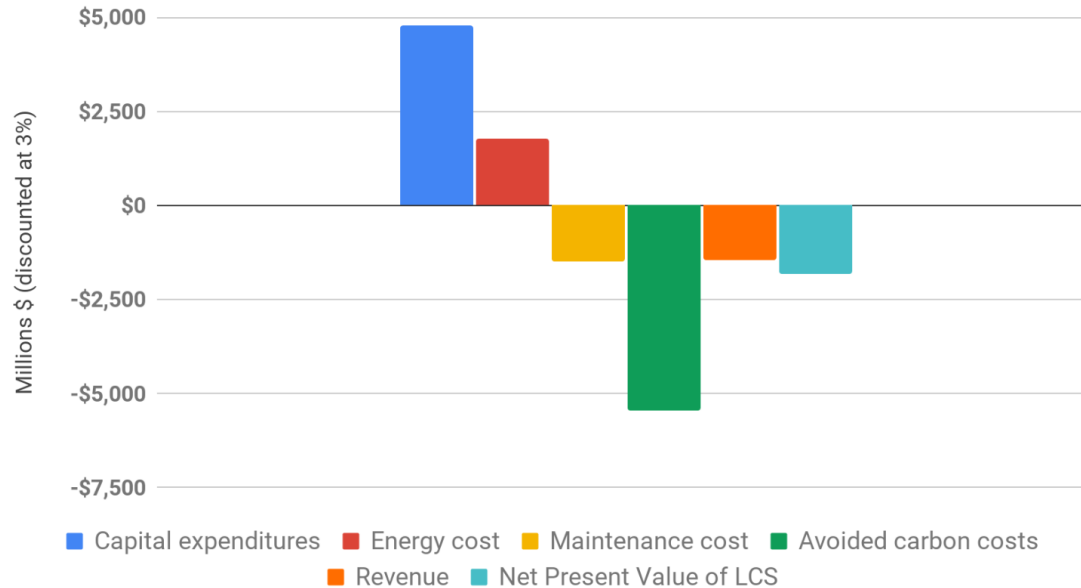


- *With capital investments annualized, revenues and savings can yield net negative program costs from the outset, underscoring the importance of innovative financing and implementation strategies, and highlighting the overall positive economics of the low carbon future.*

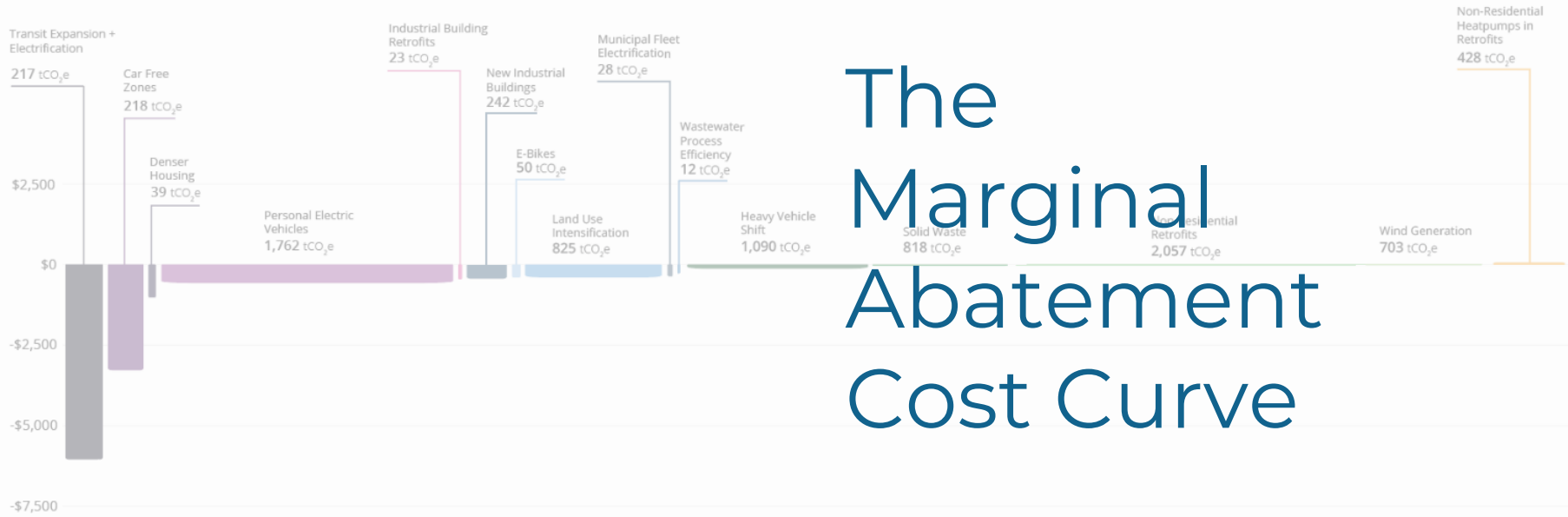
Costs positive, revenue and savings negative. The investments to achieve emission reductions in primary steel production are not included.

The Hamilton low carbon scenario has a positive net present value, driven by revenue, maintenance cost savings and reduced carbon

Present values of Investments and returns, 2021-2050
(Costs are positive in this convention, revenue and savings are negative)



**Costs positive, revenue and savings negative. The investments to achieve emission reductions in primary steel production are not included.*



The Marginal Abatement Cost Curve

Marginal abatement cost curve (MACC)

A MACC provides a graphical summary of the total emission reduction potential of actions and their unit cost per tonne of emissions reduced, and provides one measure for evaluating low carbon actions contributions to the CEEP.

MAC = NPV of all the investments, savings and revenues associated with an action over its lifetime, divided by the emission reductions achieved by the action over that same period.

In an integrated approach to climate mitigation investment, the abatement costs of individual measures tell only part of the story. For example, measures that save low carbon electricity appear to be very expensive on a unit cost per tonne saved basis, but play an essential role in enabling the carbon intensity of the grid to be kept low and for “freeing up” electricity supply for other uses. We are considering bundling measures into strategic investment areas to better reflect the overall economic attributes of the plan.

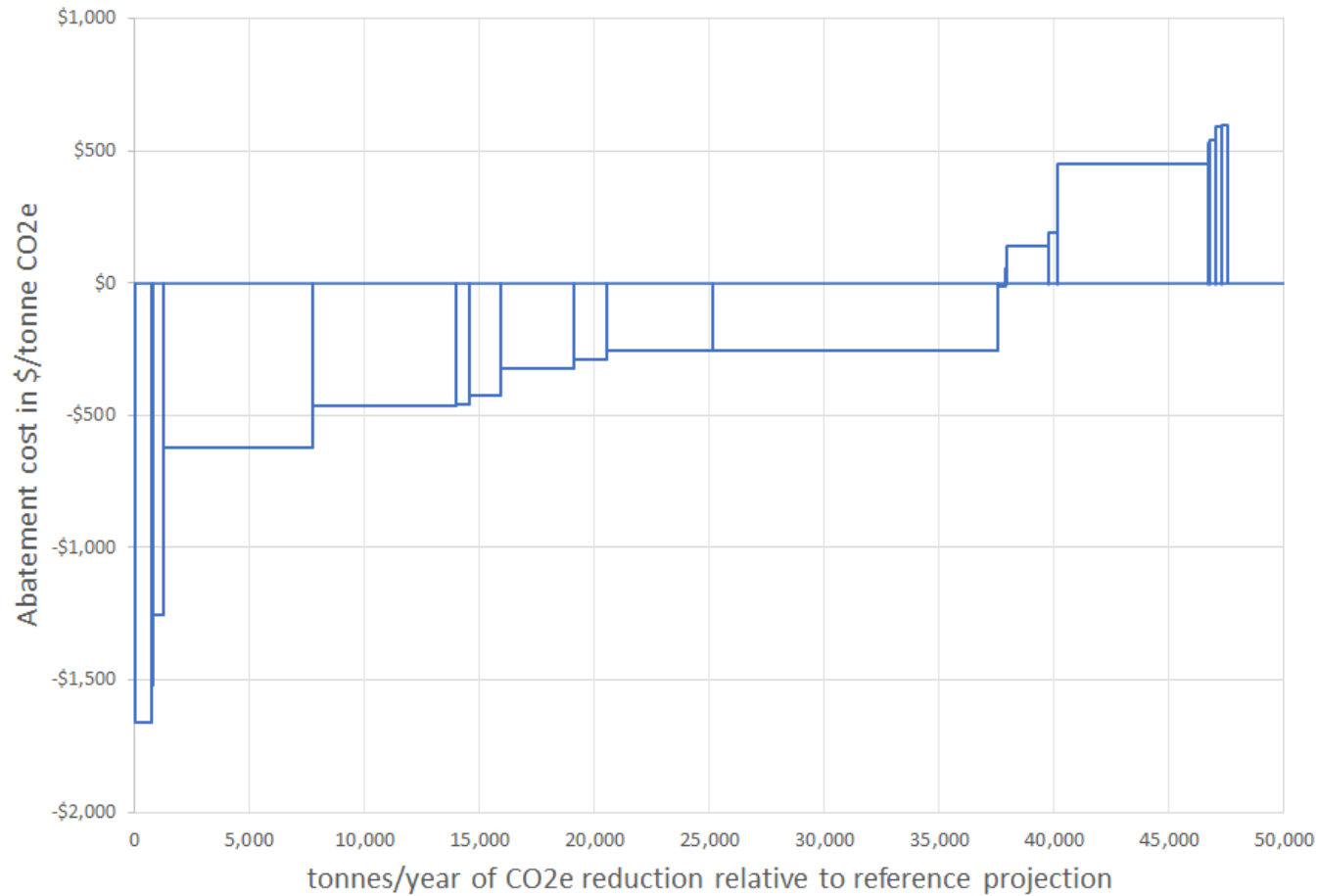
Abatement cost curve inputs: action impacts and their costs per tonne CO₂e

Action	Emissions Reduction (kt CO ₂ eq)	Marginal Abatement Cost (\$ / t CO ₂ eq)
Energy procurement (wind)	738	-\$1,661
Electrify municipal fleet	43	-\$1,521
Ground mount solar PV	473	-\$1,254
PUV electrification	6,494	-\$621
Commercial fleet electrification	6,224	-\$464
New dwelling EUI	578	-\$460
Trip reduction	1,361	-\$424
New non-res EUI	3,196	-\$320
New municipal EUI	1,430	-\$290
Retrofit non-res	4,578	-\$257
Industrial efficiency	12,438	-\$257

...continued

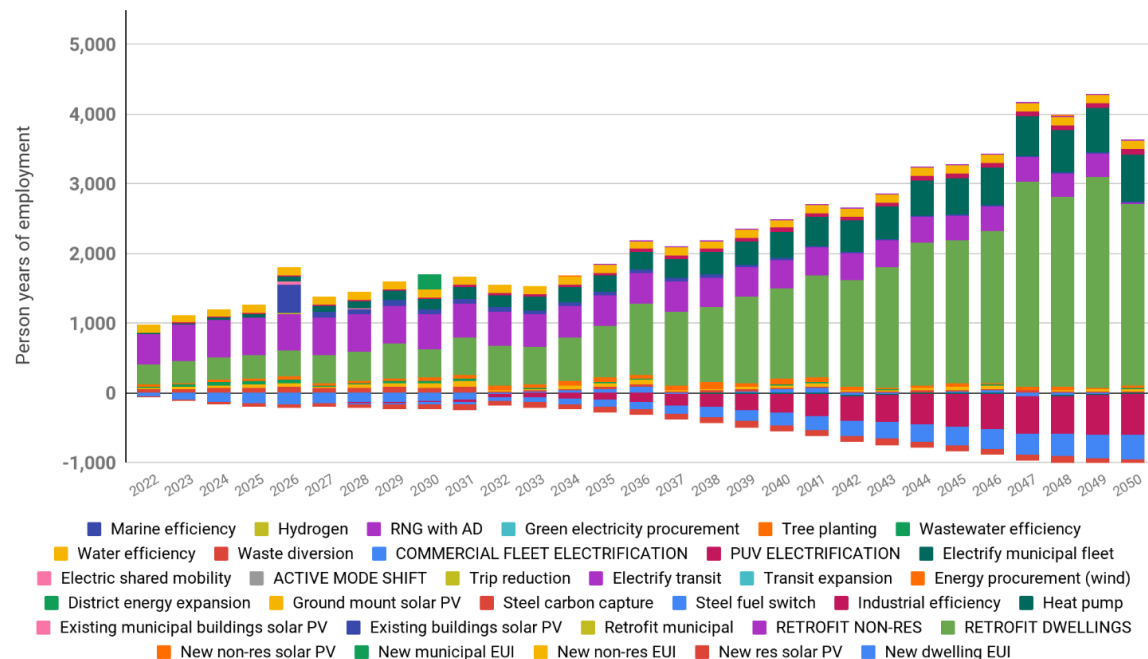
Action	Emissions Reduction (kt CO ₂ eq)	Marginal Abatement Cost (\$ / t CO ₂ eq)
Transit expansion & electrification	282	-\$11
Retrofit municipal	70	\$53
Retrofit dwellings	1,829	\$139
District energy expansion	372	\$192
Heat pump	6,619	\$451
Existing municipal buildings solar PV	22	\$532
Existing buildings solar PV	292	\$543
New res solar PV	257	\$594
New non-res solar PV	218	\$597

Hamilton MAC Curve, Low Carbon Scenario



The low carbon future creates jobs...

Employment



Every \$1 million of incremental capital investment in the low carbon future spent is expected to generate:

... **9 person-years** of employment when spent on building Retrofits.

... **8 person-years** of employment when spent on community-scale energy systems.

... **3 person-years** of employment when spent on new vehicles.

Questions?

Next Steps...

1. Completion of Implementation Framework
1. Draft Plan Consultation



Hamilton Community Energy + Emissions Plan Financial Modelling Results

THANK
YOU

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