Comprehensive Climate Analysis for Nevada

Technical Working Group Meeting 3

July 30, 2025

Presented by

Sustainability Solutions Group
& Ericka Aviles Consulting

Nevada Department of CONSERVATION & NATURAL RESOURCES

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

Overview

Agenda

Overview + Refresh on Scenarios
10 minutes

Financial Analysis Findings + Feedback
45 minutes

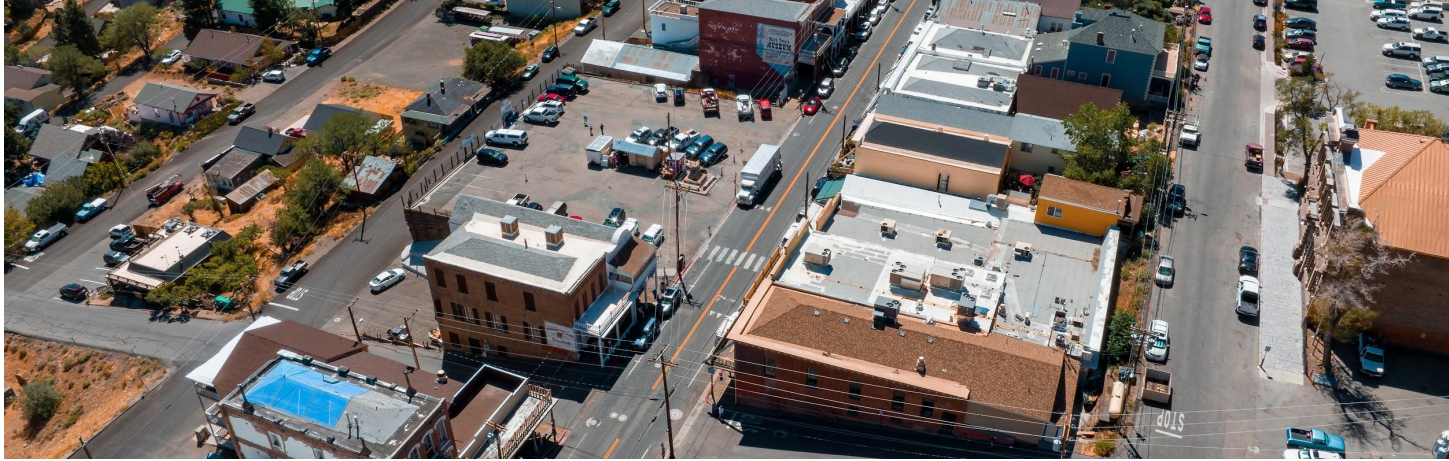
Co-Benefits Findings + Feedback
30 minutes

Objectives

Re-share overview of emission reduction scenarios, and present financial analysis.

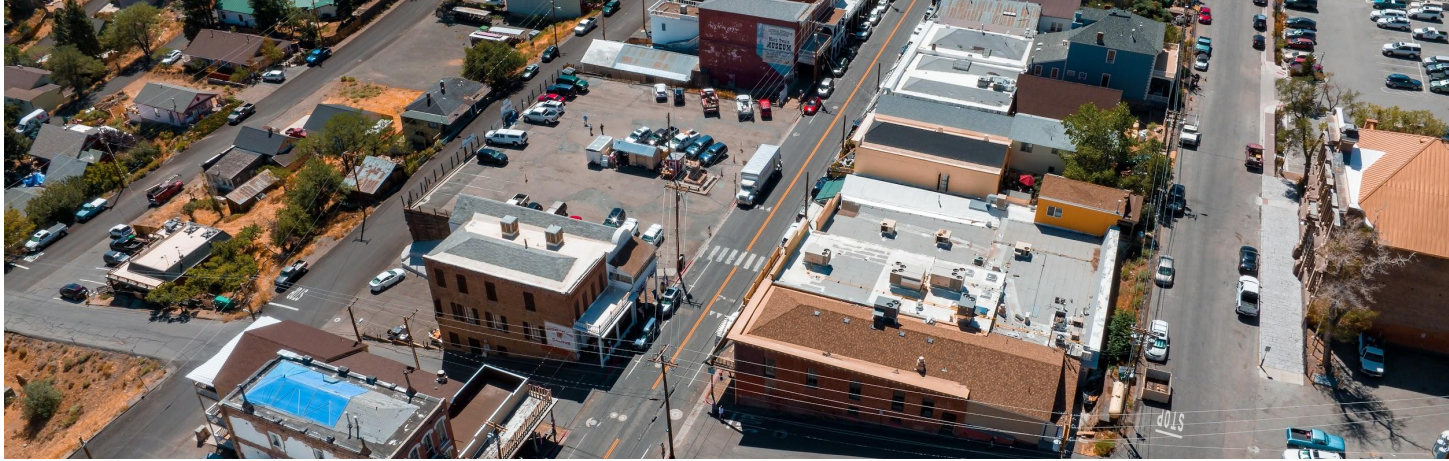
Gather feedback on the financial analysis and discuss implications for measures.

Gather suggestions for final analysis that would be useful or relevant to interested parties in Nevada communities.



TWG 1

- Overview of modeling approach, and business as usual and business as planned scenarios.
- Discussed future scenarios, and key concepts or assumptions to consider in the emission reduction scenarios.



TWG 2

- Overview of emission reduction scenarios and assumptions for measures.
- Feedback on scenarios, community priorities, and other factors that may influence emission reduction measures.

Housekeeping

Use the Zoom chat at any time to ask questions or make comments.

Raise hand to speak during discussion.

Be mindful of sharing time and listening to others.

Bureau of Air Quality Planning

Andrew Tucker
Bureau Chief

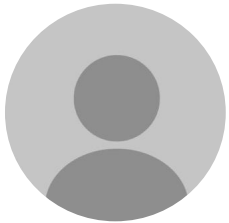
Steve McNeece
GHGs Supervisor

Jake Wahl
Staff Engineer

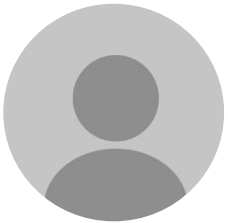
Taylor Pavlu
GHGs Environmental Scientist

Our Team – State of Nevada

Office of Energy



Rachelle A. Doubinkine
Energy Programs Manager



Marjorie Hilke
Management Analyst

Our Team – State of Nevada

Our Team – Consultants

Sustainability Solutions Group

Yuill Herbert
Principal

Kayla Rakes
Project Lead

Erica Brook
Engagement Lead

Esteban Vera Soto
Modelling Lead

Soraya Sarshar
Analyst

Ericka Aviles Consulting

Ericka Aviles
Principal

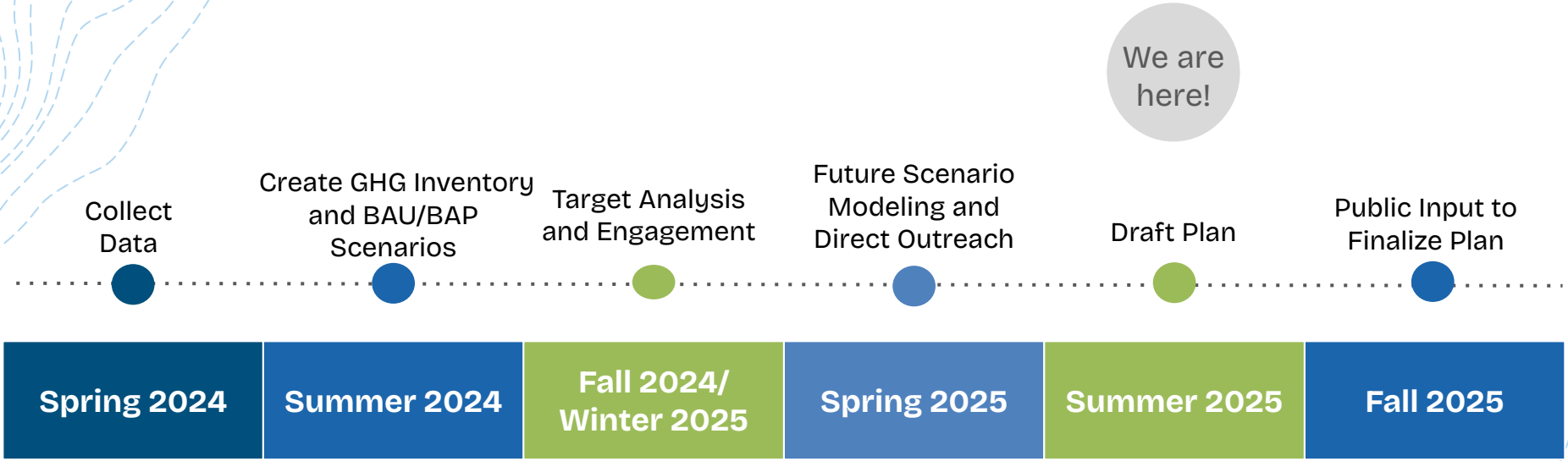
Leiandra R. Gaskill
Project Manager

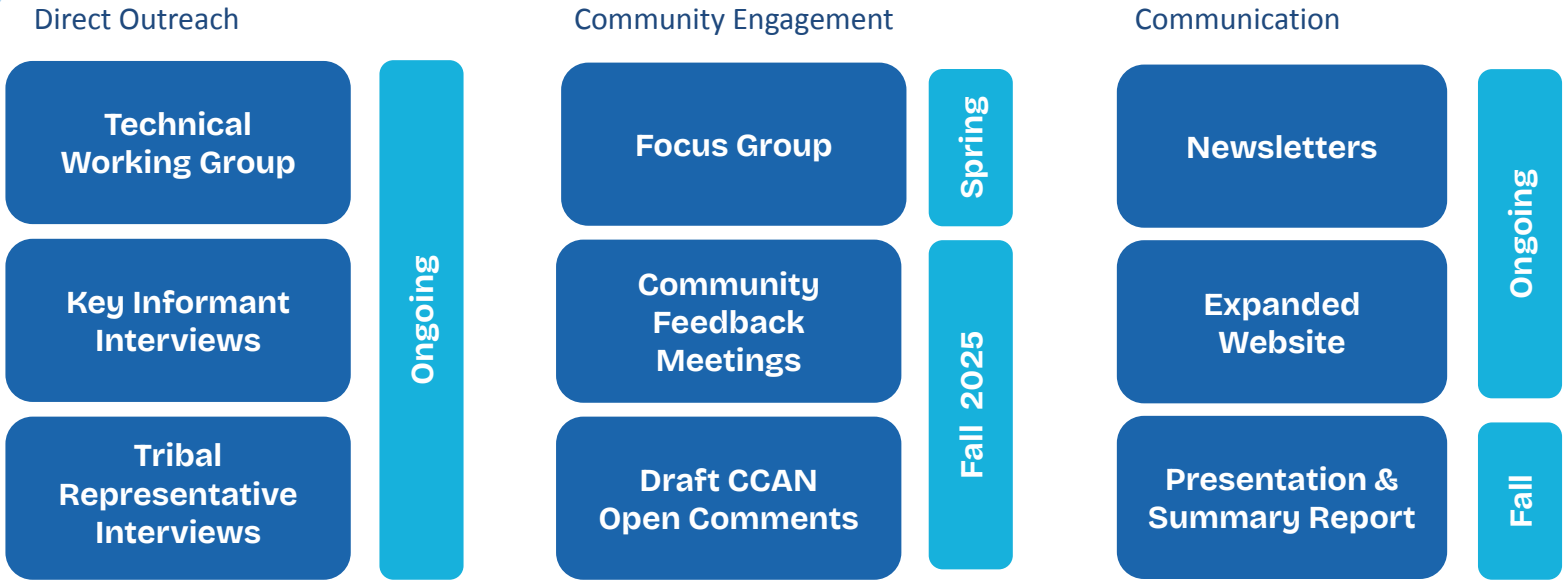
Our Team – Consultants

CCAN Purpose

Provide Nevadans with a key resource for making informed decisions about climate measures that may be helpful for them and their communities.

Process


We are here!
Collect Data
Create GHG Inventory and BAU/BAP Scenarios
Target Analysis and Engagement
Future Scenario Modeling and Direct Outreach
Draft Plan
Public Input to Finalize Plan
Spring 2024
Summer 2024
Fall 2024/ Winter 2025
Spring 2025
Summer 2025
Fall 2025

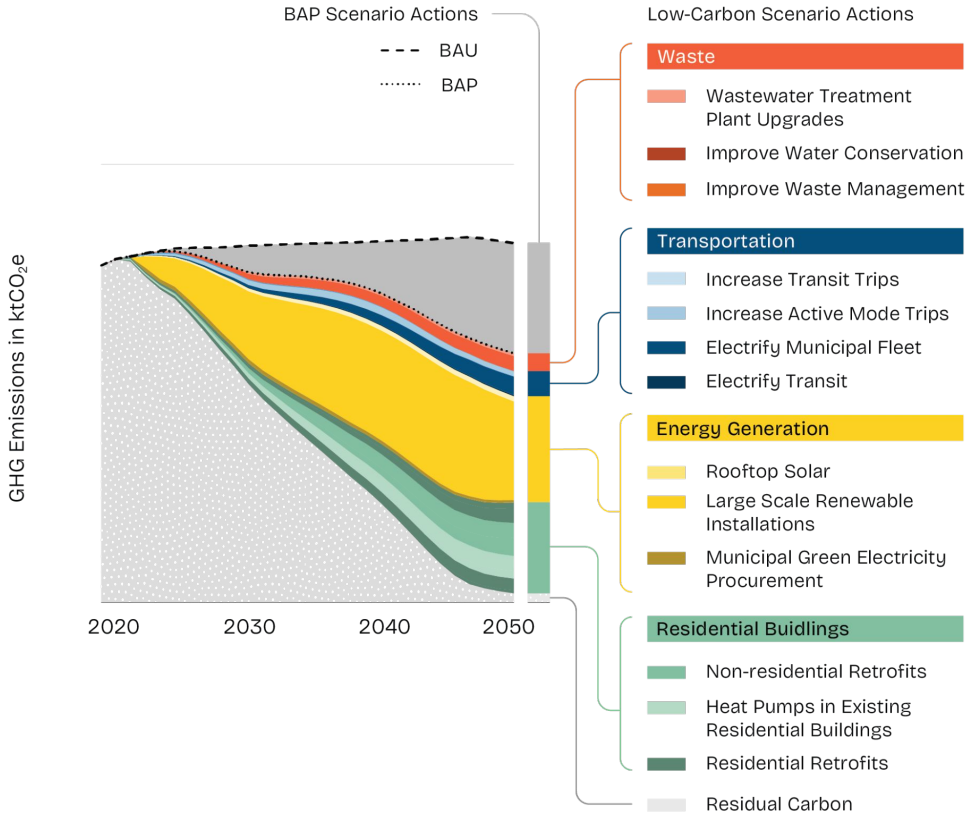

Direct Outreach
Technical Working Group
Key Informant Interviews
Tribal Representative Interviews
Ongoing
Community Engagement
Focus Group
Community Feedback Meetings
Draft CCAN Open Comments
Spring
Fall 2025
Communication
Newsletters
Expanded Website
Presentation & Summary Report
Ongoing
Fall

Process

Refresh on Future Scenarios

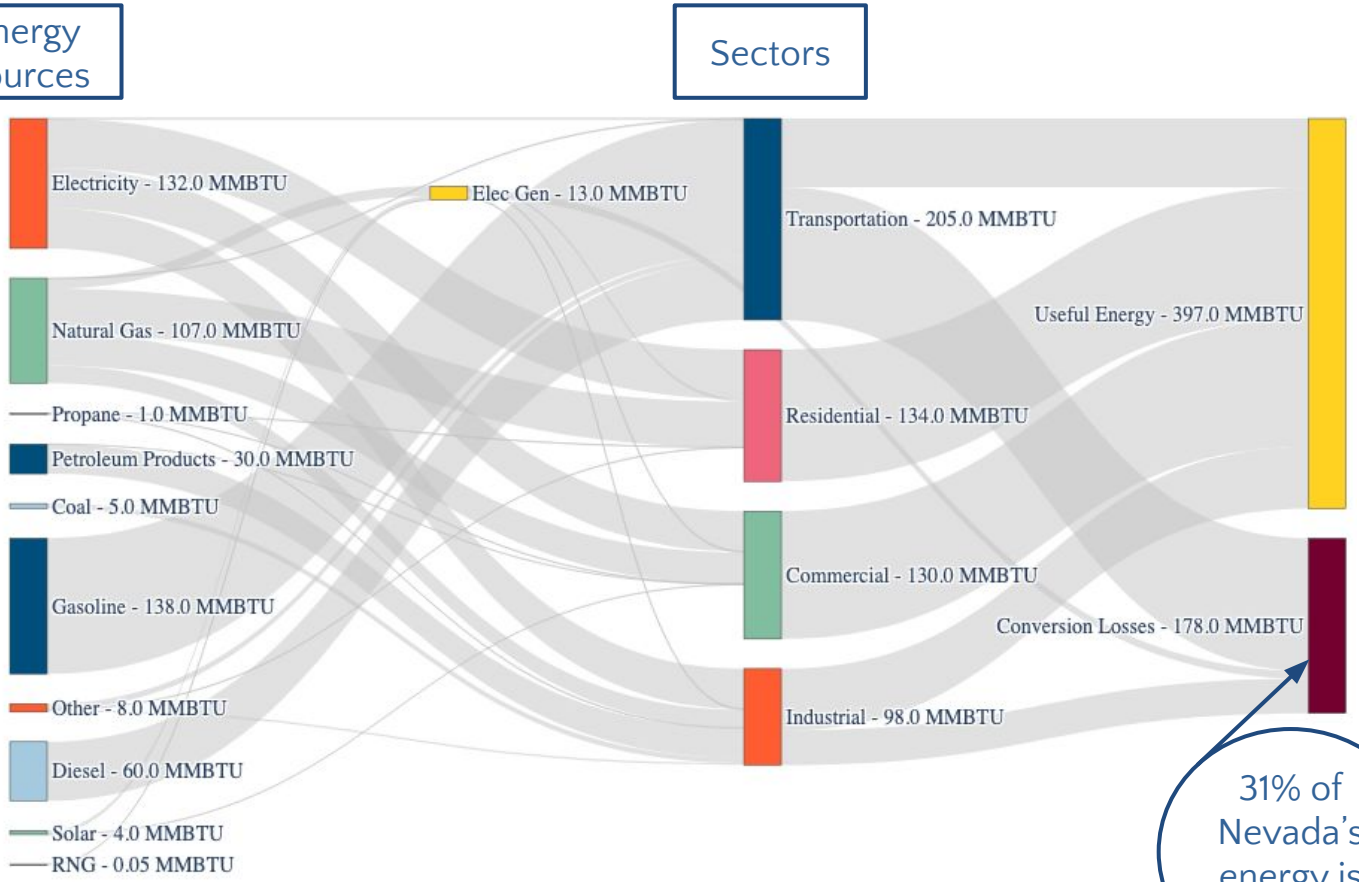
How To Build a Scenario

Colored wedges show the emission reduction potential of specific measures for each scenario.



Starting Point:

Nevada's Energy System (2021)



31% of Nevada's energy is lost

The Modeled Scenarios

What would happen if…?

Low Carbon (LC)

- Accelerated clean grid
- Ambitious retrofits and building performance
- Net zero building code
- Transition to ZEVs
- Decarbonize industry

Mixed Fuels (MF)

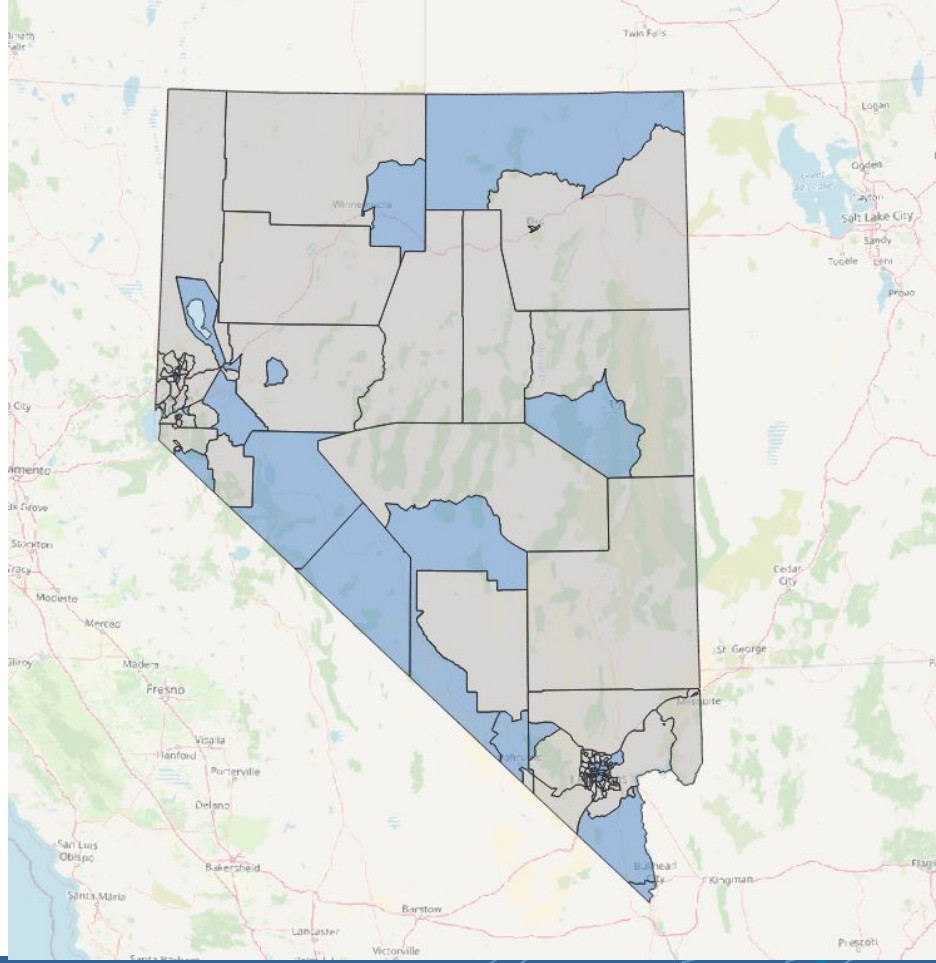
- Actions are more aligned with State's current goals
- Fossil fuels stay longer
- Transition is less aggressive
- More hydrogen and RNG are in the mix

Community-Driven (CD)

- Actions are focused on low-income and at-risk areas first
- Accelerate distributing benefits to more people
- Robust active and public transportation

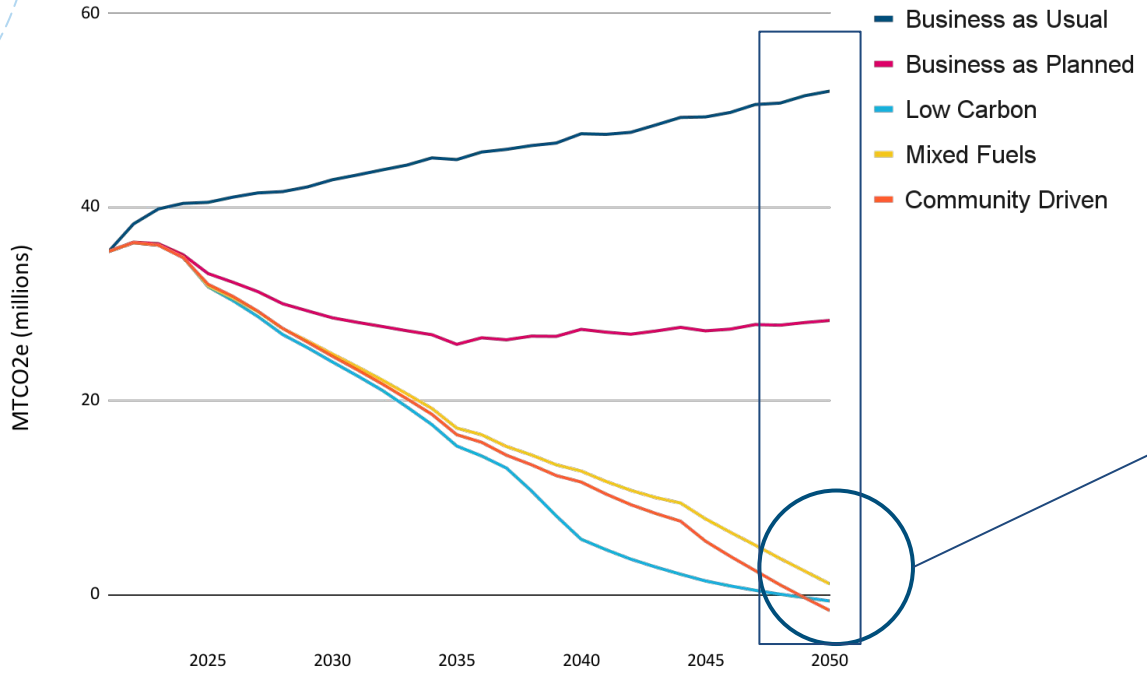
Low-Income Areas

In the Community Driven Scenario, actions are focused on prioritizing the most vulnerable and at-risk communities.



Scenario Comparison

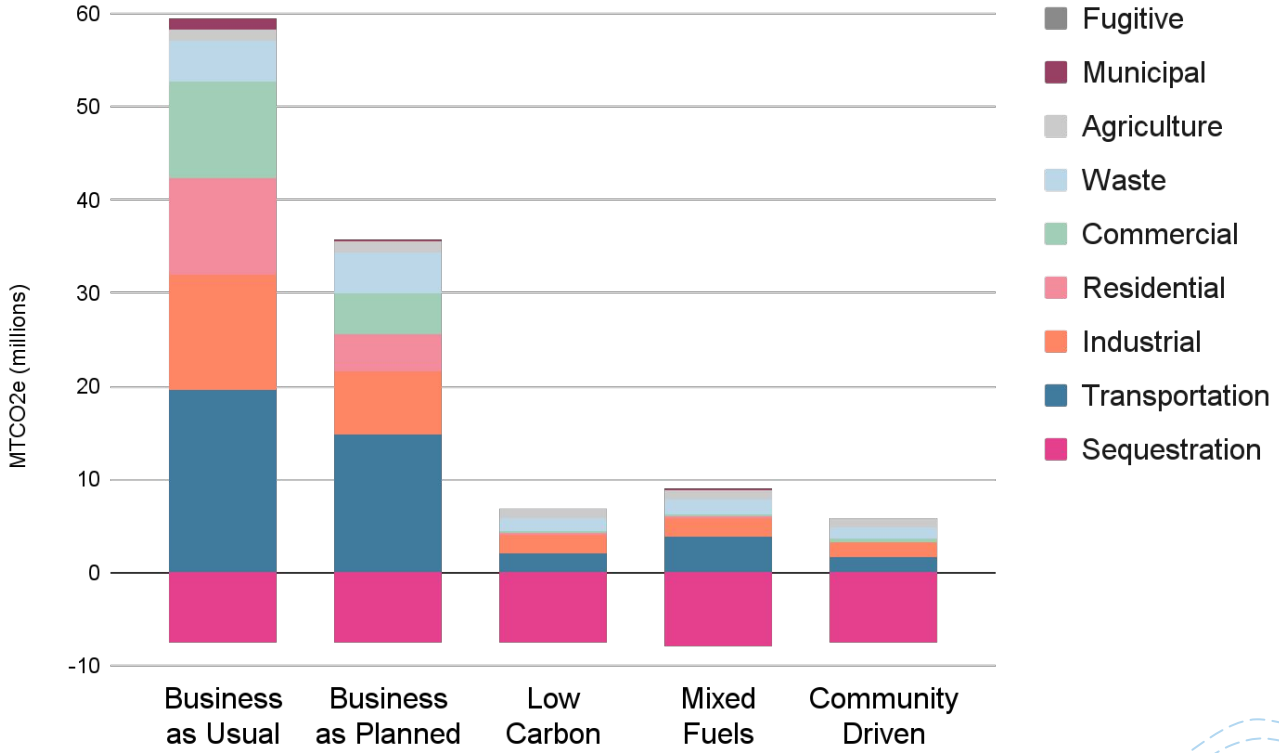
Total Net Emissions for Each Scenario



There are multiple pathways to zero emissions by 2050, or even earlier

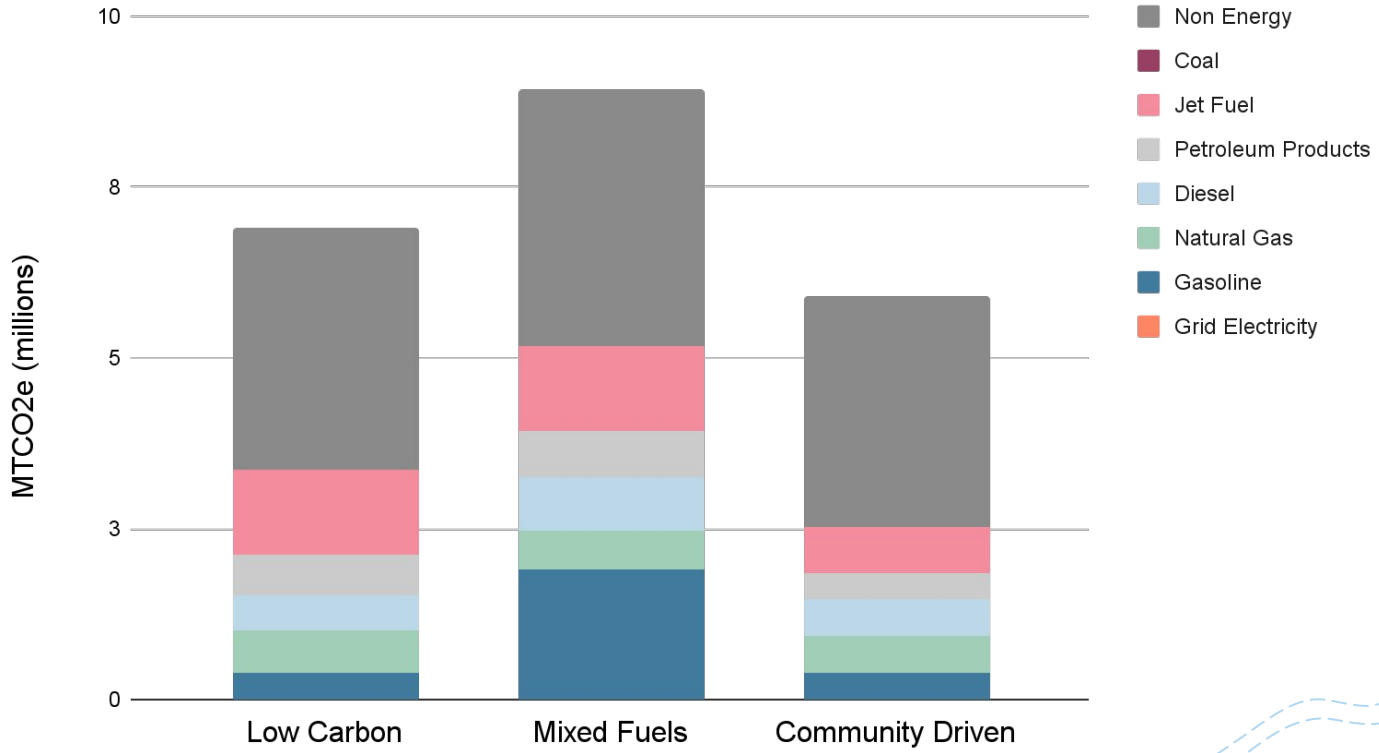
Scenario Comparison

Total Emissions for Each Scenario by Sector



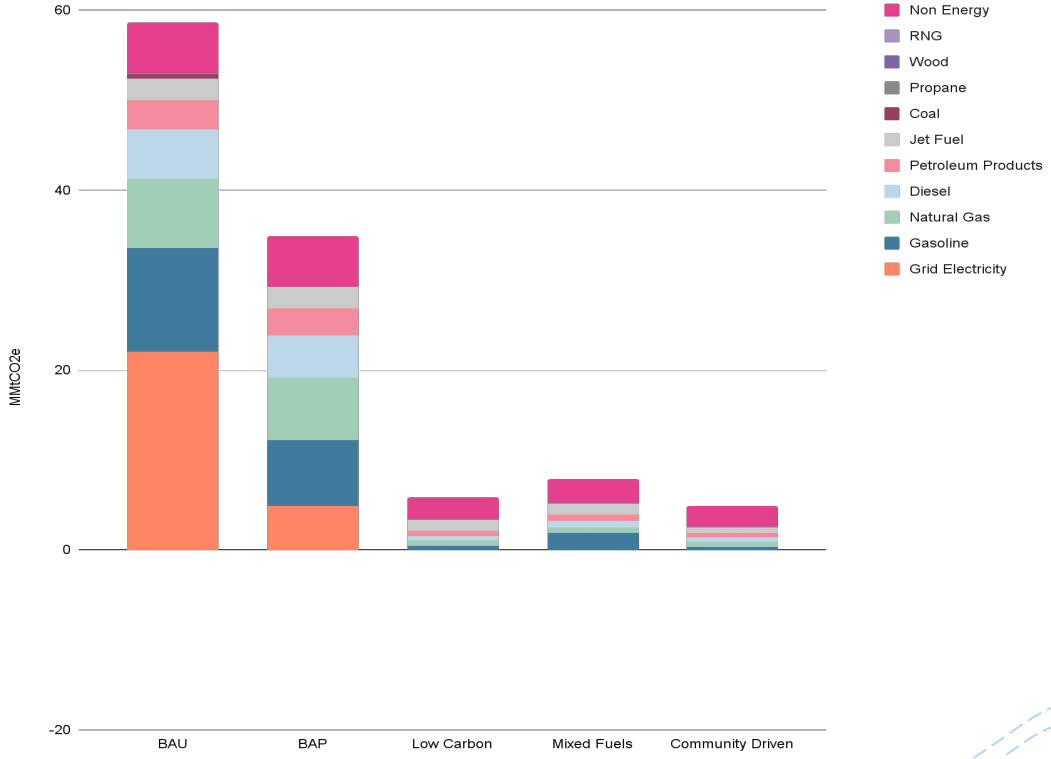
Scenario Comparison

Total Emissions for Each Scenario by Energy Source



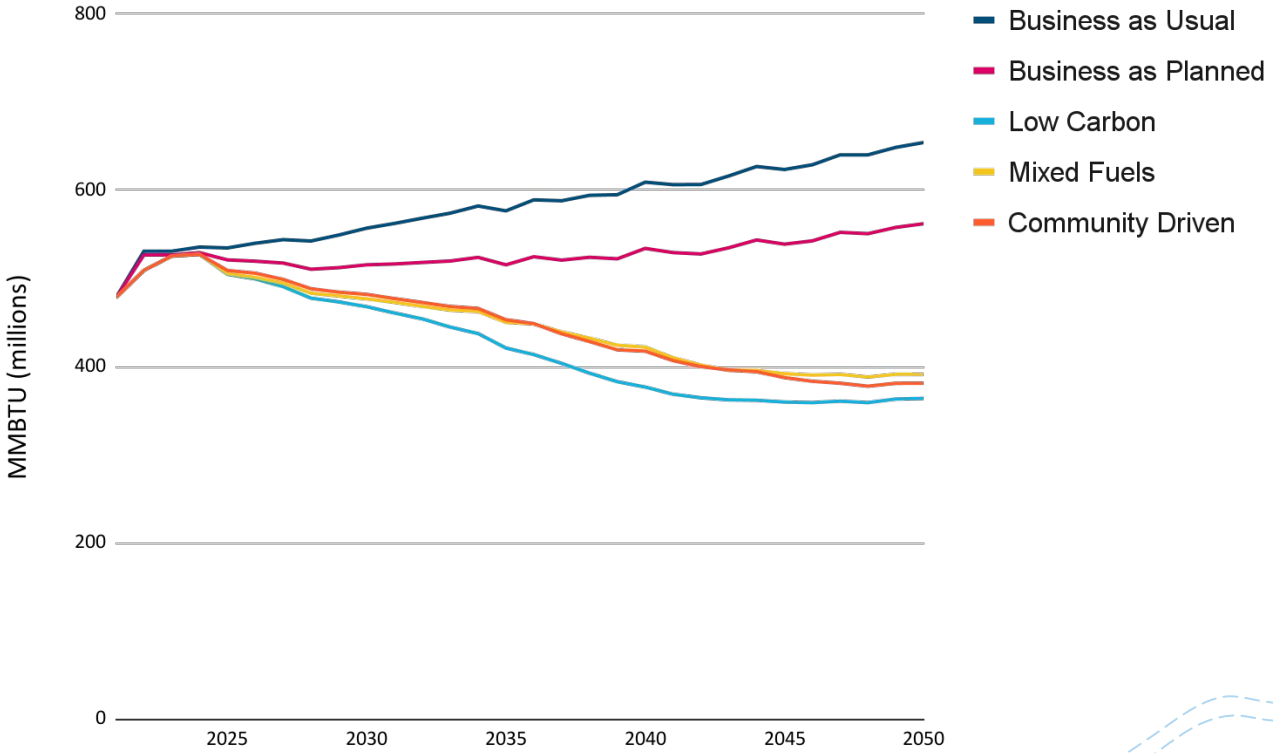
Scenario Comparison

Total Emissions for Each Scenario by Energy Source



Scenario Comparison

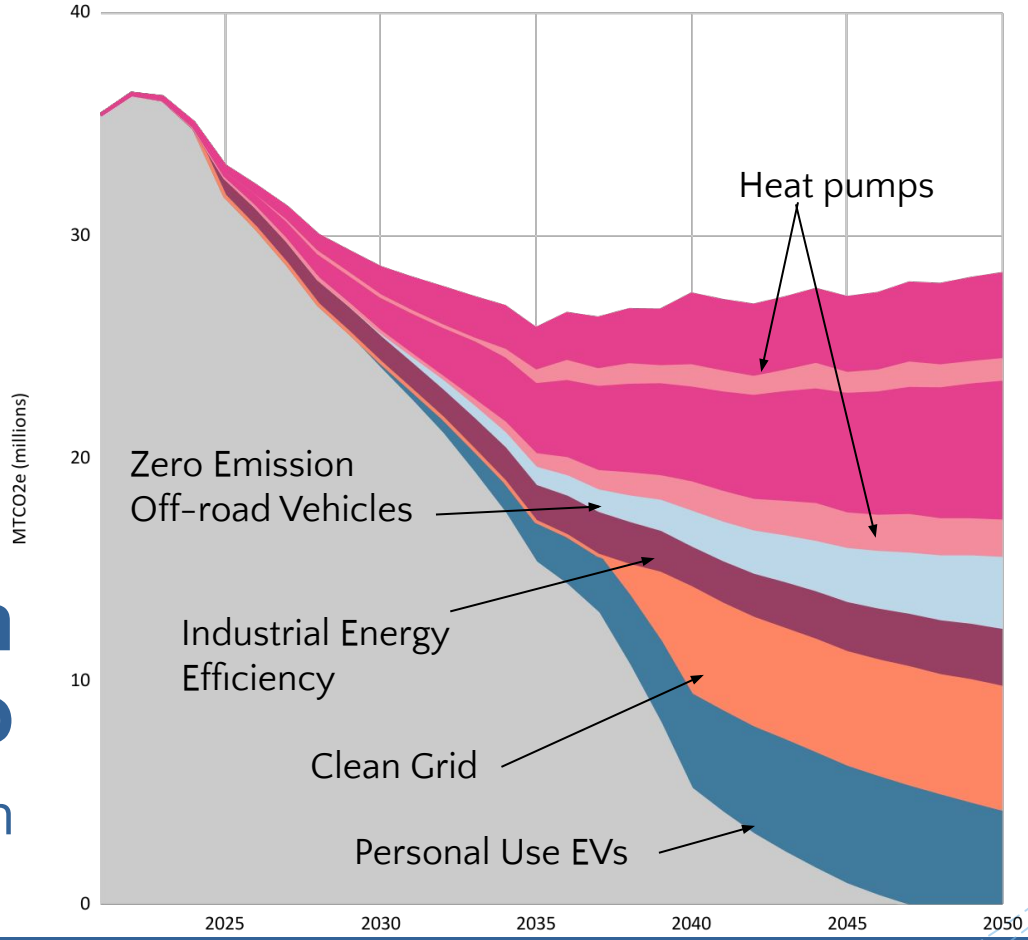
Total Energy Consumption for Each Scenario



How do we get there?

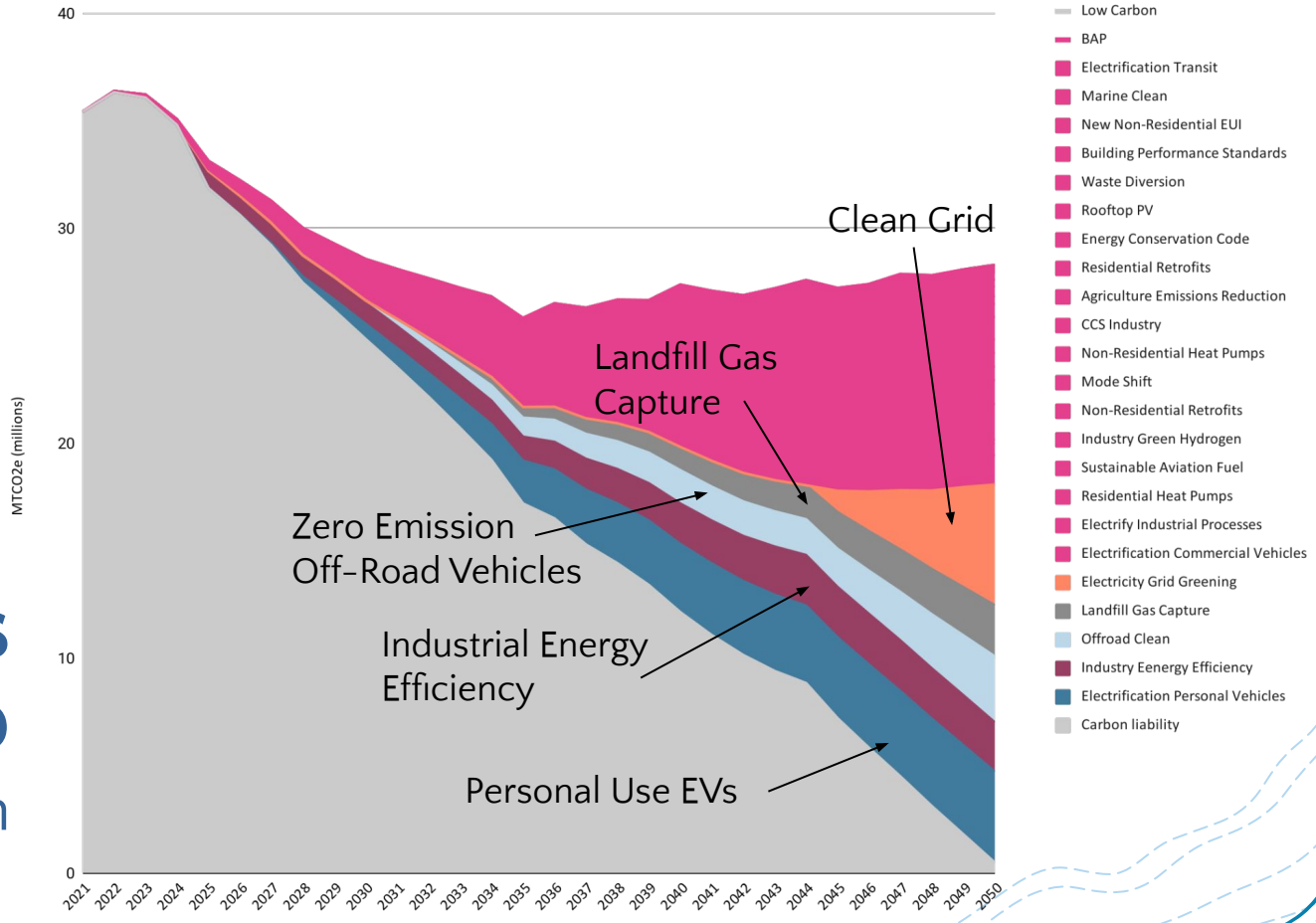
Low Carbon Scenario

Wedge Diagram



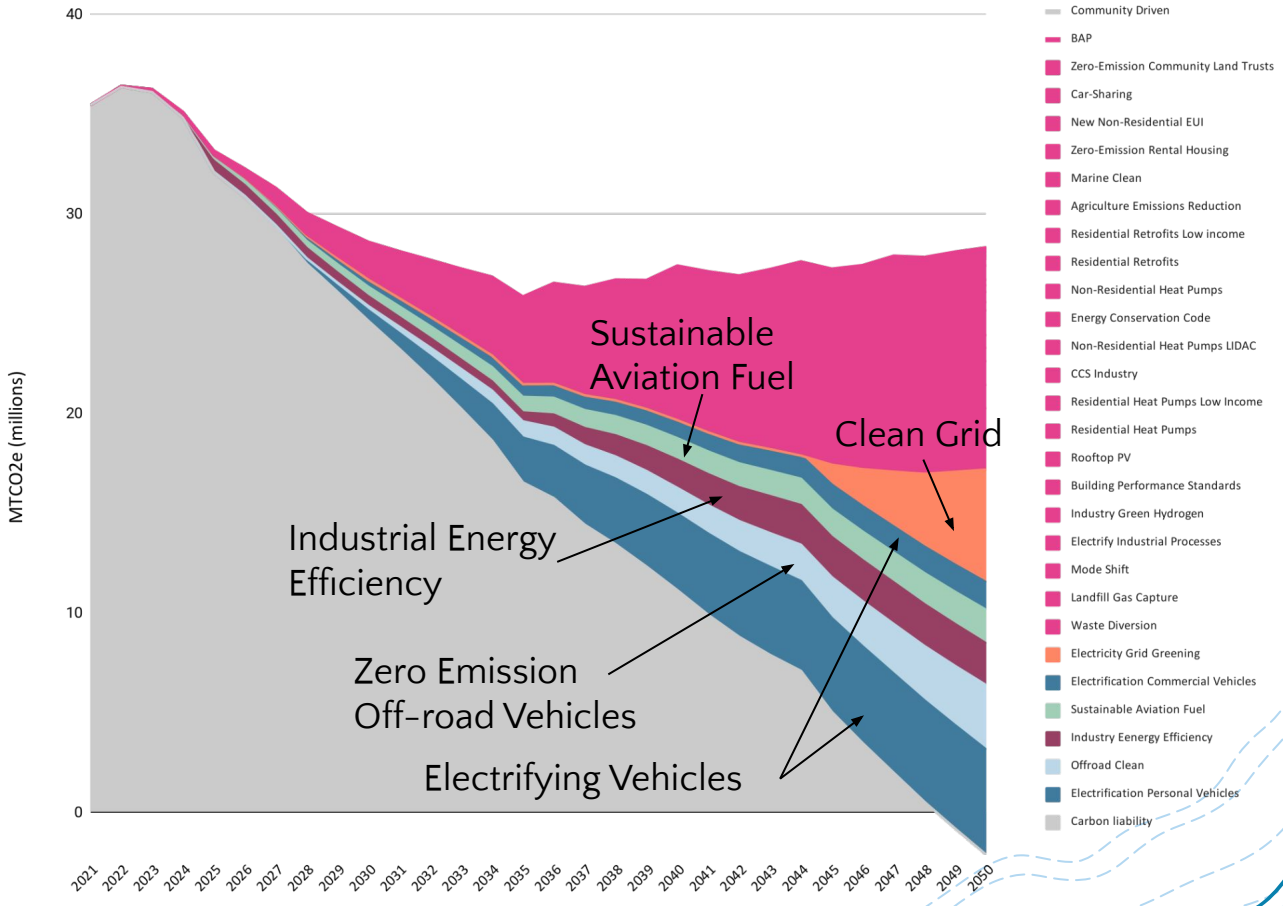
Mixed Fuels Scenario

Wedge Diagram



Community Driven Scenario

Wedge Diagram



How Financial Modeling Works

Concepts & Definitions

Financial Analysis

Net Present Value (NPV)

The net present value (NPV) of an investment is **the difference between the present value of the capital investment and the present value of the future stream of savings and revenue generated** by the investment.

A negative NPV means an investment is expected to generate more value than it costs.

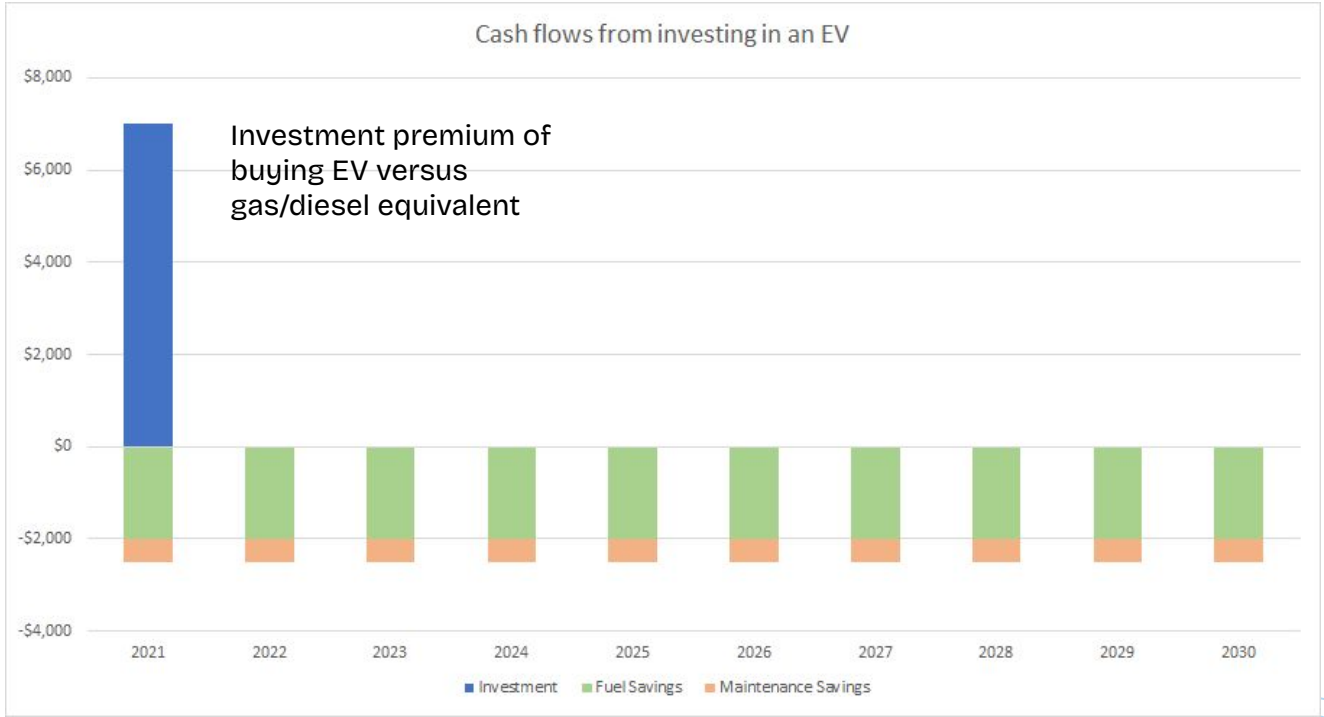
A positive NPV means that a project generates more costs than value.

Example Assumptions

1. Purchasing 1 EV vehicle costs $7,000 more than an Internal Combustion Engine equivalent vehicle in 2021.
2. Fuel savings from switching from gasoline to electricity are $2,000 per year.
3. Maintenance cost savings for switching to an EV are $500 a year.
4. Useful life for an EV is 10 years.

Cash Flow – Undiscounted

Electric Vehicles



t = 10 years

Concepts & Definitions

Financial Analysis

Discount Rate

The rate at which future costs and benefits are reduced in comparison to current costs and benefits, reflecting the value society places on benefits or costs in the future relative to benefits or costs today.

A higher discount rate means that future effects are much less significant than present effects.

A lower discount rate means that effects are closer to being equally significant.

The social discount rate applied in this analysis is 3%.

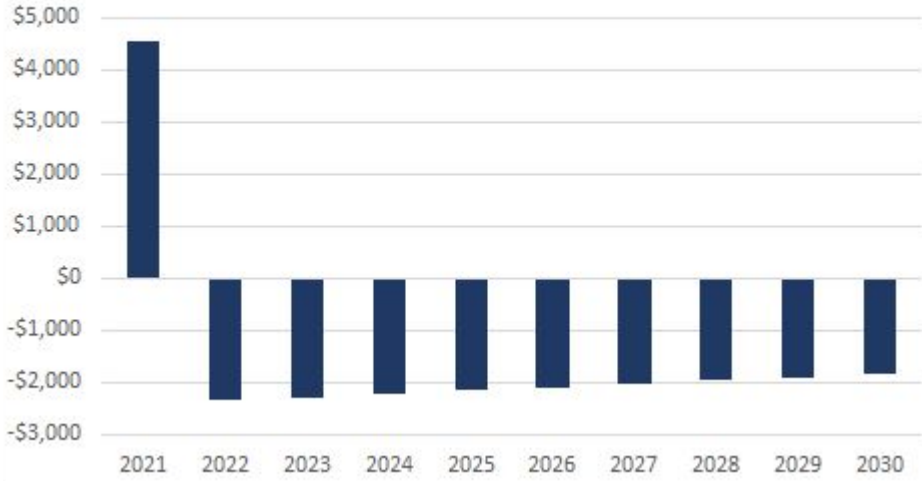
Cash Flow – Discounted

Net Present Value

Sum of all the years of discounted cash flows:

NPV = $14,326

A 5 year useful life instead of 10 would result in an NPV of $4,449.

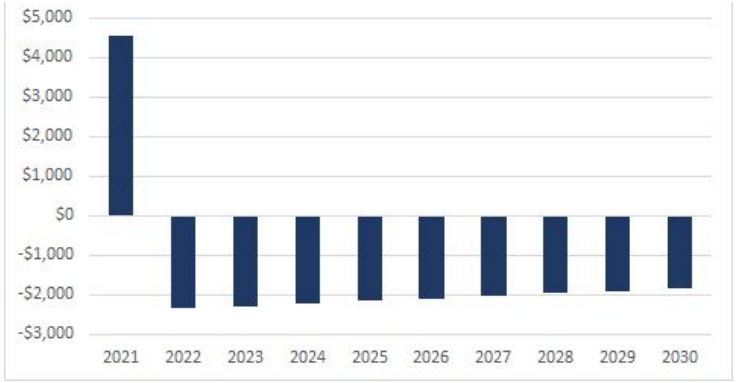


Cash Flow – Discounted

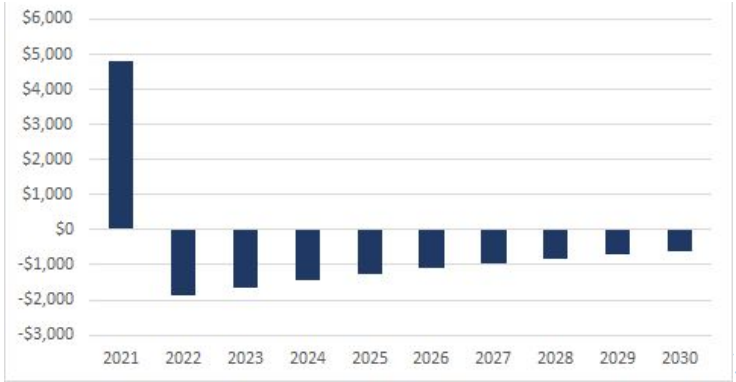
Net Present Value

Which has a higher discounting rate?

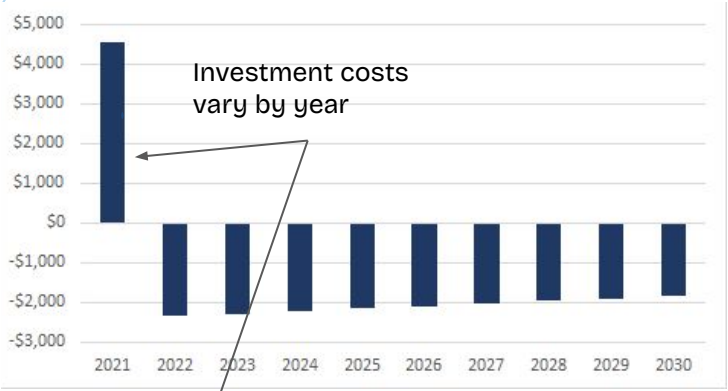
a

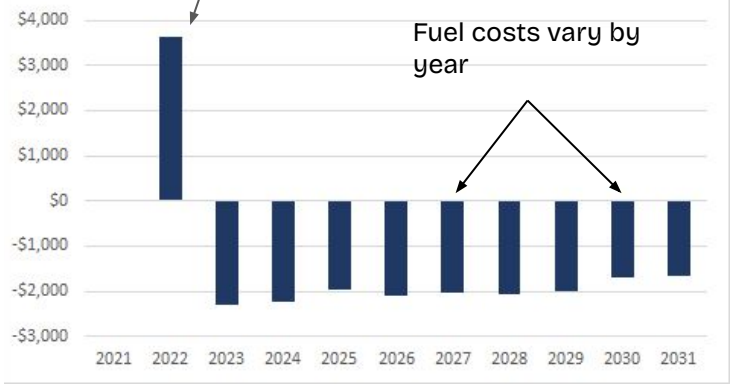


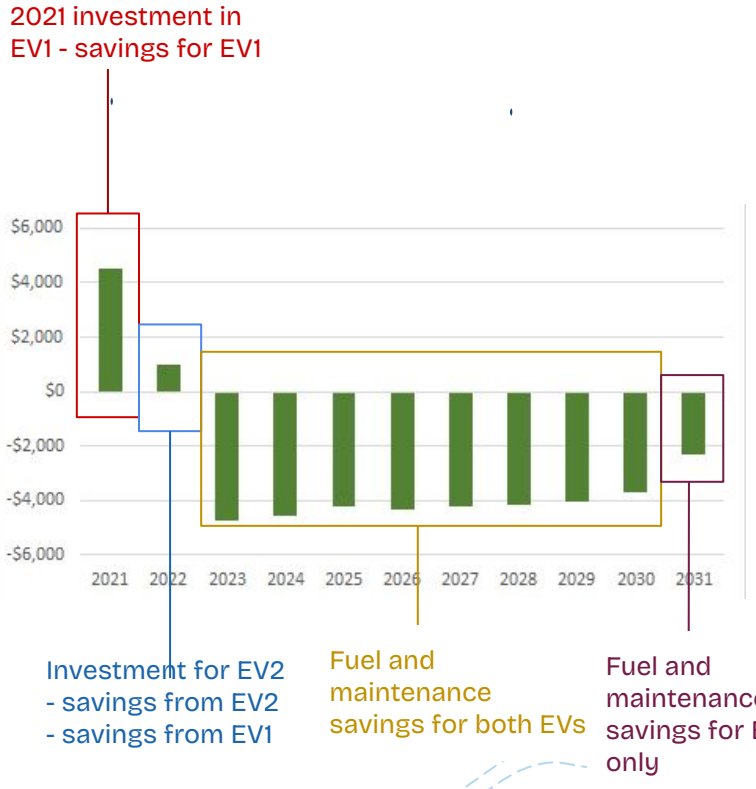
b



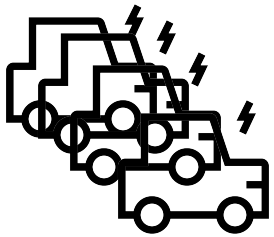
Cash Flow – Discounted







Cash Flow – Discounted



Discounting these cash flows at 3% results in a -$200M NPV over vehicle lifetime

Net Present Value

End of analysis year = 2030

Feedback

Questions or clarifications?

Net Annual Costs and Savings

Concepts & Definitions

Financial Analysis

All costs are relative to the Business-As-Planned (BAP) Scenario

The economic analysis tracks projected costs and savings associated with low-carbon measures above and beyond the costs in the BAP Scenario.

4 aggregated categories for financial performance of low-carbon measures:

1. Capital Expenditure
2. Energy Savings (or Costs)
3. Operation and Maintenance Savings (O&M)
4. Revenue Generation

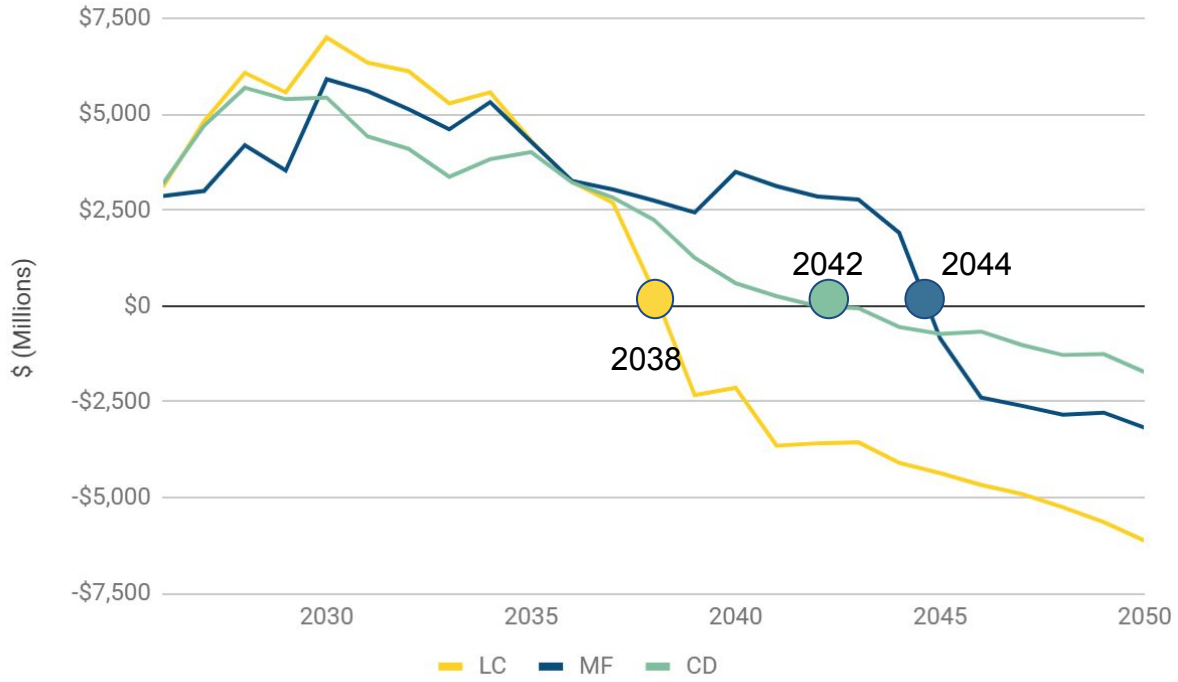
Net Annual Costs or Savings

- Low carbon pathways tend to be capital intensive early on, generating financial savings over the long run

- All three scenarios generate cost savings through
  - Reduced energy use
  - Lower operation and maintenance expenses
  - Decreased fuel costs

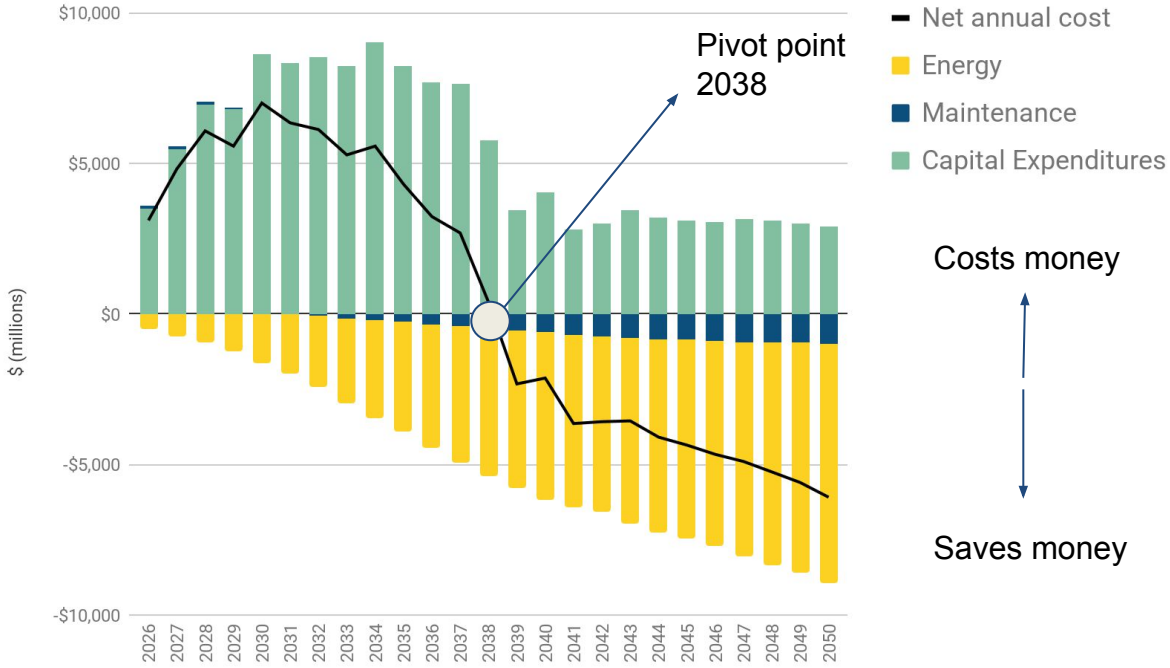
Net Annual Cost or Savings

Comparison of Low Carbon (LC) Mixed Fuels (MF) and Community Driven (CD) Scenarios



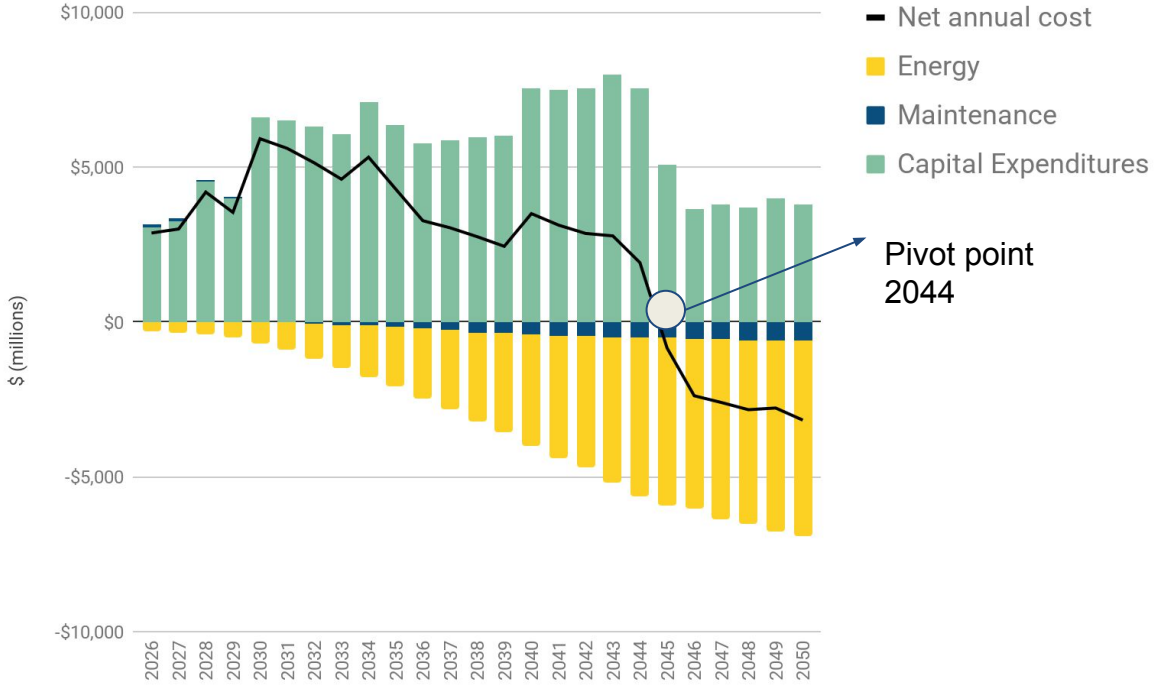
Net Annual Cost or Savings

Annual Investment and Savings in the LC Scenario (2026-2050)



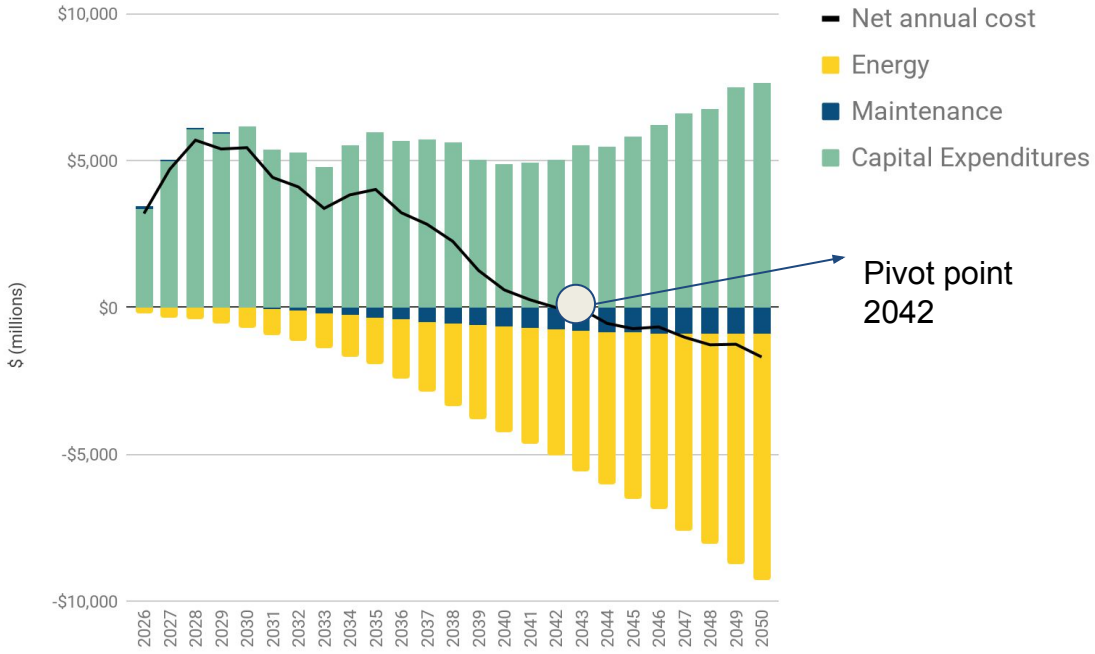
Net Annual Cost or Savings

Annual Investment and Savings in the MF Scenario (2026-2050)



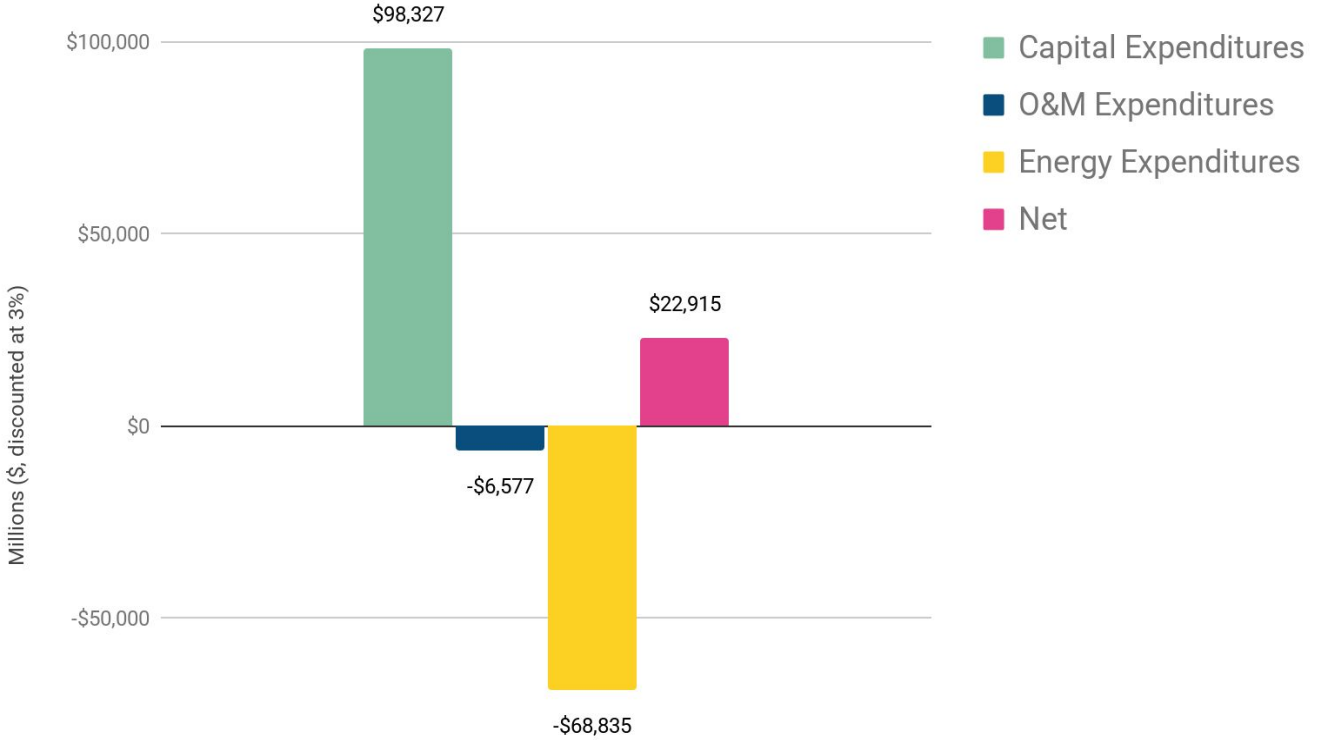
Net Annual Cost or Savings

Annual Investment and Savings in the CD Scenario (2026-2050)



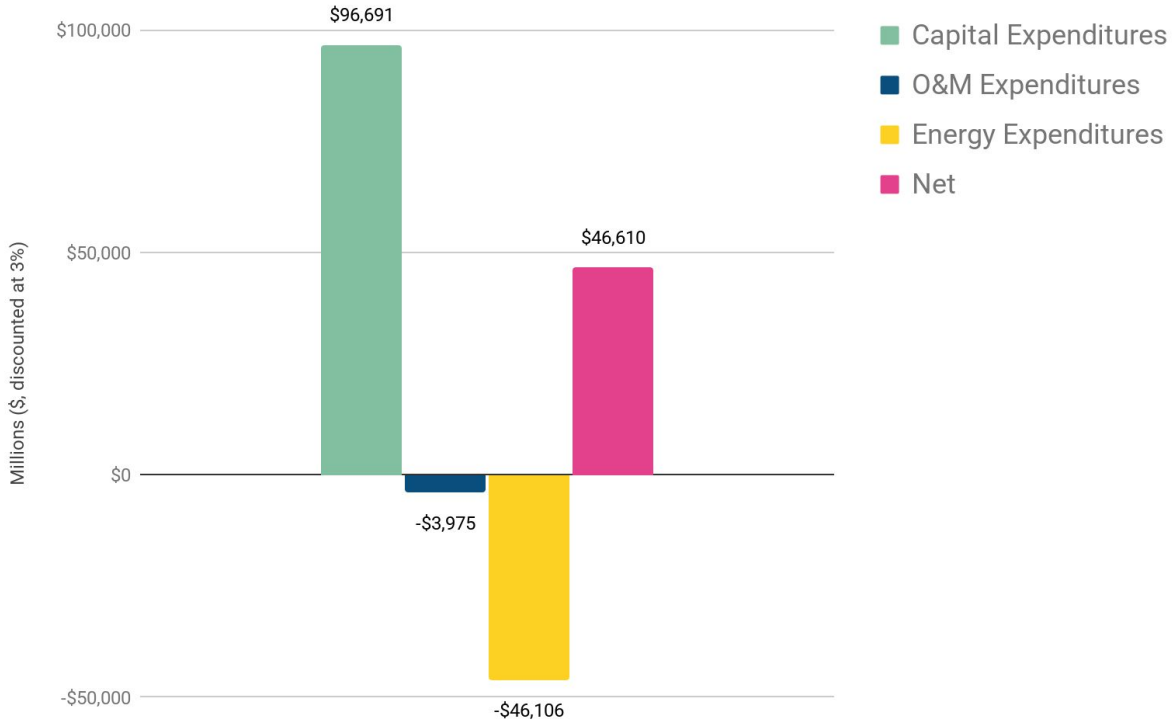
Cumulative Costs and Savings

Low Carbon Present Value (3% discounting rate, 2026–2050)



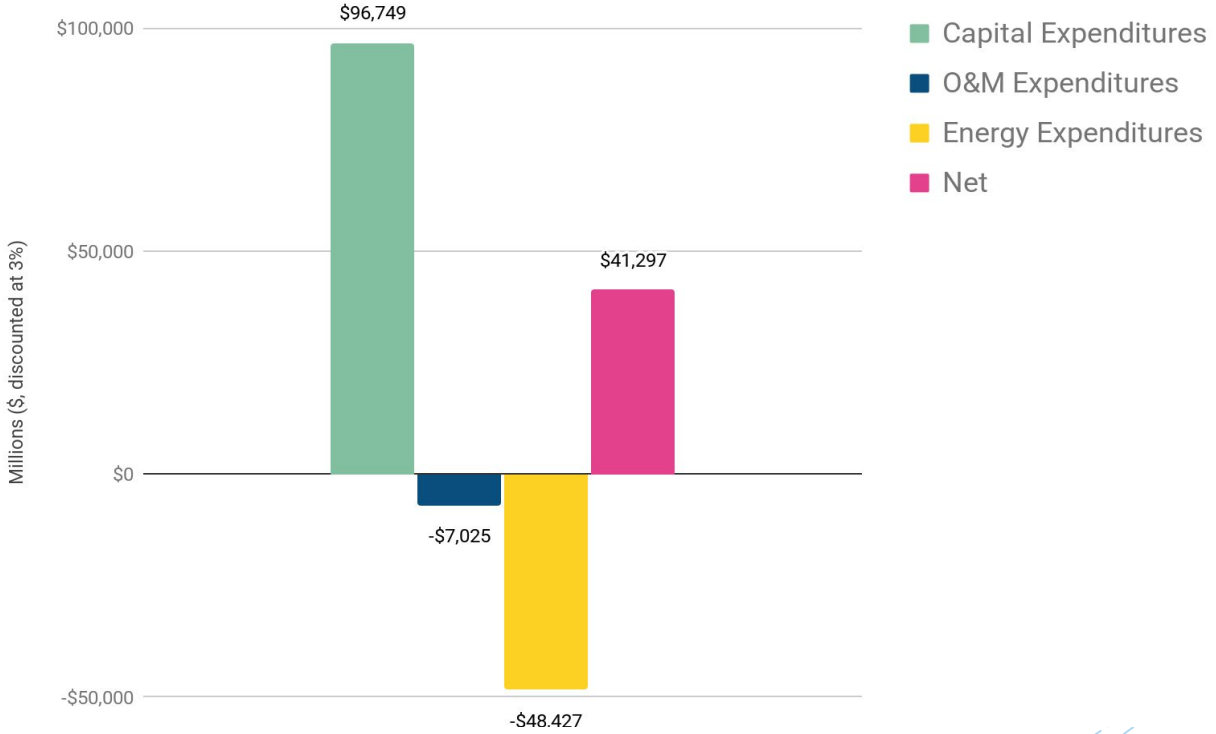
Cumulative Costs and Savings

Mixed Fuel Present Value (3% discounting rate, 2026–2050)



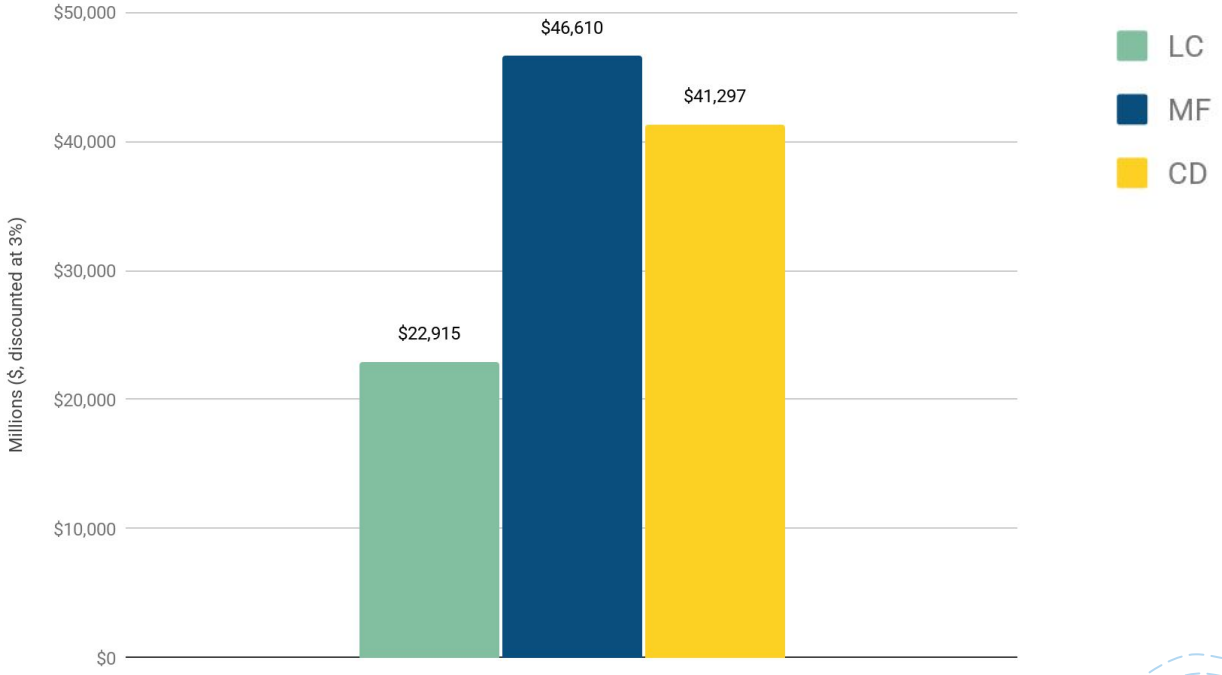
Cumulative Costs and Savings

Community Drive Present Value (3% discounting rate, 2026–2050)



Cumulative Costs and Savings

Low Carbon Present Value (3% discounting rate, 2026–2050)



Findings

1. All three scenarios result in net economic benefits

2. Capital investments are nearly the same in each scenario at $100 billion over 25 years.

3. The LC scenario delivers nearly 2 times more economic benefits than the other 2 scenarios.

Feedback

What do these findings tell you about the financial case for climate action?

Social Cost of Carbon

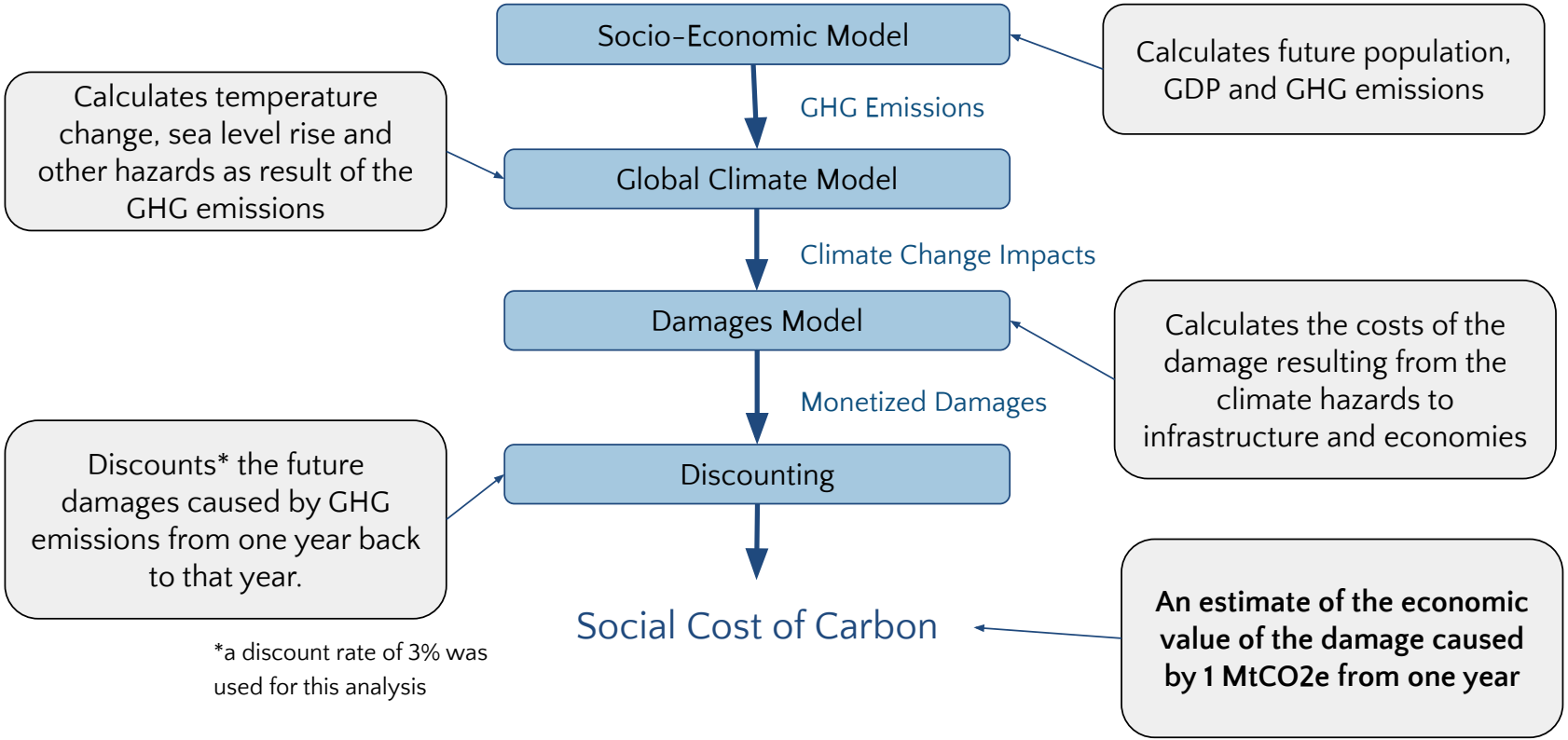
Concepts & Definitions

Financial Analysis

Social Cost of Carbon (SCC)

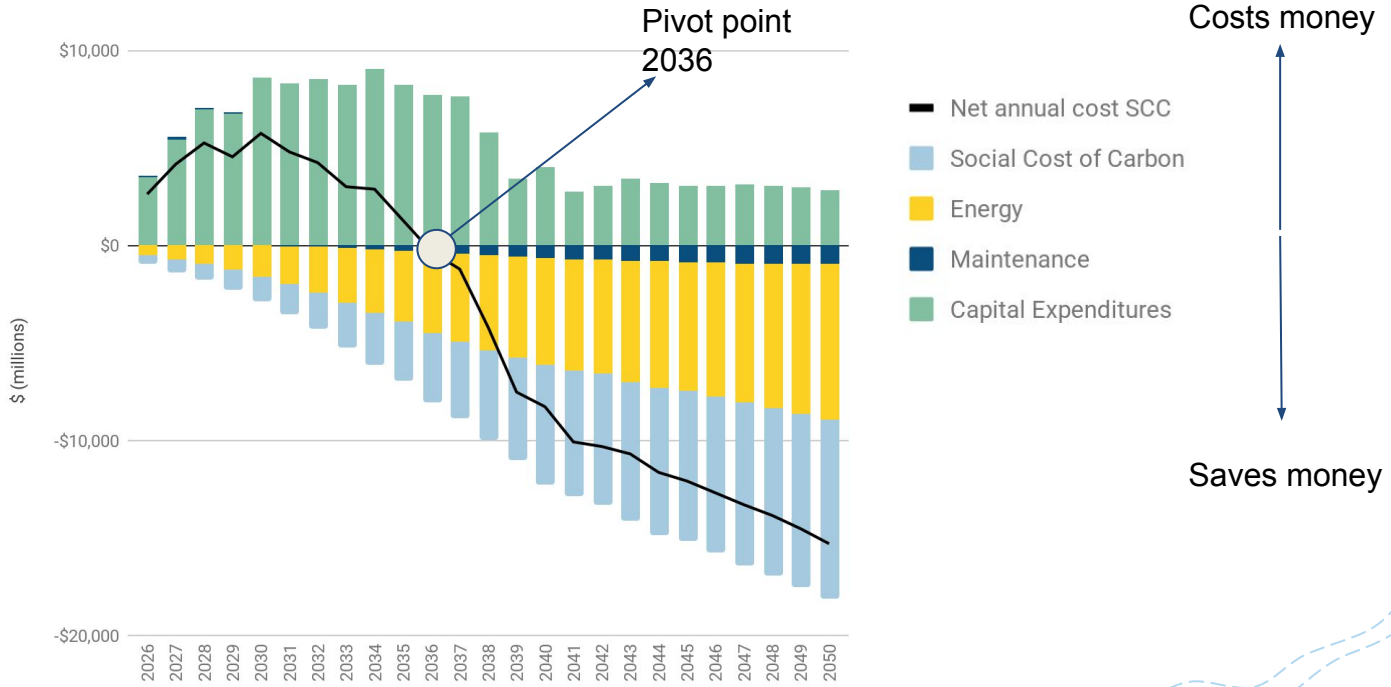
- Used to **quantify the dollar value of the scenario's impact on climate change** due to changes in GHG emissions
- Puts **a dollar value on the long-term damage from climate change:** health impacts, property damage, agricultural losses, and ecosystem decline
- Benefit-cost analysis that **compares the economic benefits** with **the economic costs** of proposed measures
- Allows us to reflect **the long-term societal benefits of avoided costs,** which often turns community investments into net savings
- Calculated using **3 different models** (Socio-Economic, Global Climate, Damages)

Social Cost of Carbon



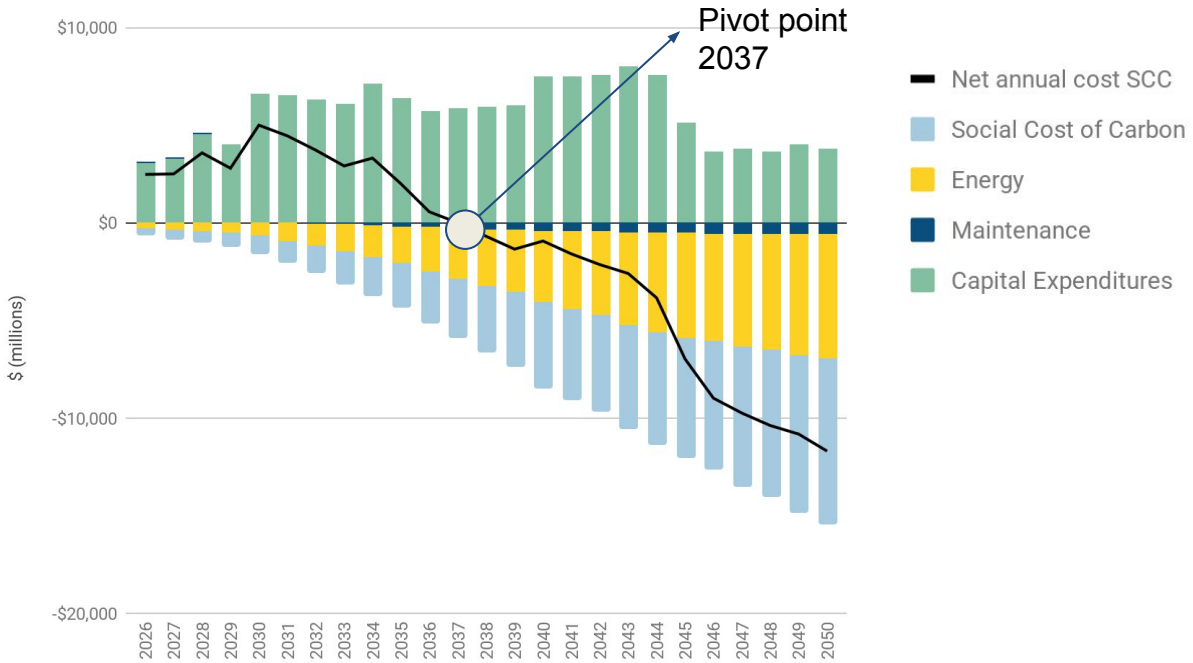
Net Annual Cost or Savings

Annual Investment and Savings in the LC Scenario with SCC (2026-2050)



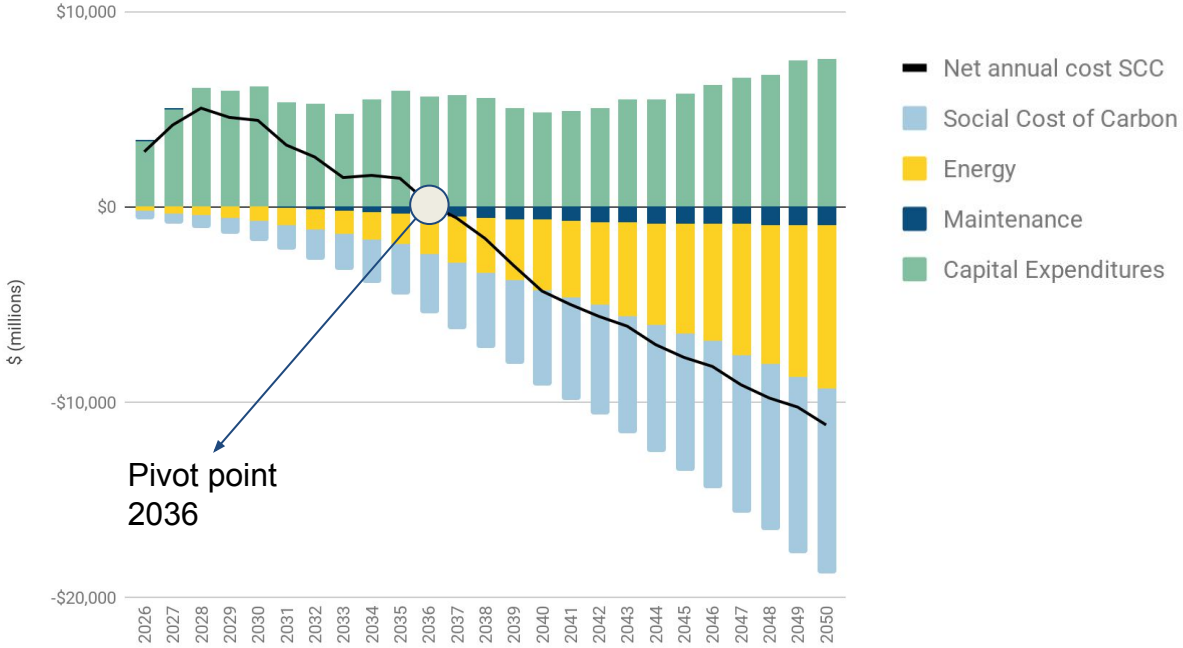
Net Annual Cost or Savings

Annual Investment and Savings in the MF Scenario with SCC (2026-2050)



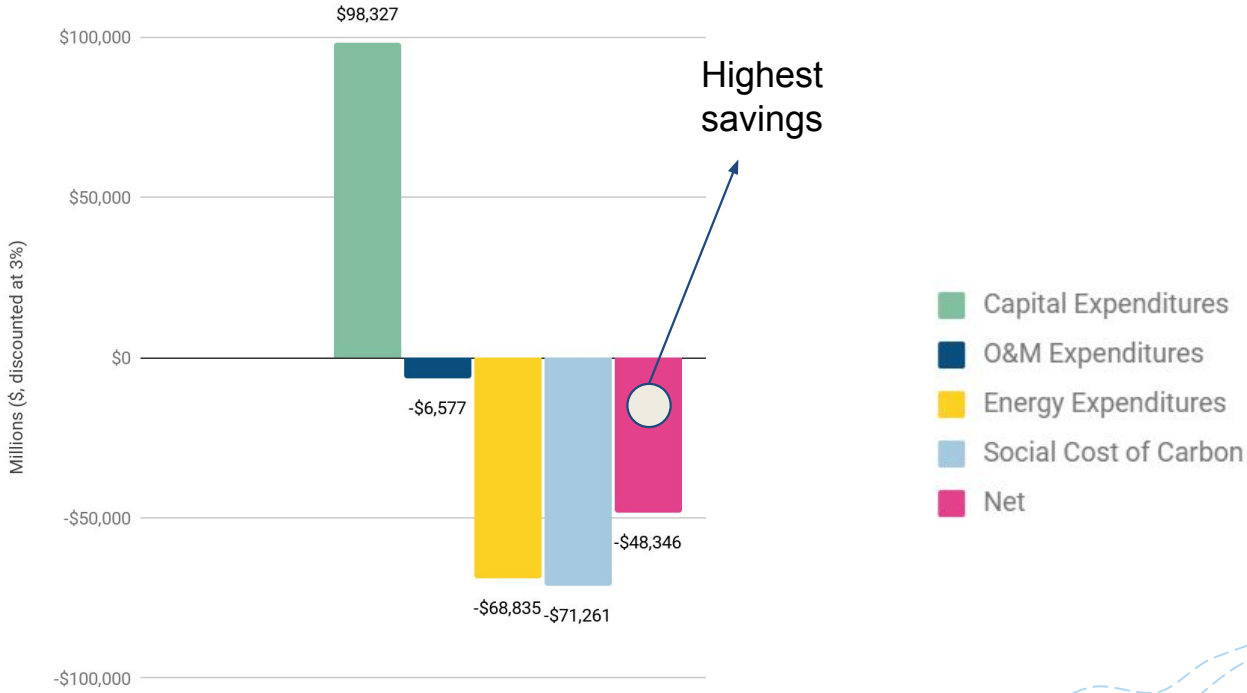
Net Annual Cost or Savings

Annual Investment and Savings in the CD Scenario with SCC (2026-2050)



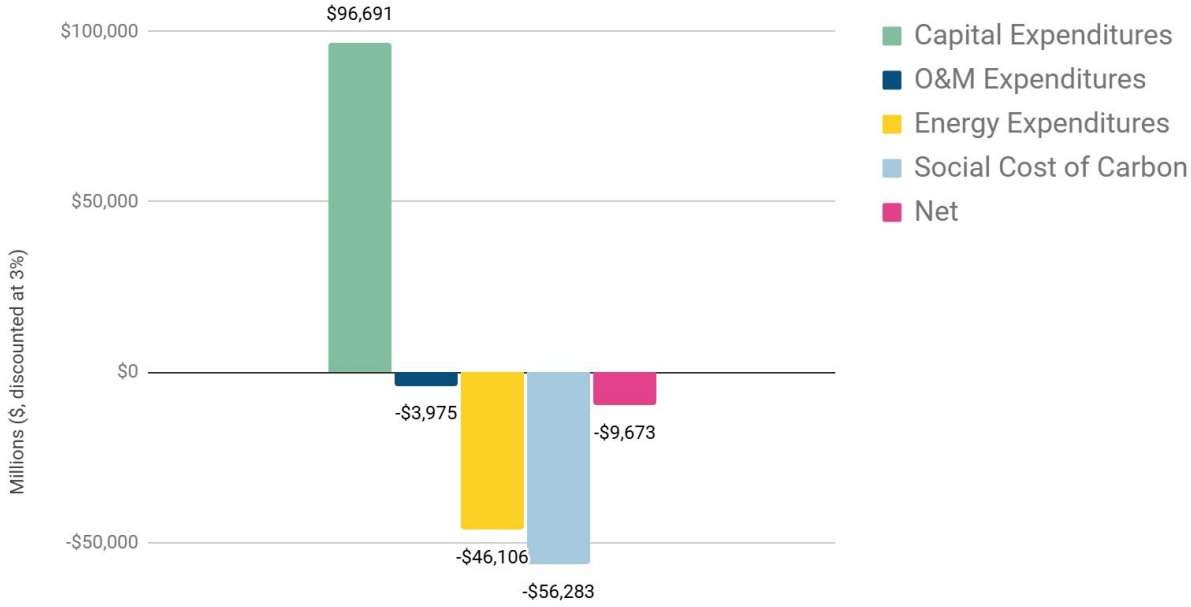
Cumulative Costs and Savings

Low Carbon Present Value with SCC (3% discounting rate, 2026-2050)



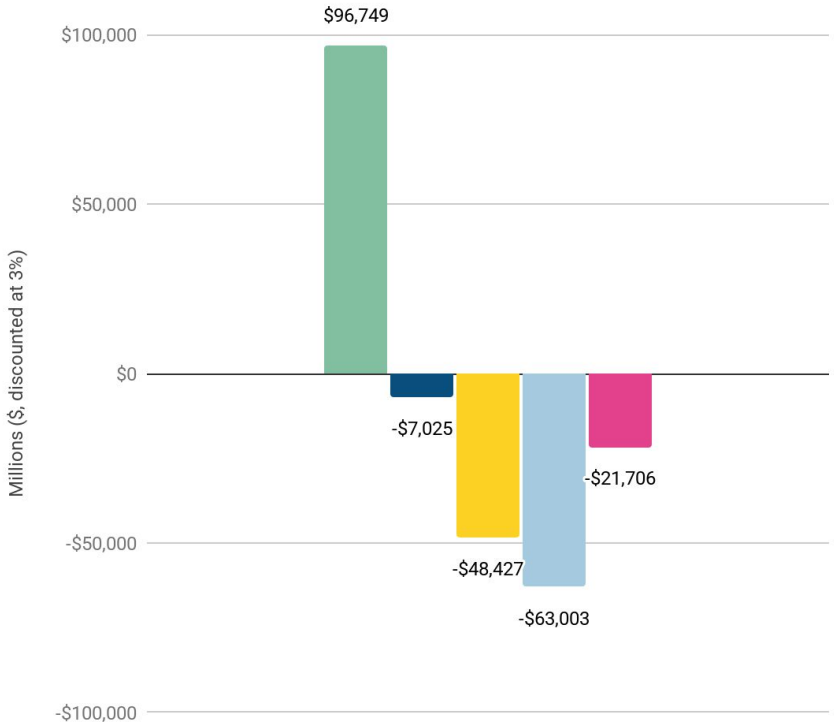
Cumulative Costs and Savings

Mixed Fuel Present Value with SCC (3% discounting rate, 2026-2050)



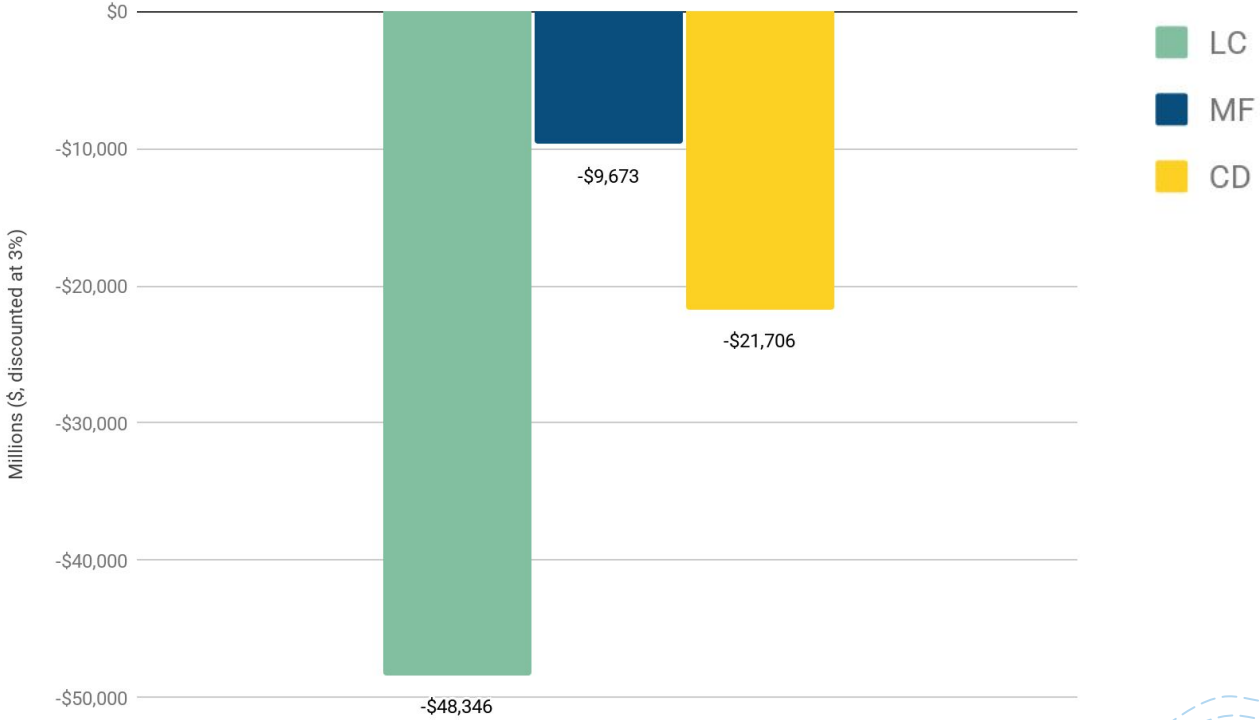
Cumulative Costs and Savings

Community Drive Present Value with SCC (3% discounting rate, 2026–2050)



Cumulative Costs and Savings

Low Carbon Present Value with SCC (3% discounting rate, 2026-2050)



Feedback

Do you think the social cost of carbon influences the financial case for emission reduction? Why or why not?

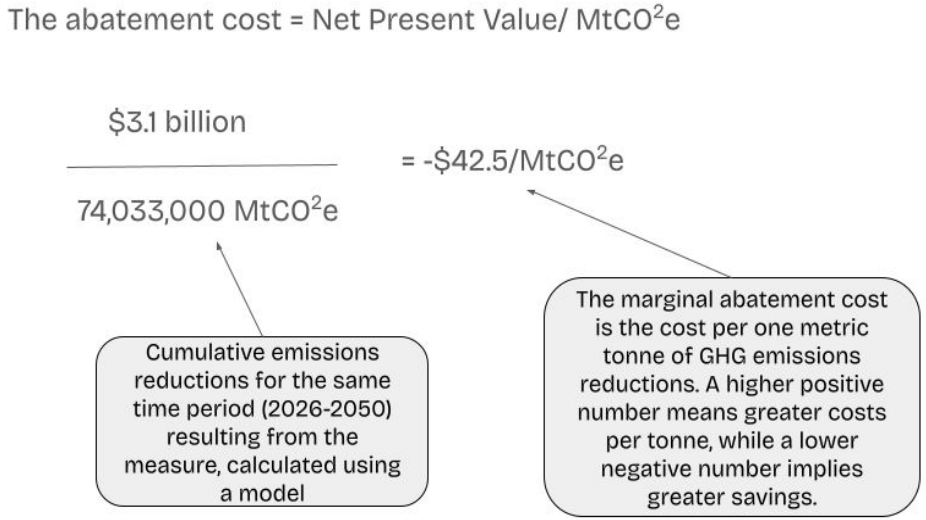
Abatement Cost

Concepts & Definitions

Financial Analysis

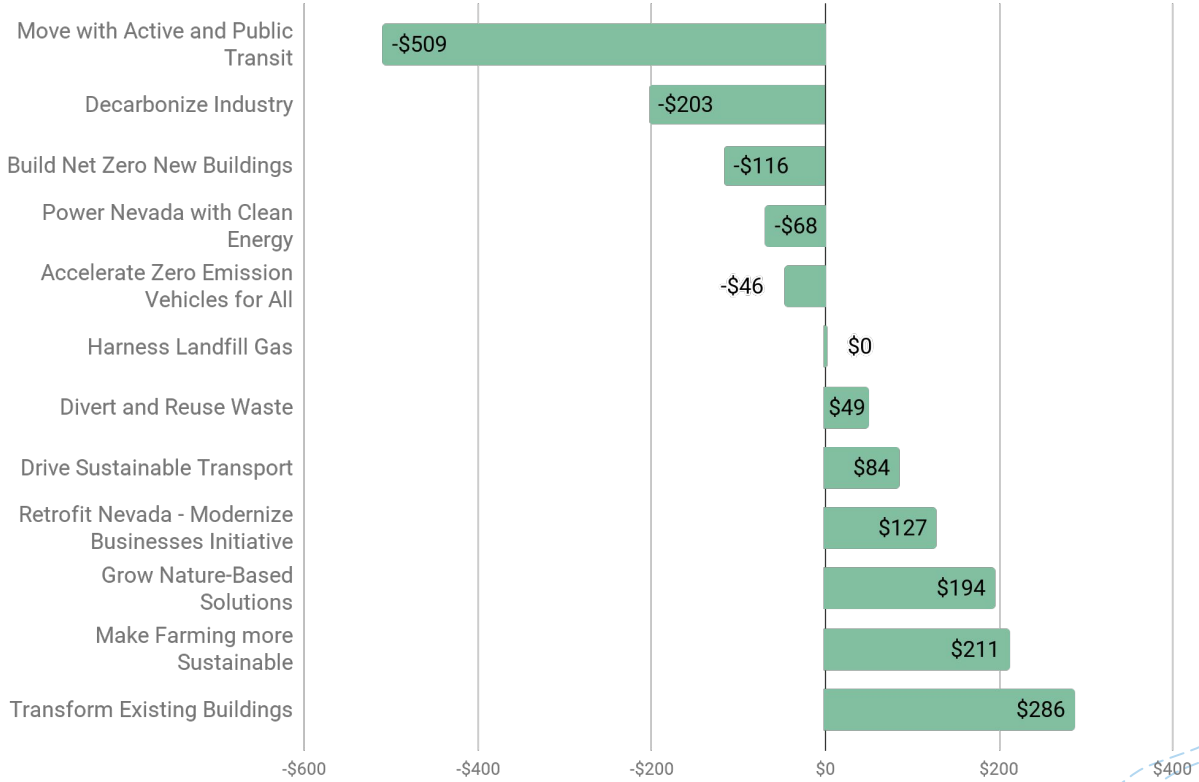
Abatement Cost

The abatement cost of an action is **the estimated cost for that action to reduce one metric ton of GHG emissions**, calculated by dividing the action's NPV the total GHG emissions reductions (tCO2e) resulting from the action.



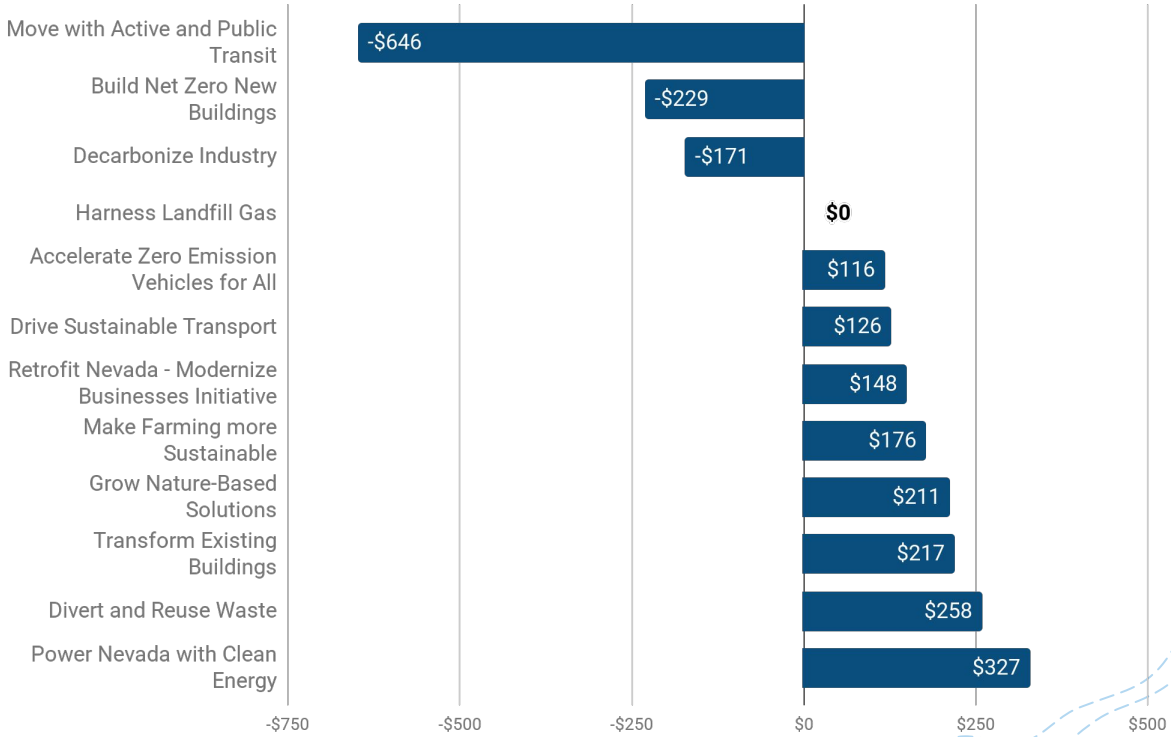
Abatement Cost

$/tCO2e reduced for each LC Measure



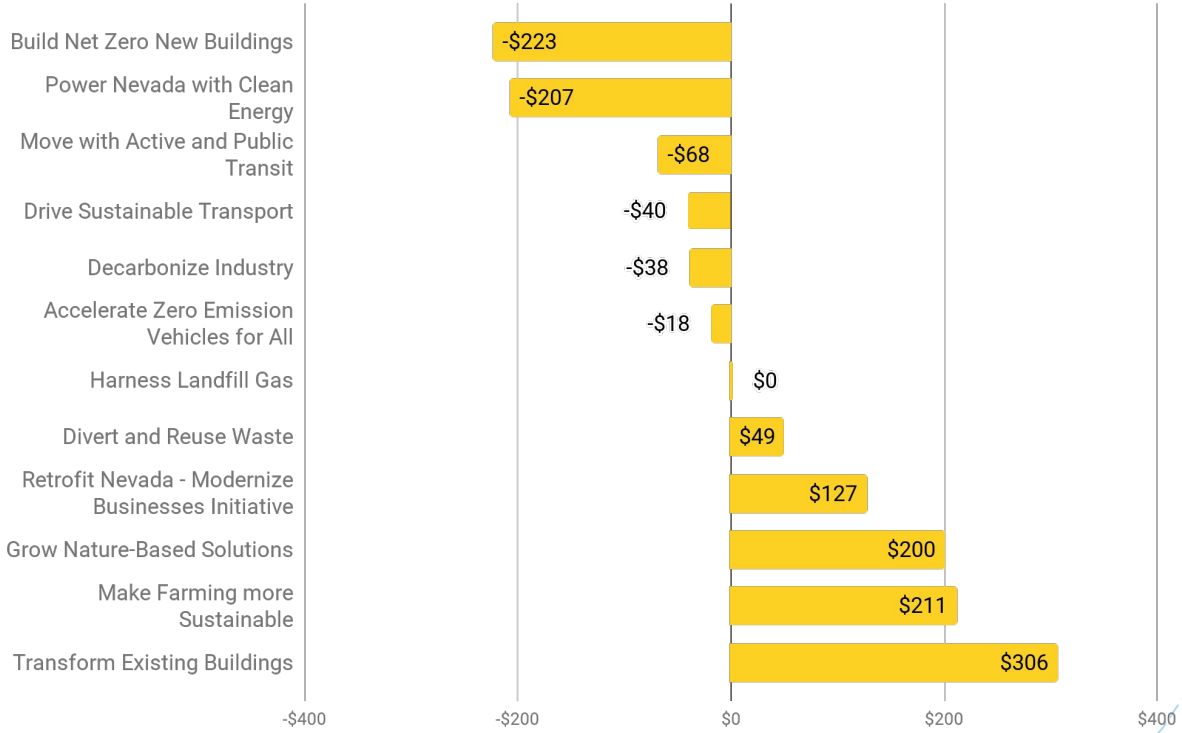
Abatement Cost

$/tCO2e reduced for each MF Measure



Abatement Cost

$/tCO2e reduced for each CD Measure



Feedback

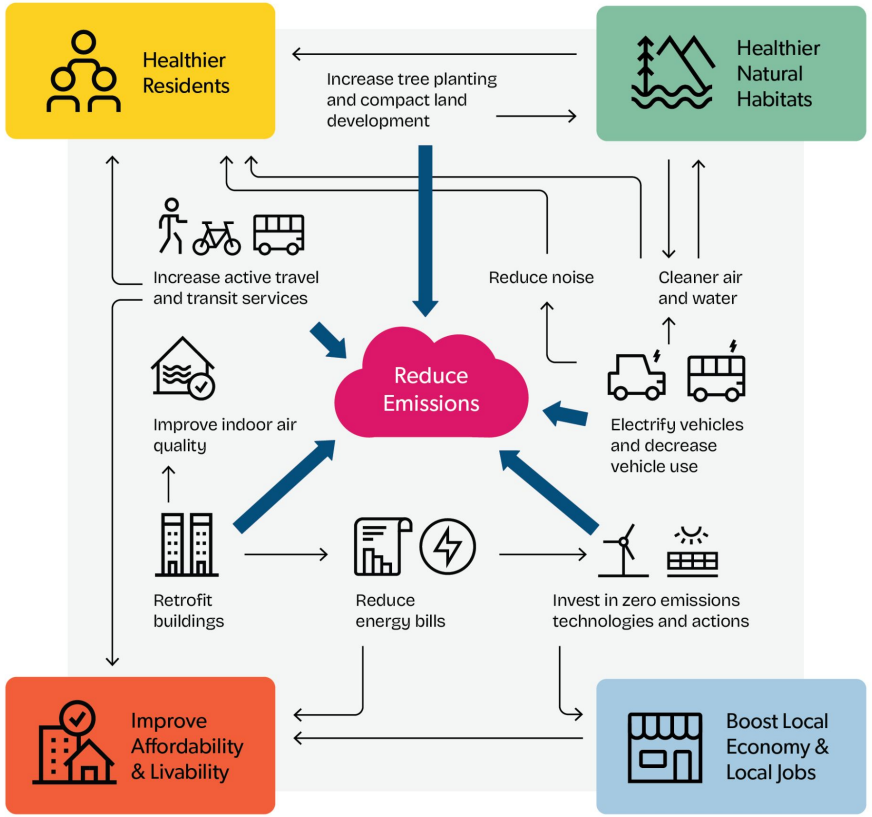
Which representation of financial modelling do you find most interesting?

(Net Annual and Cost Savings, Social Cost of Carbon, Abatement Cost)

Co-Benefits

Co-Benefits

Measures that can reduce emissions can also support healthier residents and natural habitats, boost local economies, create local jobs and improve affordability and livability.

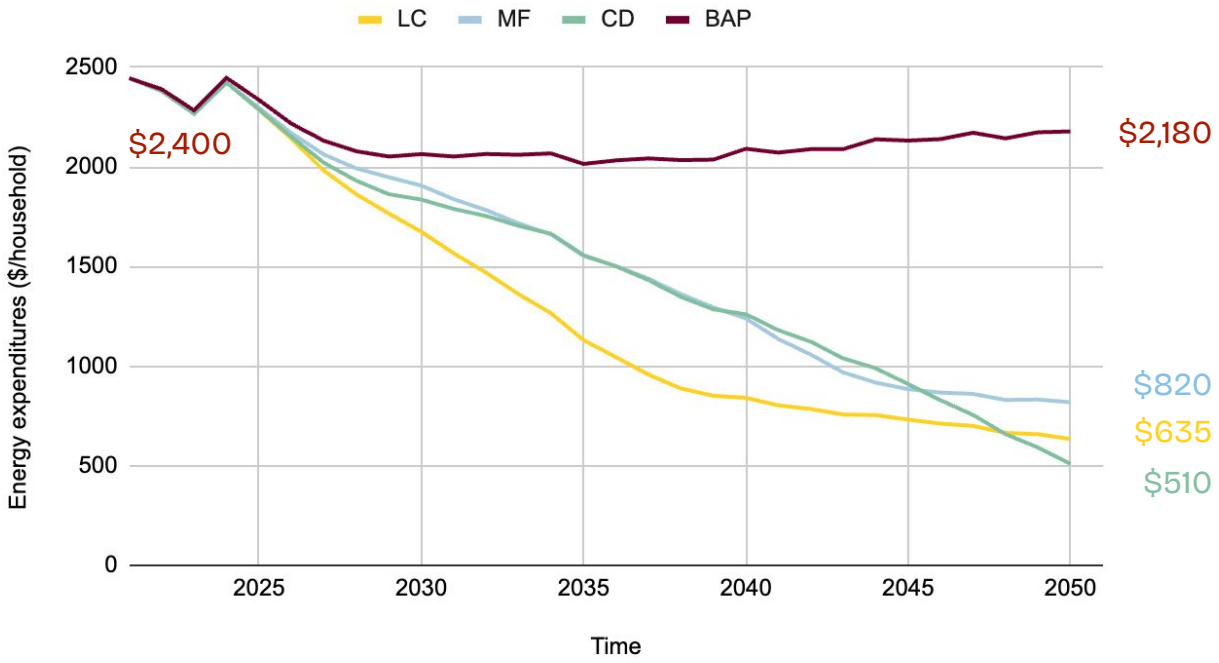


Energy Affordability

- A household faces a high energy burden when it spends more than 6% of its income on energy.
- Cost-effective energy efficiency measures, such as improving insulation and installing more efficient appliances, have the potential to reduce energy use by 13-31%.
- Transit-oriented urban development can reduce per capita use of automobiles by 50%, reducing household transport expenditures by 20%.

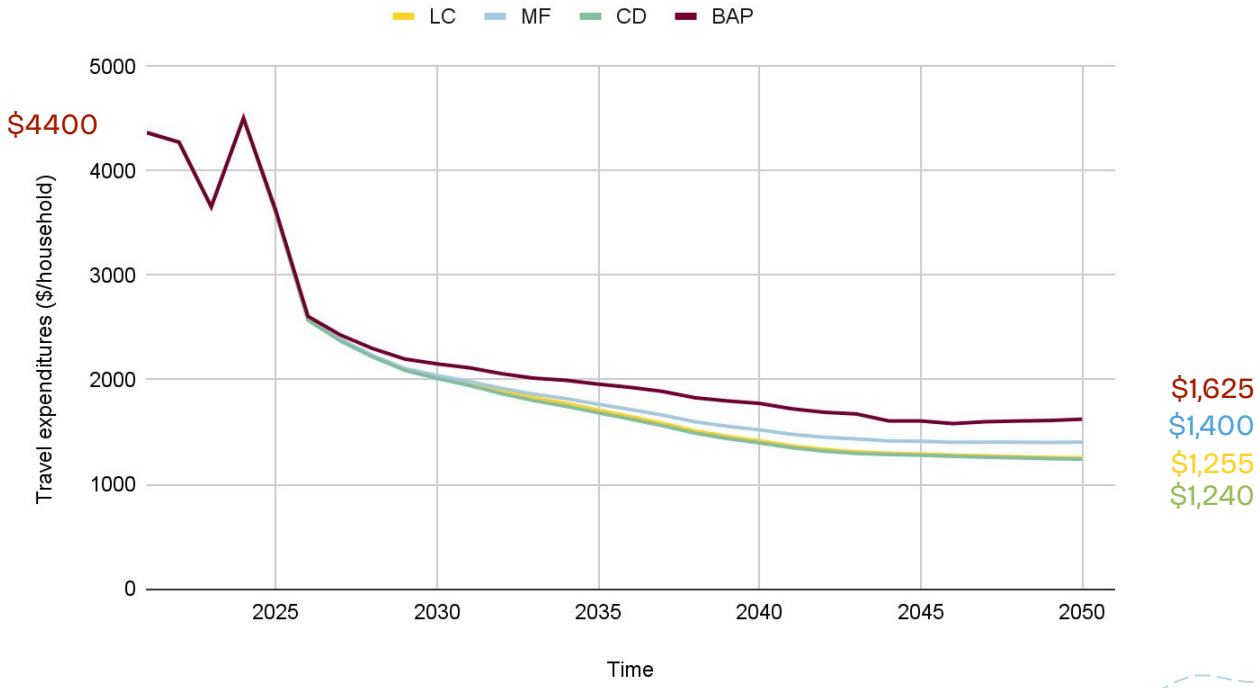
Household Spending

Average annual spending on stationary energy in each scenario (2021 – 2050)



Household Spending

Average annual spending on energy for travel in each scenario (2021 – 2050)



Employment Impacts

Job Creation

Cumulative Job Creation for Each Scenario (2026-2050)

Big Moves	Low-Carbon Scenario	Mixed Fuel Scenario	Community Driven Scenario
Transform Existing Buildings	180,776	185,399	180,277
Build Net Zero New Buildings	36,909	27,199	31,443
Retrofit Nevada - Modernize Businesses Initiative	113,343	113,343	124,043
Power Nevada with Clean Energy	24,557	24,126	55,383
Move with Active and Public Transit	-19,972	-5,679	28,405
Accelerate Zero Emission Vehicles for All	-277	1,349	-66,887
Drive Sustainable Transport	192	130	192
Decarbonize Industry	108,367	94,887	52,521
Divert and Reuse Waste	5,896	5,896	5,896
Harness Landfill Gas	24	24	24
Make Farming more Sustainable	4,063	2,438	4,063
Grow Nature-Based Solutions	315	339	312

Job Creation

Average annual person years of employment in each scenario (2026-2050)

Big Moves	Low-Carbon Scenario	Mixed Fuel Scenario	Community Driven Scenario
Transform Existing Buildings	7,532	7,725	7,512
Build Net Zero New Buildings	1,538	1,133	1,310
Retrofit Nevada - Modernize Businesses Initiative	4,723	4,723	5,168
Power Nevada with Clean Energy	1,023	1,005	2,308
Move with Active and Public Transit	-832	-237	1,184
Accelerate Zero Emission Vehicles for All	-12	56	-2,787
Drive Sustainable Transport	8	5	8
Decarbonize Industry	4,515	3,954	2,188
Divert and Reuse Waste	246	246	246
Harness Landfill Gas	1	1	1
Make Farming more Sustainable	169	102	169
Grow Nature-Based Solutions	13	14	13

Job Creation

Cumulative Jobs by Sector (2026-2050)

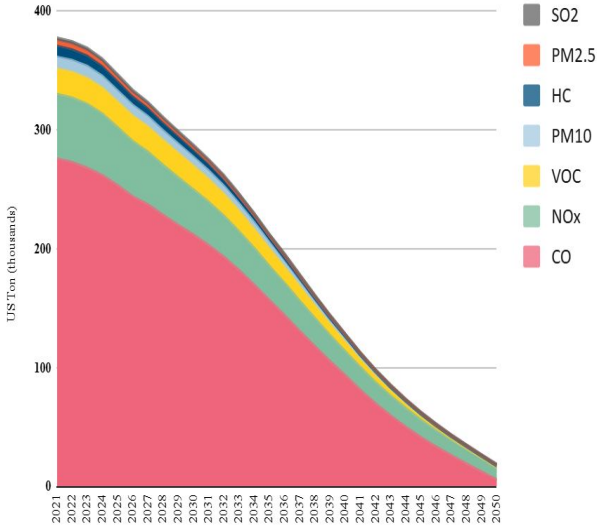
Big Moves	Low-Carbon Scenario	Mixed Fuel Scenario	Community Driven Scenario
Construction	313,529	313,729	319,846
HVAC equipment manufacturing	16,785	11,743	14,461
Electric power generation, transmission and distribution	25,272	24,596	56,839
Transit and ground passenger transportation	-20,000	-5,707	-38,302
Motor vehicle manufacturing	-57	1,506	12
Commercial and industrial machinery and equipment repair and maintenance	108,367	94,887	52,521
Waste management and remediation services	5,920	5,920	5,920
Crop production	4,063	2,438	4,063
Support activities for agriculture and forestry	315	339	312

Reducing Co-Pollutants

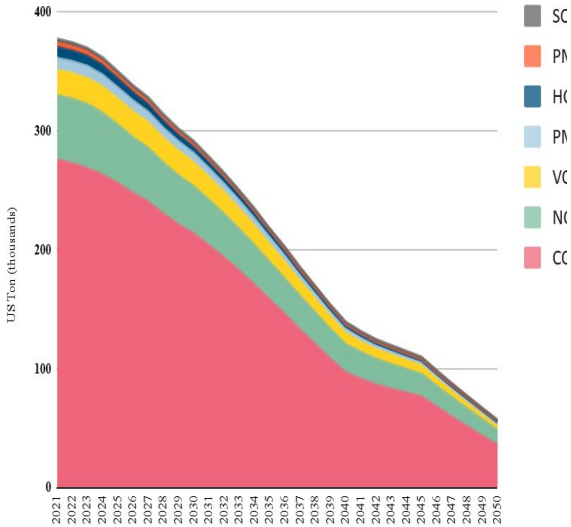
Comparing Scenarios

Co-Pollutant Reductions Overall

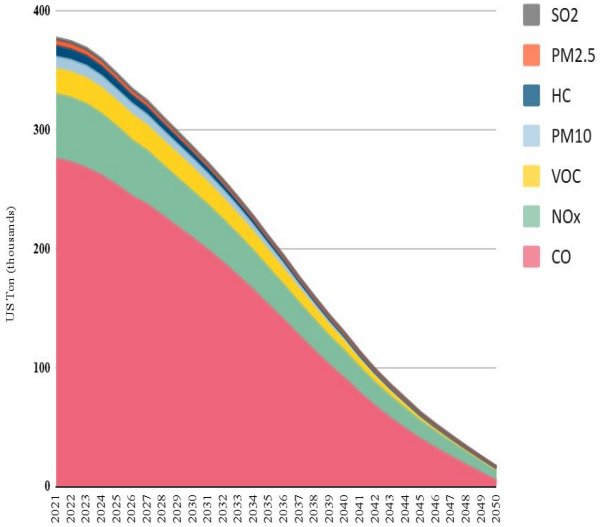
LC



MF



CD

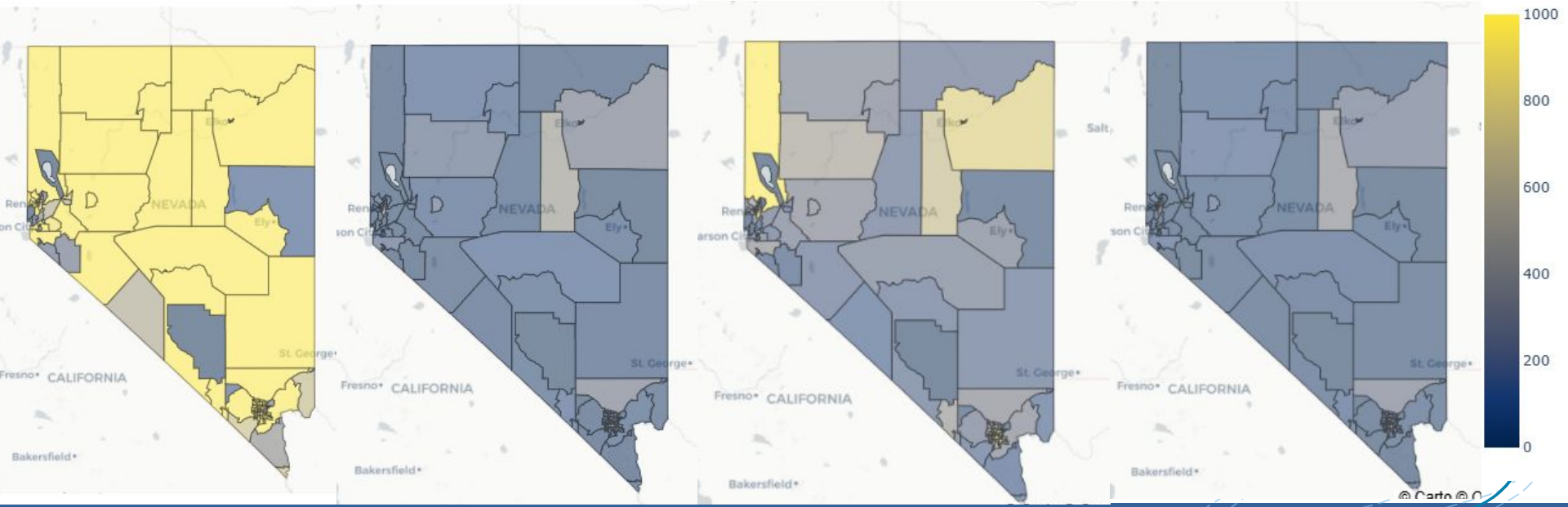


Nearly identical pollutant reductions would be achieved in the LC and CD scenarios.

Comparing Scenarios

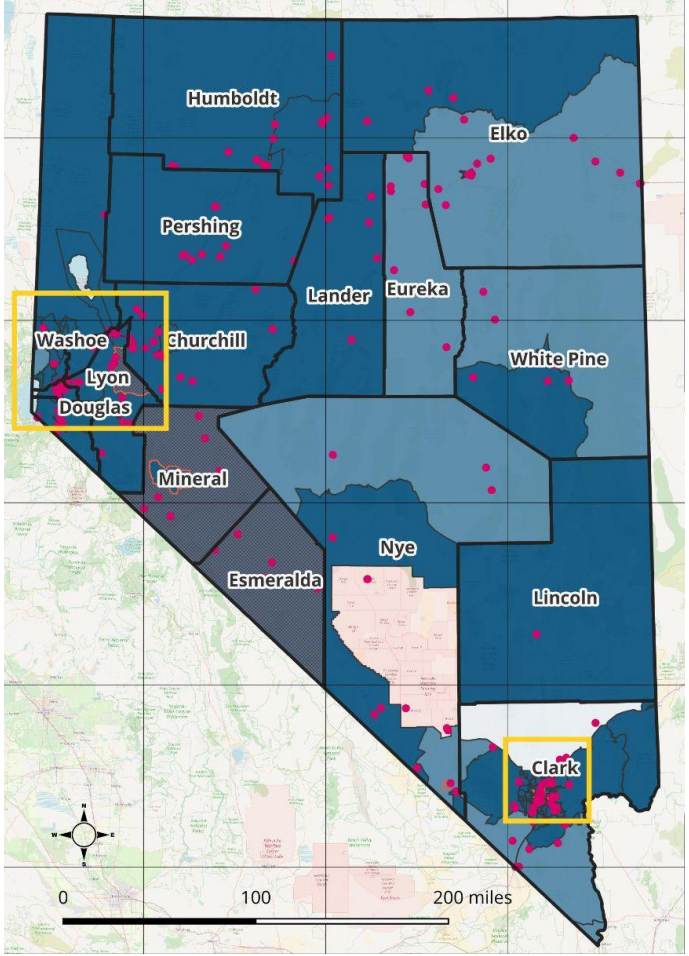
Co-Pollutant Reductions Overall

BAU 2021 | LC 2050 | MF 2050 | CD 2050



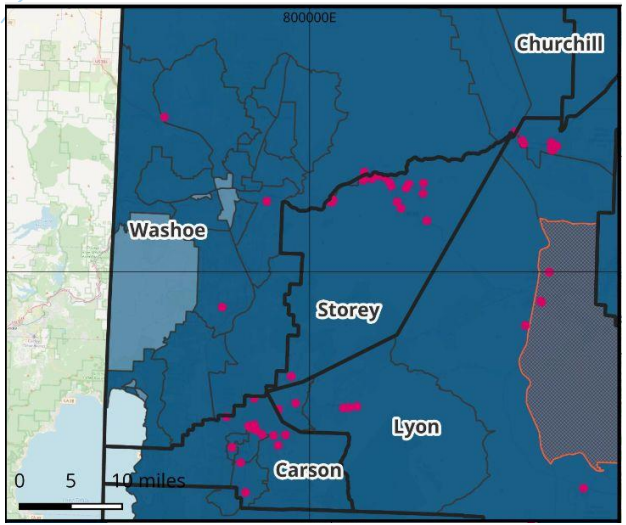
Reductions in PM2.5

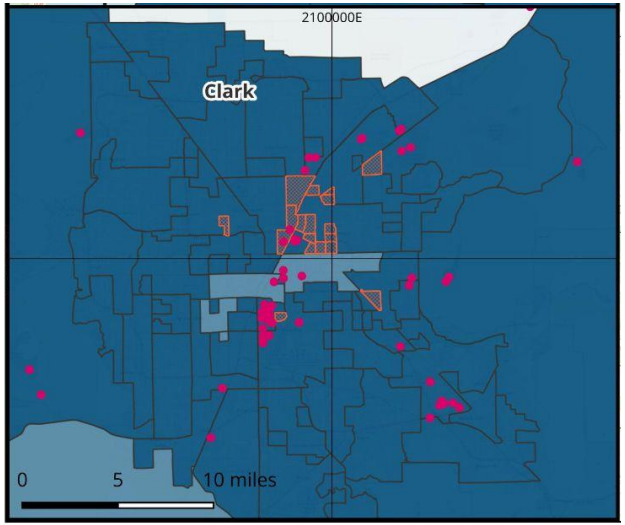
Reductions (%) in PM2.5 by zone by 2050 in relation to current areas with high energy burden in Nevada in the LC Scenario



Reductions in PM2.5

Reductions (%) in PM2.5 by zone by 2050 in relation to current areas with high energy burden in Nevada in the LC Scenario





Legend

- County Limits
- Industries
- Greater than or equal to the 90th percentile for energy burden

PM2.5 Reduction (%)

- 33 - 40 %
- 40 - 60 %
- 60 - 80 %
- 80 - 99.8 %

Feedback

Is there any co-benefit analysis that you feel is missing from the CCAN?

Next Steps

Upcoming Engagement

- September 9th, 11th and 23rd
  - Draft CCAN Community Feedback Meetings
- September 1st–30th
  - Open Public Comment Period
- November
  - Submission to EPA
  - Presentation of Final CCAN

Thank You

Website:
ndep.nv.gov/air/climate-pollution-reduction-grant

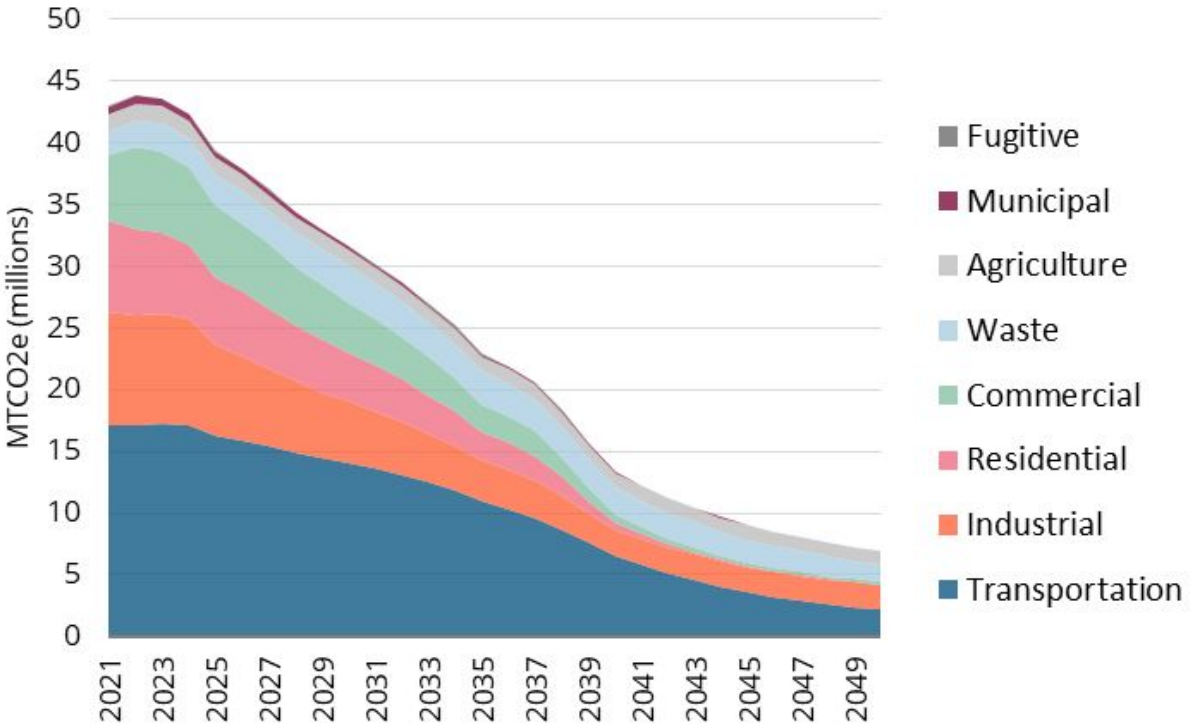
Email: ndep.cprg@ndep.nv.gov

Feedback

Link in chat to share additional information and provide feedback about this session.

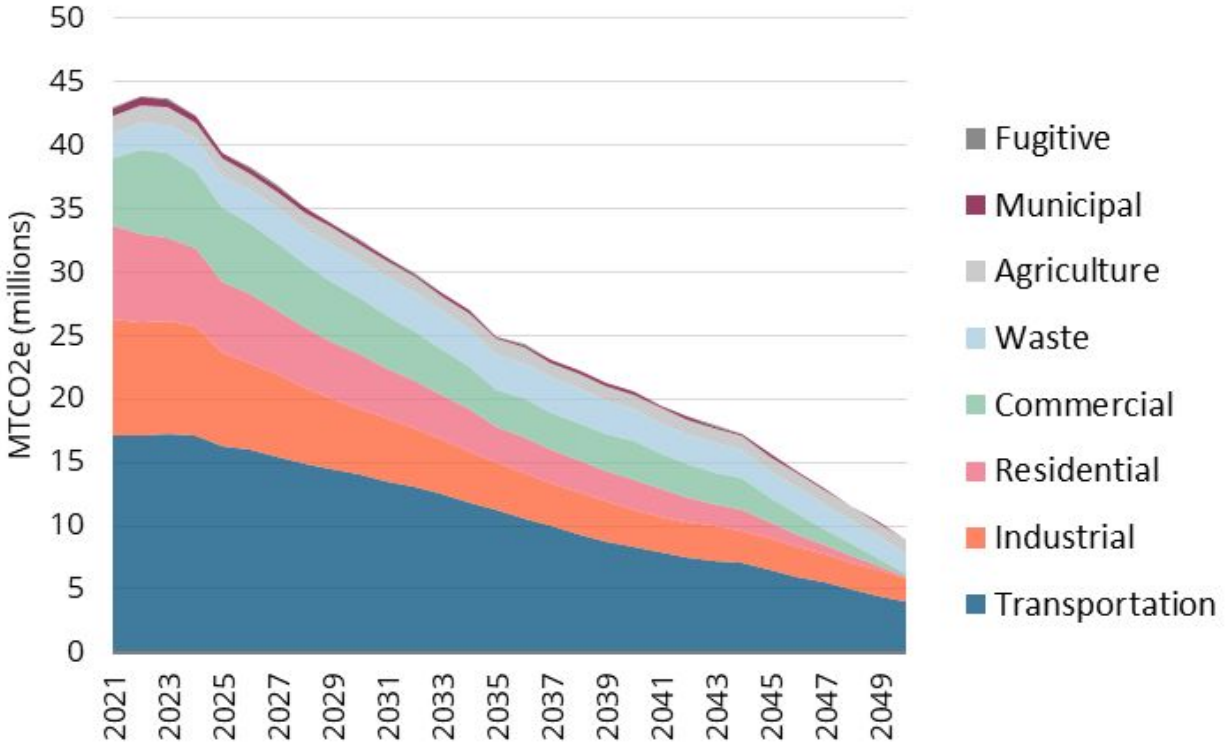
Low Carbon Scenario

Total Emissions by End-use Sector



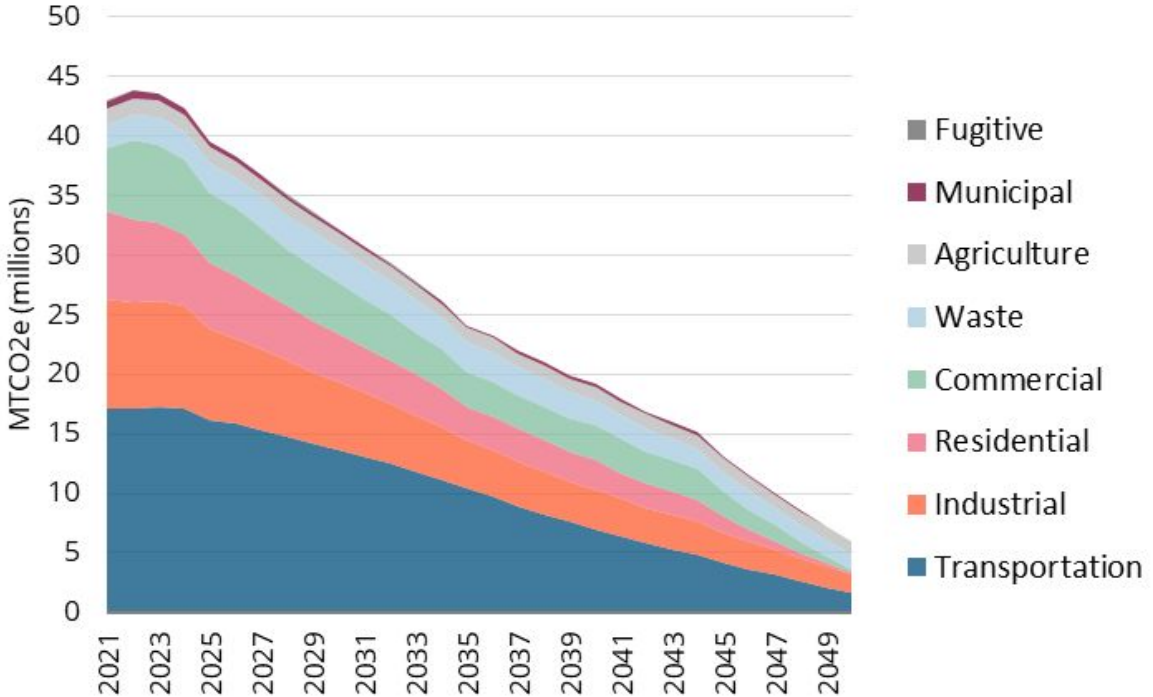
Mixed Fuels Scenario

Total Emissions by End-use Sector

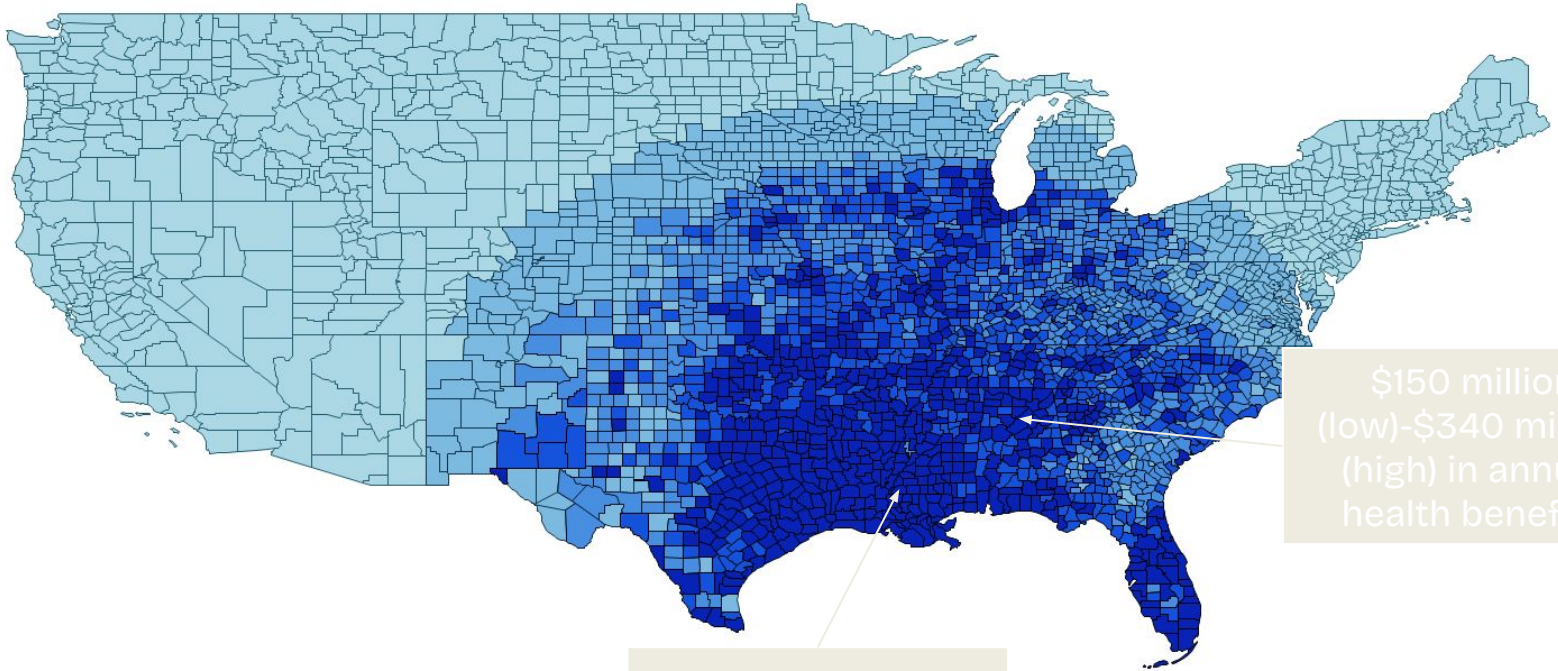


Community Driven Scenario

Total Emissions by End-use Sector



A Greater Benefit: Air Quality Improvements Deliver Health Benefits Across the U.S.



$150 million (low)-$340 million (high) in annual health benefits

$90 million per year in benefits to CRPC counties

CAPEX + OPEX

Capital Investments	Community based, result in jobs, new economic activities
Operating Expenses	Decrease up to 50% due to increased efficiency across all sectors
Revenue	Renewable energy, transit fees, etc
Return on Investment	