



Interim Results

Rhode Island Carbon Pricing Study

Cadmus Group & Synapse Energy Economics, Inc.
EC4 Meeting
Wednesday, September 23rd, 2020

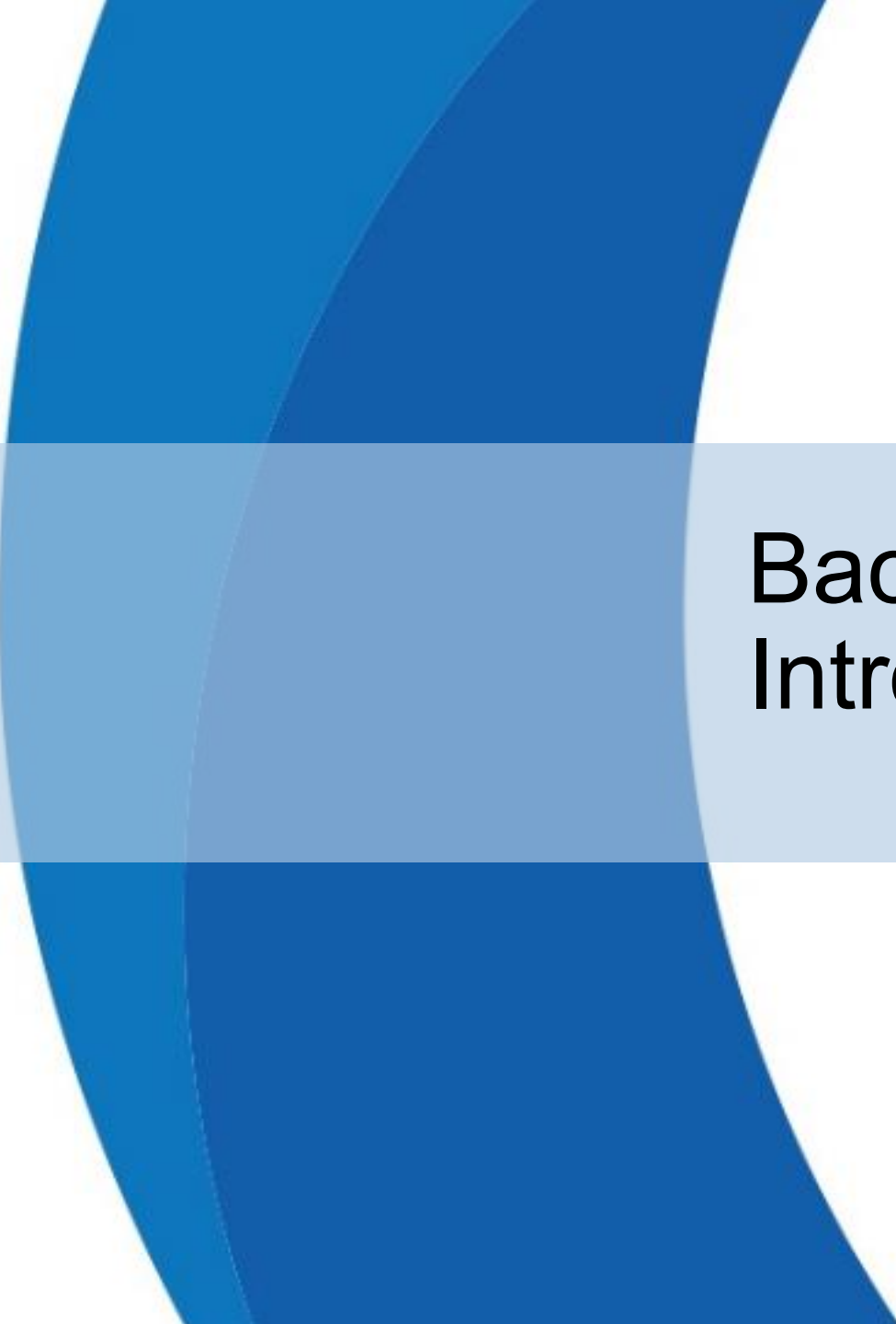


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Agenda

- Welcome, Background & Introductions
- Overview of Carbon Pricing Scenarios
- Initial Modeling Results
- Initial Policy Analysis and Stakeholder Engagement Findings
- Questions and Feedback



Background & Introductions

Project Overview

The purpose of this study is to provide an impartial assessment of potential state and regional carbon pricing policies. It is intended to inform (not set) policy design.

As context, the Resilient Rhode Island Act of 2014 created greenhouse gas (GHG) emissions reductions targets for at 45% below 1990 levels by 2035 and 80% below 1990 levels by 2050.

Final Deliverables

A report and associated presentation that outline key findings from the policy analysis, modeling and stakeholder engagement.

Note that this study is conducted in the context of other related efforts in the State.

Leading Agencies



Consulting Support From

CADMUS



Synapse
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Project Status

Tasks	Status	May	Jun	Jul	Aug	Sep	Oct	Nov
Task 1. Project Management	Ongoing							
Task 2. Literature Review and Policy Selection	Complete							
Task 3. Policy Analysis	In Progress							
Task 4. Carbon Pricing and Economic Modeling	In Progress							
Task 5. Stakeholder and EC4 Engagement	Ongoing							
Task 6. Final Report and Public Presentations	Not Yet Started							

Today's Objectives

- Provide an update on project progress
- Share interim results



Overview of Carbon Pricing Illustrative Cases

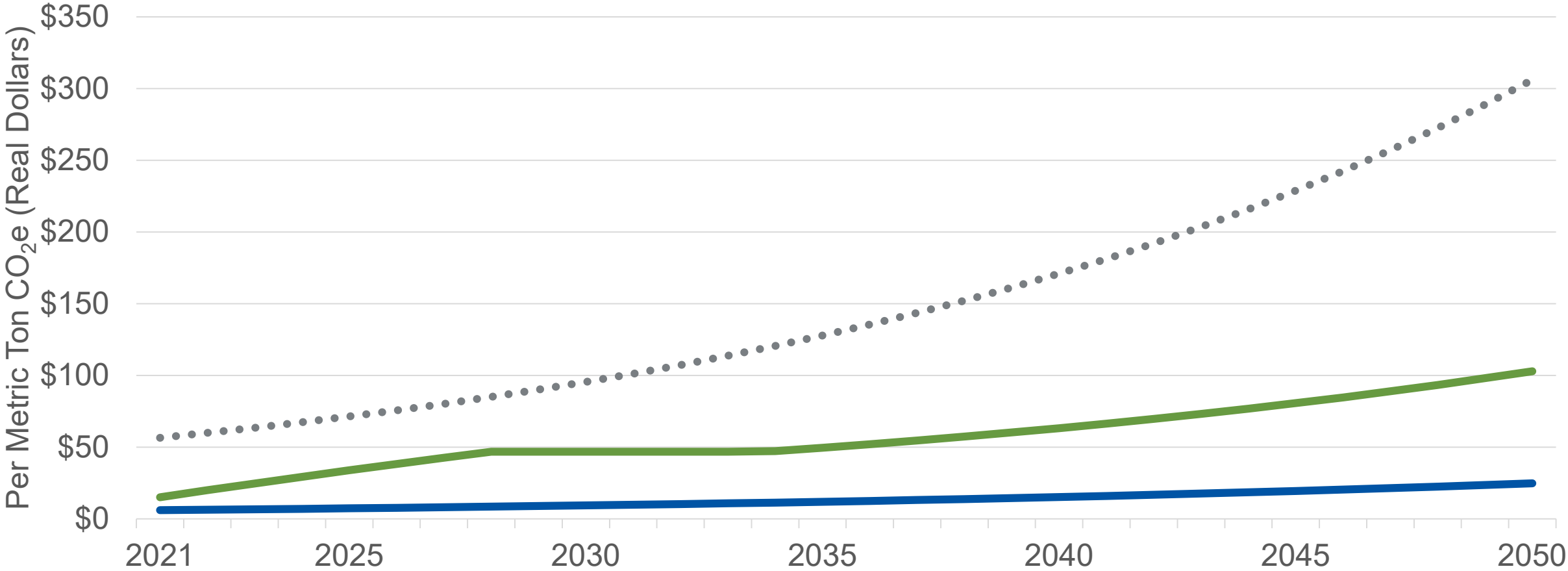
Illustrative Cases Studied

- The study examines a baseline and five cases that explore several policy tradeoffs, including:
 - Level of the carbon price
 - Use of the revenue
 - Rebates

	Case	Carbon Price	Investment Focus	Rebates
1		(None/Low/High)	(Incentives / Public Services)	(Yes/No)
2				
3				
4				
5				
6				

Illustrative Cases Studied | Price Levels

— Low Price — High Price ... AOCFA



- Low price based on **Regional Greenhouse Gas Initiative (RGGI)**
- High price based on **Economic and Climate Resilience Act of 2019 (ECRA, known as Energize RI Act in previous years)**
- **American Opportunity Carbon Fee Act (AOCFA)** is a federal bill introduced by RI's Senator Whitehouse
- AOCFA was included for initial pricing-response analysis, but is not included in deeper impacts analysis

Illustrative Cases Studied | Revenue Use

- In both price scenarios, the policy is expected to generate some amount of revenue.
- This study explores two primary uses of revenue, including:
 - **Investing the revenue in programs** that aim to reduce GHG emissions
 - **Returning the revenue in the form of rebates** to Rhode Island residents and businesses
 - **Administrative costs**
- In both the high and low pricing scenarios, the same amount of the revenue will be invested in programs that support GHG reductions.
 - Rebate level will include all revenue not used for administrative cost or program investment
- Revenue use for each of the carbon pricing scenarios is outlined below:

	Low Price Scenario	High Price Scenario
Revenue Use	<ul style="list-style-type: none">• Administrative costs• Investment in programs	<ul style="list-style-type: none">• Administrative costs• Investment in programs• Rebates

Revenue Investment Options

		Incentives	Public Services
Transportation			
Building Thermal			

Revenue Investment Options

		Incentives	Public Services
Transportation	Majority of Revenue	<ul style="list-style-type: none"> Light duty electric vehicle incentives 	<ul style="list-style-type: none"> Free transit fares
	Remaining Revenue	<ul style="list-style-type: none"> EV charger incentives Electric transit bus deployment 	<ul style="list-style-type: none"> Transit bus service expansion Electric transit bus deployment Active transportation infrastructure (i.e. bike lanes)
Building Thermal	Majority of Revenue	<ul style="list-style-type: none"> Air- and ground-source heat pump incentives 	<ul style="list-style-type: none"> Air- and ground-source heat pump installation and building weatherization for low-income residents and public buildings
	Remaining Revenue	<ul style="list-style-type: none"> Building weatherization Heating/cooling billpay assistance 	<ul style="list-style-type: none"> Heating/cooling billpay assistance

Illustrative Cases Studied

	Case	Carbon Price	Investment Focus	Rebates
1	Baseline	None	N/A	No
2	Low Price Alone	Low	N/A	No
3	Low + Incentives	Low	Incentives	No
4	Low + Public Services	Low	Public Services	No
5	High + Incentives	High	Incentives	Yes
6	High + 2x Incentives	High	Double Incentives	Yes*

*The rebate will be smaller in this scenario because investment is higher.

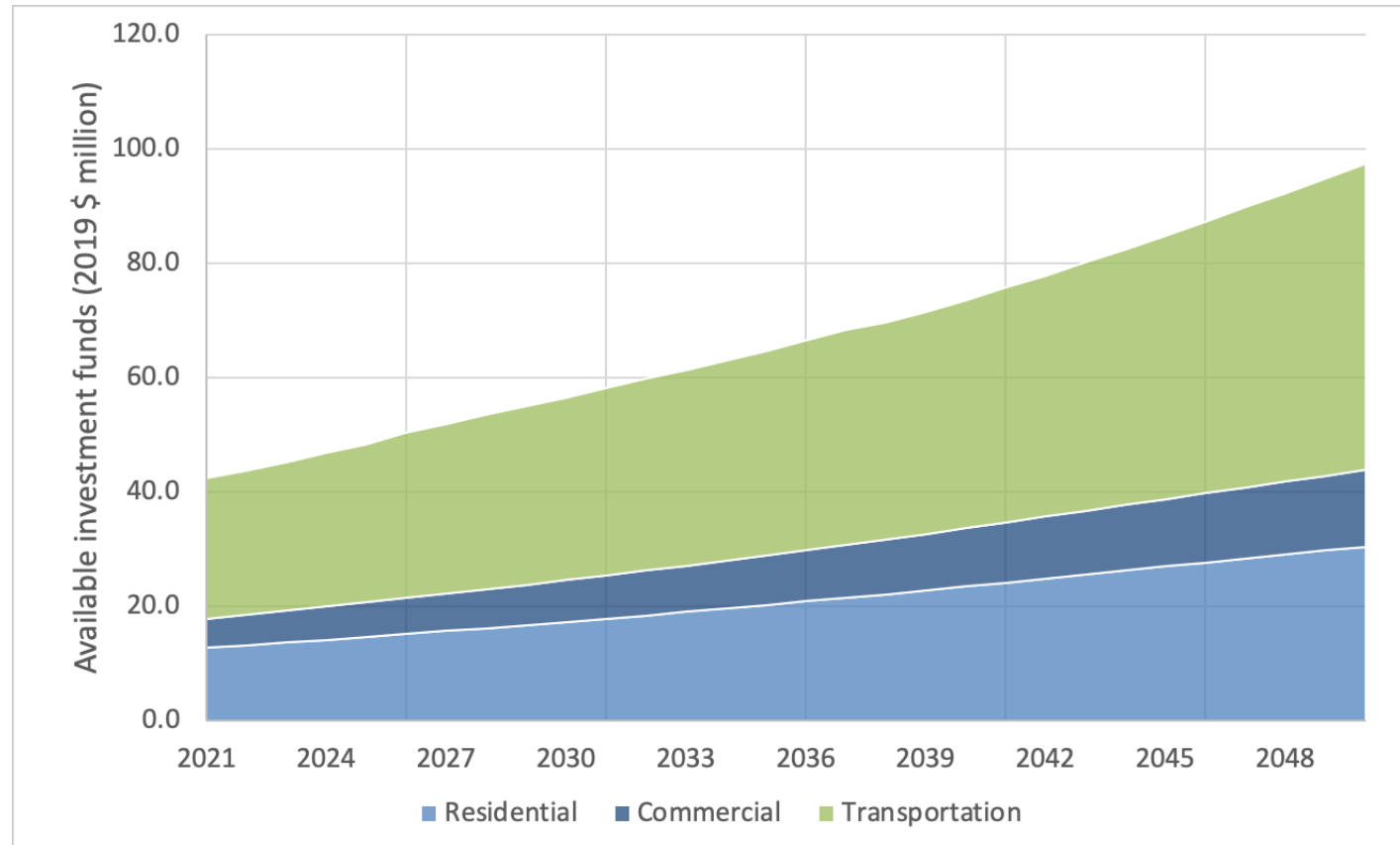
- Study structure designed to illustrate impacts of each change, not to develop or propose any particular policy
- Sector-specific results include emissions directly from each sector and do not include emissions associated with electric power generation



Early Modeling Results

Revenues from Low Carbon Price

- Used to fund investments, allocated by sector according to their contributions

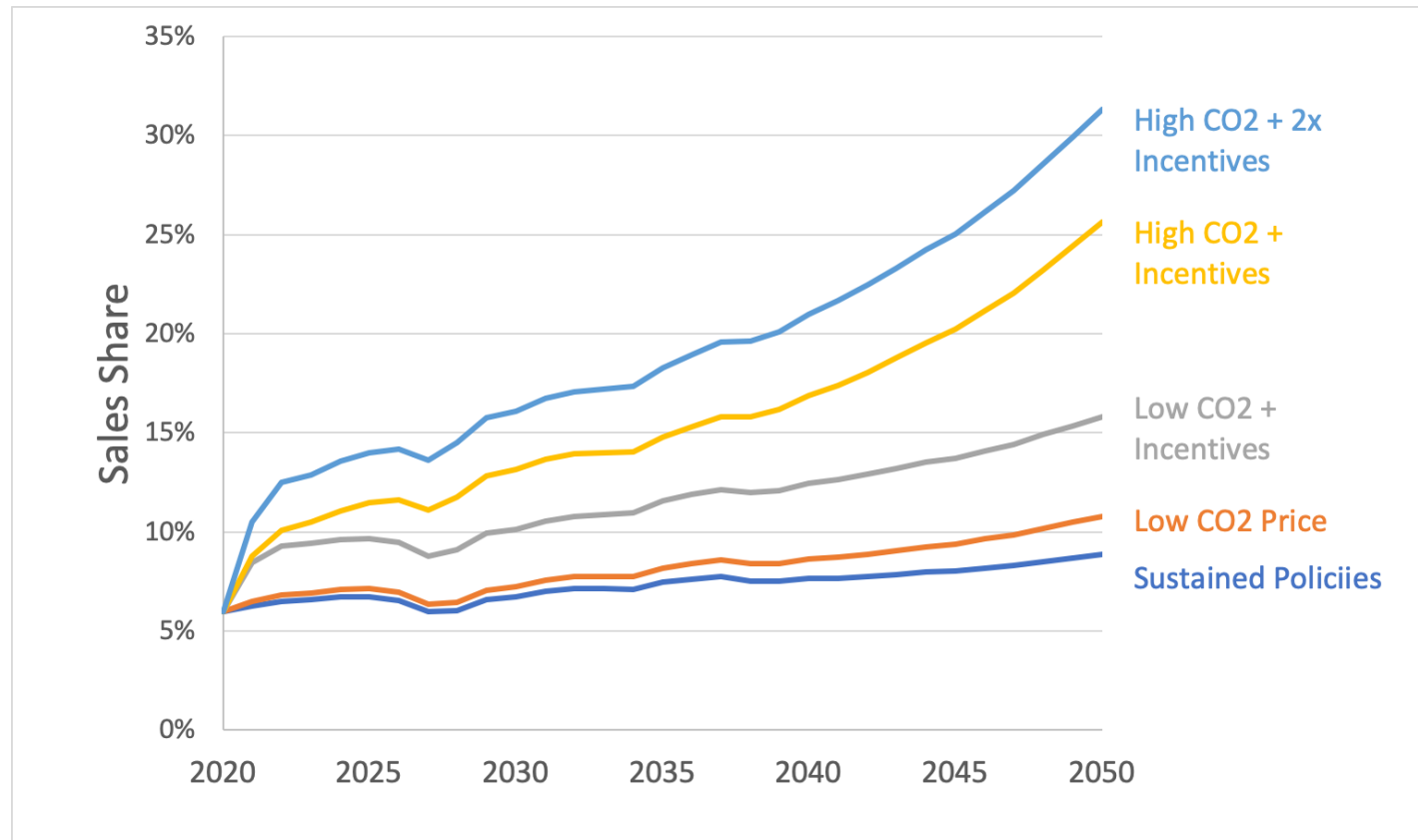




Buildings

Price and Incentive Impacts on Market Adoption of Heat Pumps

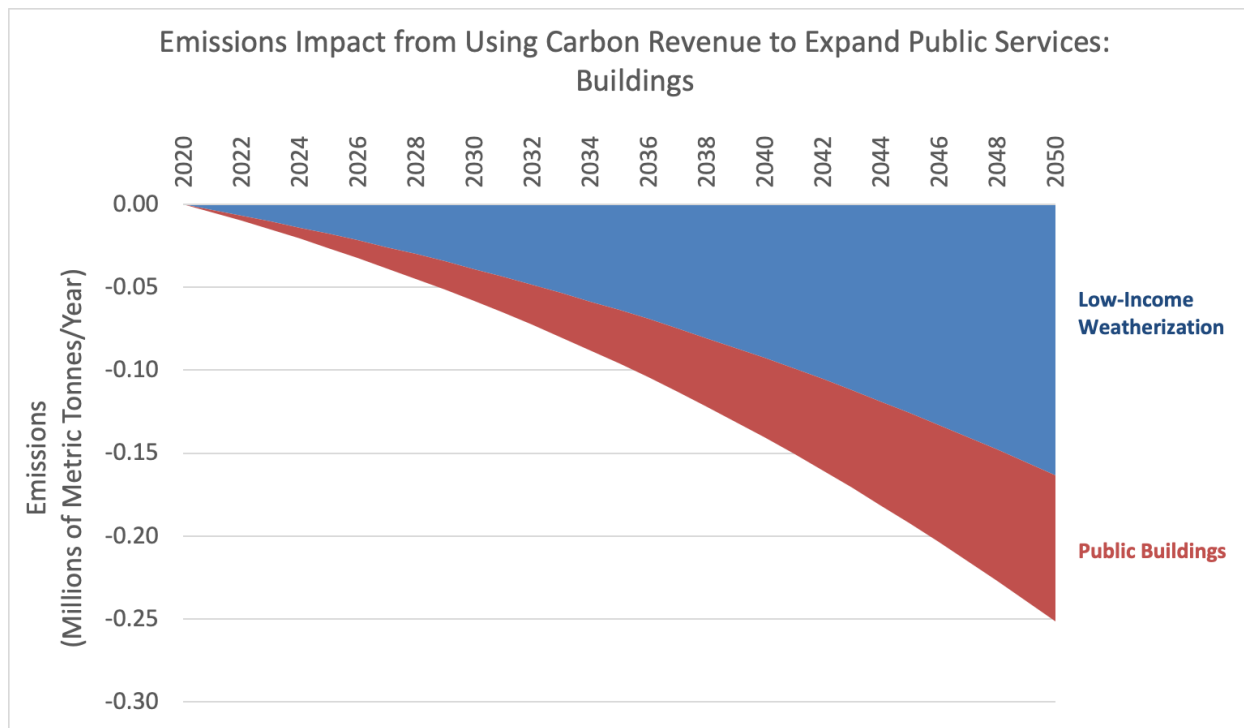
- Illustrative results for residential heat pump adoption in homes with forced air heat and access to natural gas:



- Also modeled for homes with boilers and using delivered fuels
- Also modeled for residential water heaters and commercial space and water heating

Public Services Investments

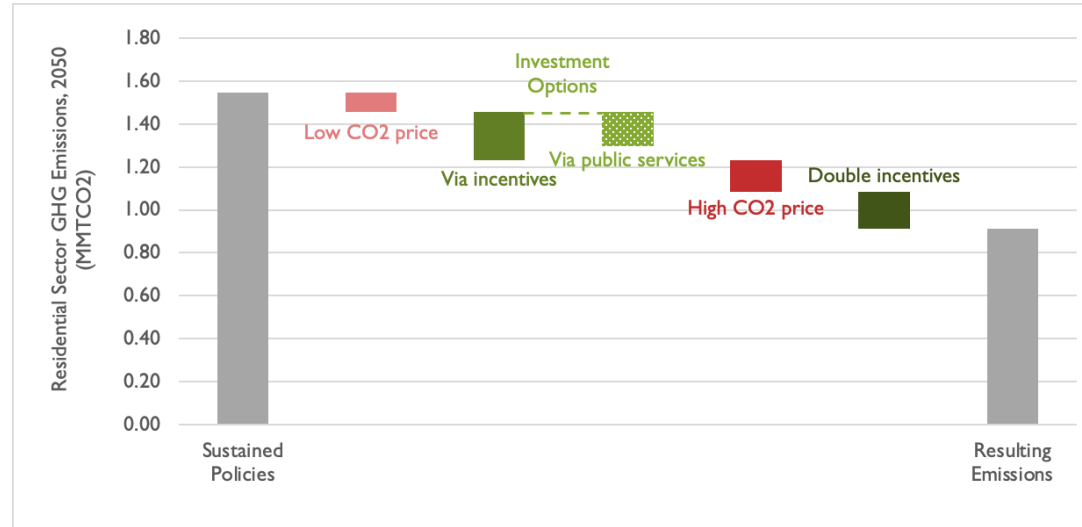
- 75% of revenues used for weatherization and heat pump installations
- Residential portion: Low-income weatherization w/ no-cost HP installation
- Commercial portion: Public buildings weatherization and HPs (schools, municipal buildings, state buildings, etc.)



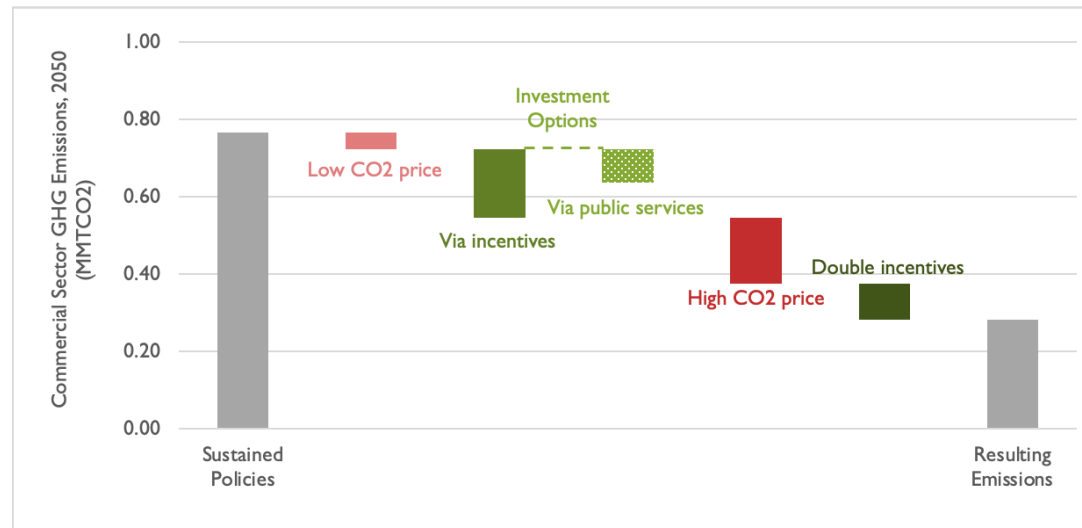
For context: Total building emissions today are about 3 million MT/year, so by 2050 this is about a 10-15% reduction from the baseline.

2050 Building Emissions Waterfalls

Residential:



Commercial:



Buildings-Sector Insights from Modeling

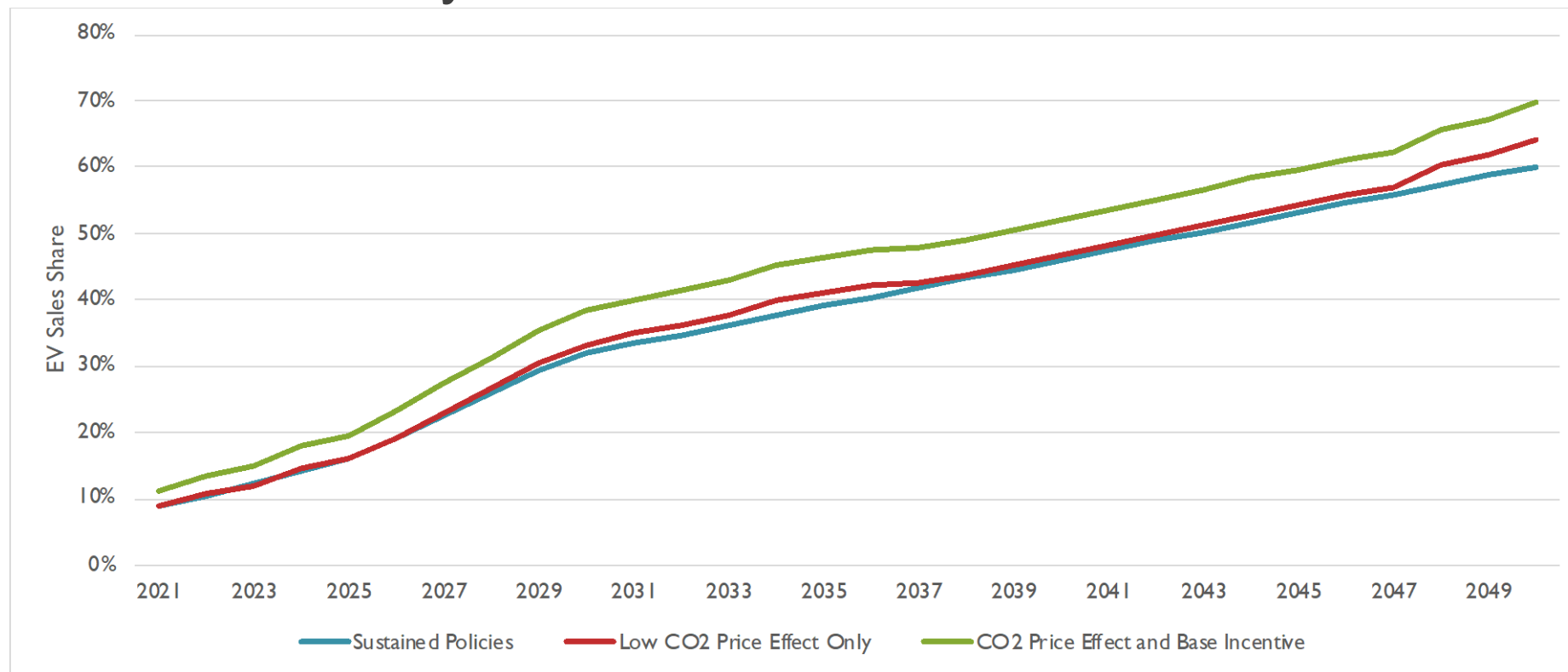
- Commercial sector is more sensitive to fuel prices as the carbon prices get higher, while residential is (relatively) more responsive to upfront costs
- Investment in low-income weatherization and public buildings can reduce emissions about half as much as incentives
 - All participants in public-service programs assumed to be additional, whereas in the incentive case there are some free riders
 - Assumed economies of scale from coordinated programs



Transportation

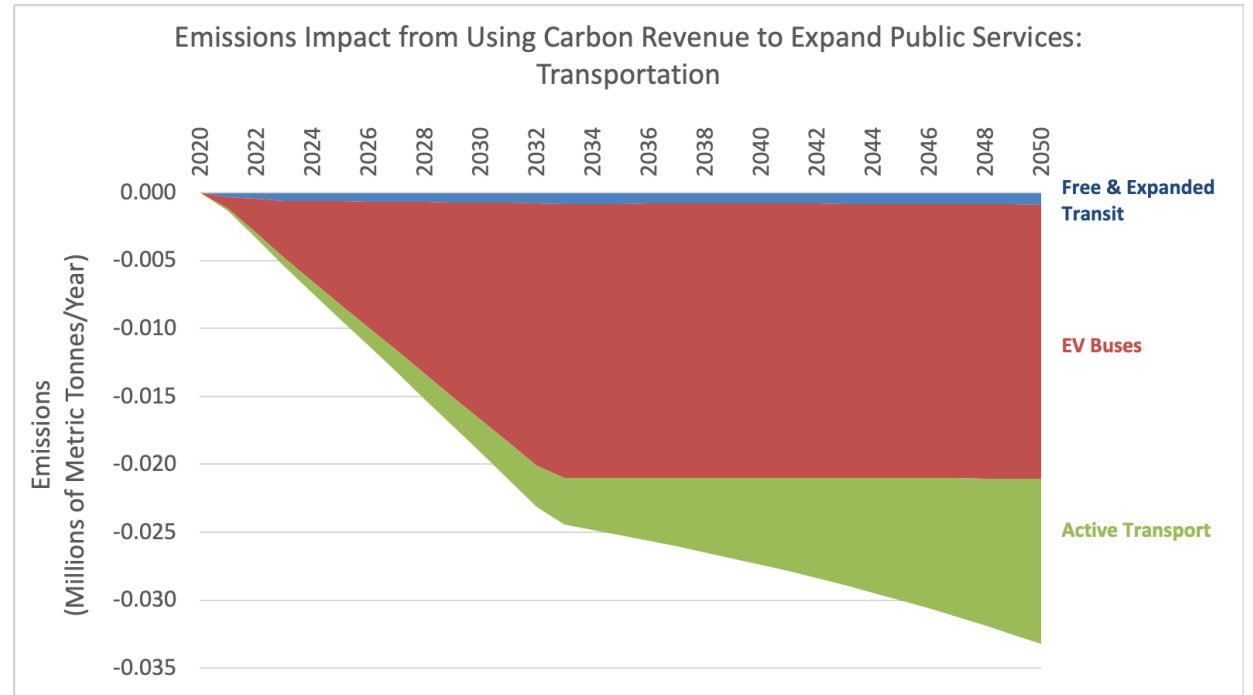
Price and Incentive Impacts on Market Adoption of Electric Vehicles

- EV incentives ~\$1300 in the baseline incentive case
- EV sales share results by case:

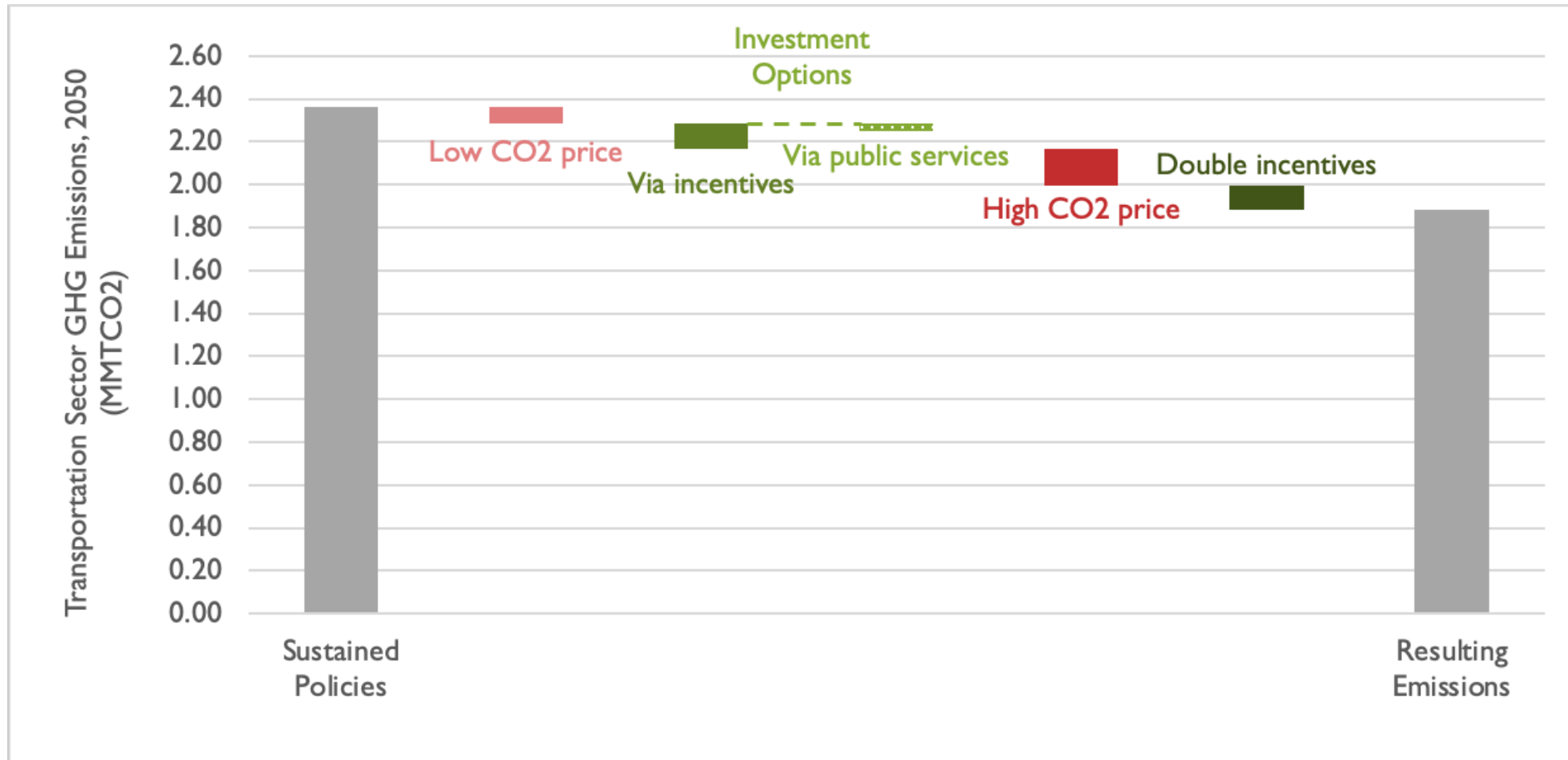


Public Services Investments

- Replace all RI Transit buses with EV buses over 12 years, plus incremental growth to meet system expansion
- Eliminate all passenger fares on RI transit (not MBTA)
- Remainder (other than 5% for admin costs) split between expanding transit service and active transport



2050 Transportation Emissions Waterfall



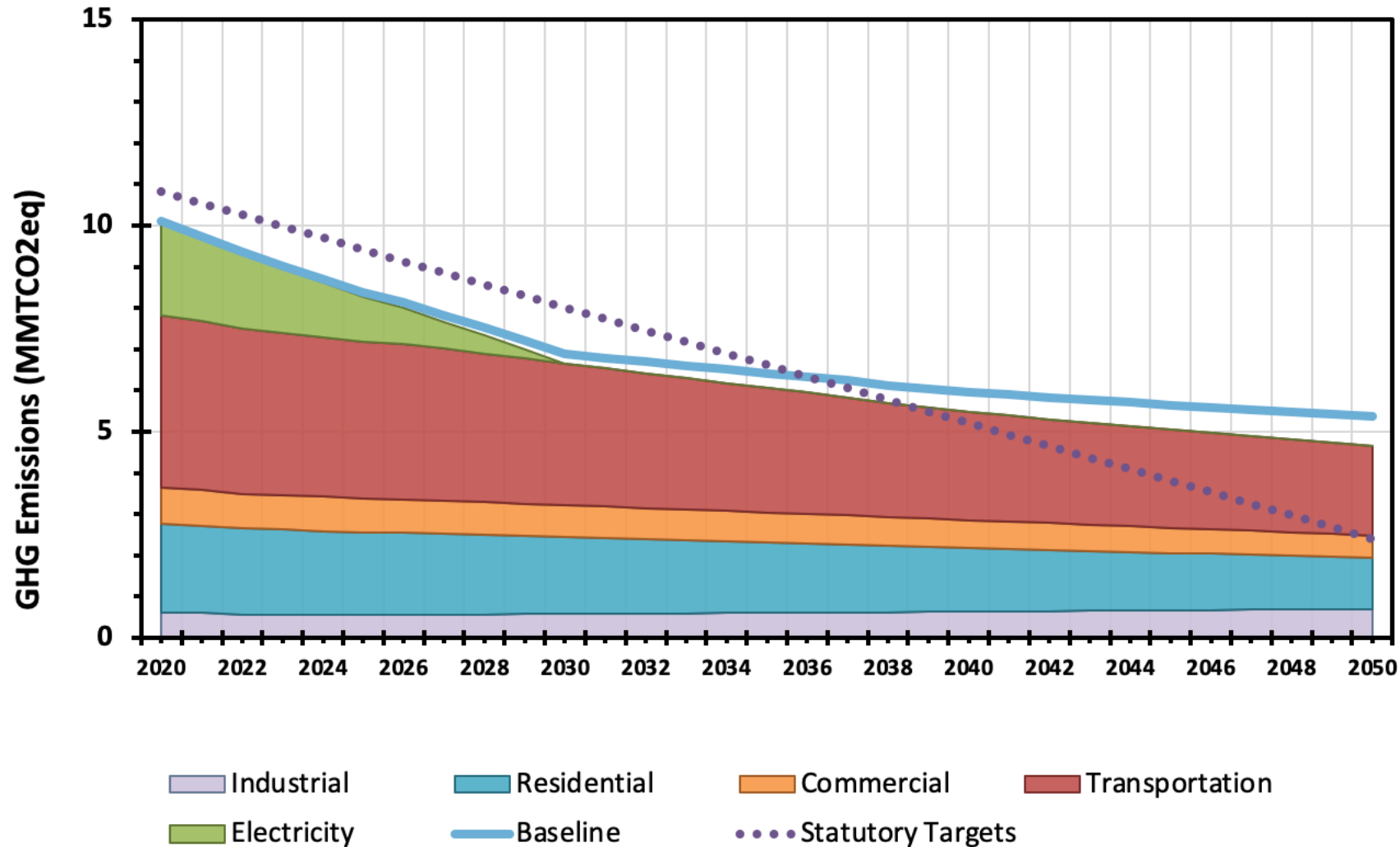
Transportation-Sector Insights from Modeling

- EV uptake is relatively large even in the sustained policies case, driven by falling EV prices (calibrated to TCI modeling), so increment from carbon pricing policy is relatively smaller than in buildings
- Using revenue to pay for operating costs (e.g., transit fare elimination) has less impact on cumulative emissions than using revenue to fund changes in capital stock (e.g., EV buses)

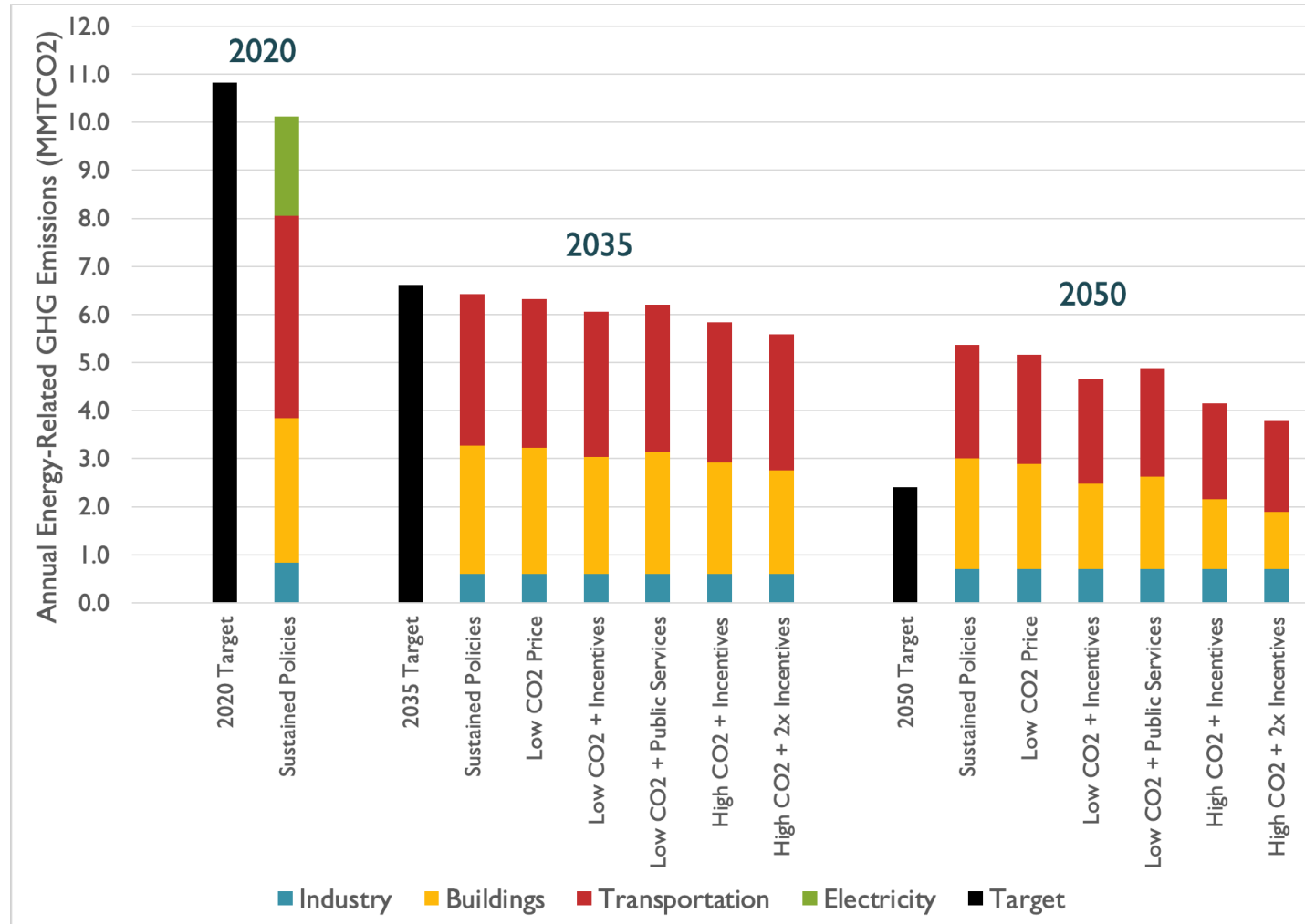


Aggregate Emissions Results

Illustrative Annual Results: Low Carbon Price with Incentive Investments



Emissions in Milestone Years



Insights from Modeling (Cross-Sector)

- 2050 GHG target would likely require substantial additional complementary policies, even in a high carbon price case
- Electric RPS to 100 percent has a transformative effect on achieving the 2035 GHG target
- Transportation is much less elastic with respect to fuel price than buildings
- Stock-turnover dynamics mean that changes in market share take time to turn into changes in emissions
 - Policies that favor near-term changes in market share for low-carbon technologies are likely to have a larger emissions impact in 2035 or 2050, all other things being equal

Next Steps in Modeling

- We are still refining our energy modeling (for example we do not yet capture charging station impacts on EV adoption, and need to coordinate further with the team conducting the 100% renewable electricity study)
- Economic impacts
 - Aggregate and household-level impacts
 - Note: we expect aggregate effects to be small in all cases
- Health impacts



Stakeholder Engagement- Initial Findings

Stakeholder Engagement | Overview

- To inform the policy analysis and ensure the final report reflects stakeholder perspective, Cadmus conducted several stakeholder engagement efforts, including:
 - **Equity Interviews** with four representative stakeholders identified with input from the RI Team
 - **Sector-Specific Focus Groups** with key representatives of the Rhode Island building thermal and transportation sectors
- The final report will integrate results from the policy analysis and stakeholder engagement with the modeling

Complementary Action – Exists and Is Needed

- **Existing Efforts** connect to Carbon Pricing
 - There are several **existing policies, programs, and initiatives** in both the transportation and building thermal sectors that are seeking to **reduce GHG emissions** (see table for some examples)
 - Prices would build on the **success of RGGI**
- Carbon pricing **alone is not adequate**
 - **Additional** actions will be needed to complement carbon pricing to achieve decarbonization goals
 - **Education and outreach** is key to ensuring the success of investment programs
 - Decarbonization relies on end use **customer choices**

Transportation	Building Thermal
Transportation and Climate Initiative	Heating Sector Transformation Study
ZEV Mandate	RI Weatherization Assistance Program
VW Settlement Investment	National Grid Energy Efficiency Programs
Advanced Clean Trucks Rule	Efficient Buildings Fund
	PACE Financing
	Weatherization Assistance Program

Wider Geographic Scope Would Lead to Greater Success

- Operating at a regional scale helps make it more **politically palatable**
- RGGI program has **wide geographic scope** and has been **successful**
 - New states still joining
- Emission reductions can occur at **lower cost**
- Administrative costs can be **shared**
- **Prevents** leakage

Equity in Program Design and Revenue Use

- **Equity as a Conscious Design Choice**

- Carbon prices are inherently **regressive**, unless intentional policy design choices are made such as careful revenue reinvestment
- Low income households spend a **higher portion** of their income on energy
- Equitability of a program depends on the **use of the revenue**
- Low income households could see a **net gain** in income with a rebate
- **Programs** can be used to improve equitability

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- **How the Revenue Could Best Support Frontline Communities**

- Value in returning revenue to communities in the form of a rebate and/or through programmatic offerings, with a slight **preference for rebates**.
- The revenue should be used in a way that will **benefit local communities** and economies
- **Communities should be involved** in the process of determining how the revenue is used
- The revenue should be used in ways that connect to **supporting existing needs**

Political Context - Spectrum of Views on Carbon Pricing

- Some groups **have been consistently opposed** to carbon pricing policies in RI
- Certain industries need to balance environmental priorities with **practicality** (e.g. trucking)
- Challenges of pursuing a carbon price in **political** arena
- Some stakeholders voiced reservations about **whether the funds will be used in an equitable and targeted fashion**
- Some stakeholders view a carbon price as a non-essential approach **that could reduce focus on** from important work of deeply transforming energy system
- Some stakeholders are concerned about potential for emitters to **pass on costs** to consumers



Next Steps

Next Steps

- Receive stakeholder comments through October 1st
 - Feedback should be sent to: Chris Kearns - Christopher.Kearns@energy.ri.gov
- Carry out next steps in modeling (refining modeling, conducting economic and health impact analysis)
- Based on final model inputs, and stakeholder feedback and research, complete synthesizing policy analysis and complete report by early November
- Past presentations and stakeholder materials can be found here: <http://www.energy.ri.gov/carbonpricingstudy/>



Questions?

CADMUS

Thank You

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