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Policy Options Meeting

Rhode Island Carbon Pricing Study

Cadmus Group & Synapse Energy Economics, Inc.

Tuesday, May 19th 2020

Synapse Energy Economics, Inc.

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Cadmus & Synapse Presenters

Farrah Andersen
Associate
Cadmus

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Senior Analyst
Cadmus

Asa Hopkins
Vice President
Synapse

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Agenda

- Welcome & Introductions
- Project Overview & Today’s Goals
- Review Initial Policy Findings
- Preview Policy Evaluation and Modeling
- Questions and Feedback

Introductions

Participating Agencies

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About Cadmus

Since 1983

Employee-owned social good consultancy

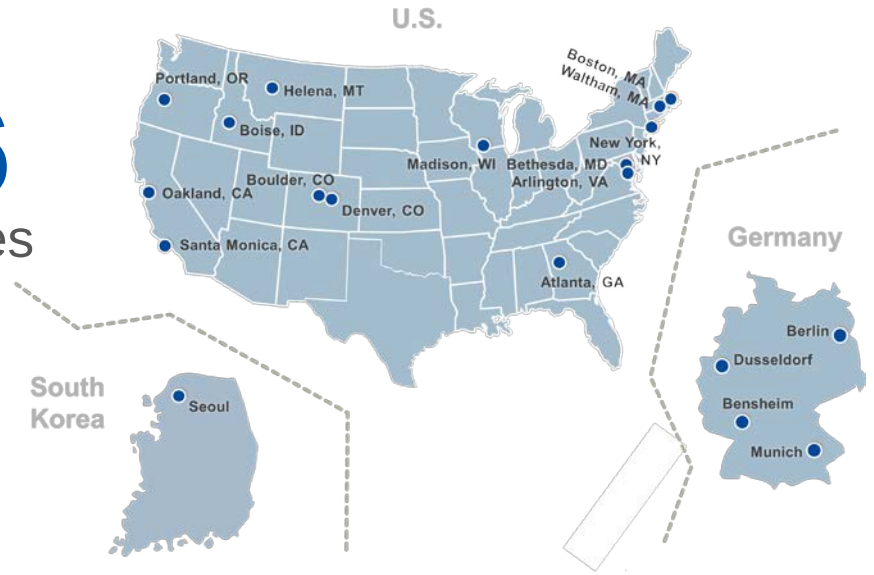
36
Years

Of helping our clients address complex challenges in a highly collaborative environment

Started with 2 Co-Founders,

550+ strong as of 2020

16
Offices



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Synapse

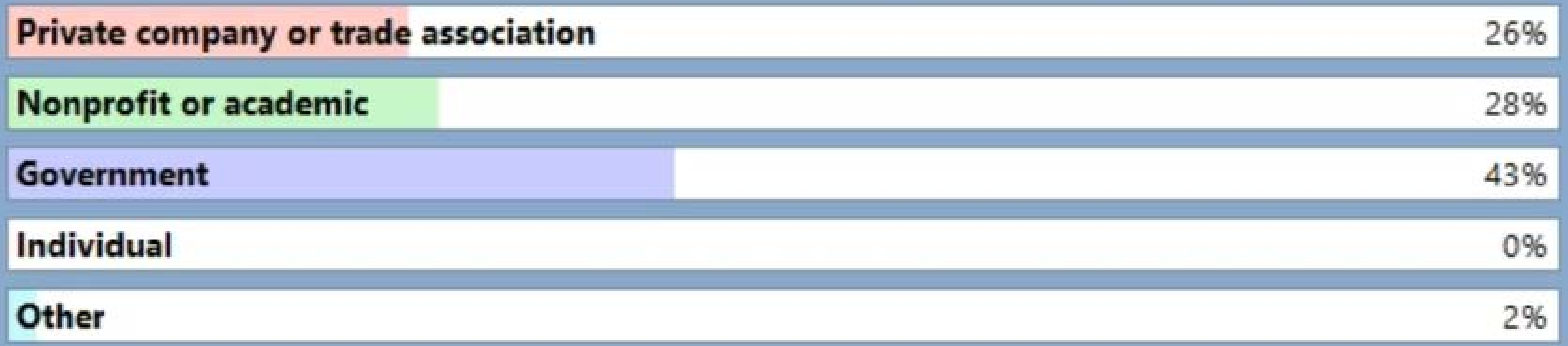
- Founded in 1996 by CEO Bruce Biewald
- Leader for public interest and government clients in providing rigorous analysis of the energy sector
- Staff of 35 includes experts in energy and environmental economics and environmental compliance
- Recent relevant experience with MA Comprehensive Energy Plan, Burlington (VT) Net Zero 2030 Roadmap, Building Decarbonization in California, Transforming Transportation in New York, Northeast Regional Assessment of Strategic Electrification
- Project team: Dr. Asa Hopkins, Pat Knight, Jamie Hall, Jason Frost, Ben Havumaki, Kenji Takahashi, and others

Poll: What organization do you represent?

A. Private company or trade association
B. Nonprofit or academic
C. Government
D. Individual
E. Other

What organization do you represent?

Poll Results (single answer required):



Project Overview

Project Goal and Deliverables

Project Goal

To investigate potential state and regional carbon pricing policies.

Final Deliverables

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

The purpose of this study is to provide an impartial assessment of various carbon pricing policies. It is intended to inform, not set, final policy design.

Three Focal Sectors

The study will focus on three focal sectors that account for 86% of GHG emissions in Rhode Island.

Transportation

36%

Electric

26%

Thermal

24%

Looking Forward

Tasks	May	Jun	Jul	Aug	Sep
Task 1. Project Management					
Task 2. Literature Review and Policy Selection *(Complete)*					
Task 3. Policy Analysis					
Task 4. Carbon Pricing and Economic Modeling					
Task 5. Stakeholder and EC4 Engagement					
Task 6. Final Report and Public Presentations					

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Initial Policy Findings

Poll: How familiar are you with carbon pricing?

A. Expert
B. Familiar
C. Somewhat familiar
D. Not very familiar
E. New to carbon pricing

How familiar are you with carbon pricing?

Poll Results (single answer required):

Policy and Literature Review

What was reviewed?

- Existing policies
- Studies on carbon pricing
- Proposed legislation
- Complimentary policies

RGGI Inc.

46 national and **31** subnational jurisdictions have implemented or scheduled carbon pricing initiatives

Factors Examined

- Sectors covered
- Program longevity
- Pricing mechanism
- Pricing levels
- GHG reductions

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Role of a Carbon Price

Disincentive

Drives a change in behavior or operations due to a higher cost of consuming fossil-based energy

Stick

The Energy System

Carrot

Incentive

Generates revenue for investing in greenhouse gas reduction programs

Greenhouse Gas Emissions Reductions

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Carbon Pricing Programs

Cap-and-Trade

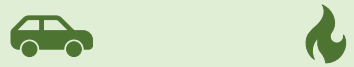
- Cap total emissions
- Tradeable emissions allowances
- Carbon price set by market forces
- Certainty on total emissions
- Generates revenue for investment or rebates

Carbon Fee

- Set fee per ton of CO2e
- Carbon price set by administrator
- Certainty on price
- Less certainty on emissions
- Generates revenue for investment or rebates

Rebates, such as a dividend or tax reduction, offset the costs incurred by the application of a fee or cap-and-trade program.

2020 Pricing Levels of Current Programs

Program	Type of Program	Focal Sectors Covered	Current Pricing Level (per metric ton CO2e)
Japan	Carbon Fee		$3
Regional GHG Initiative (RGGI)	Cap-and-Trade		$6
Transportation Climate Initiative (TCI)	Proposed Cap-and-Trade		$6-$22
South Africa	Carbon Fee		$9
California	Cap-and-Trade		$18
Northwest Territories	Carbon Fee + Rebate		$21
European Union ETS	Cap-and-Trade		$25
Korea	Cap-and-Trade		$33
British Columbia	Carbon Fee + Rebate		$42
Finland	Carbon Fee		$64
Switzerland	Carbon Fee + Rebate		$99
Sweden	Carbon Fee		$123

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Case Study: California Cap-and-Trade

Background

- Started in 2013 as part of larger climate change policy
- Broadest cap-and-trade program in the world
- Linked to Quebec (2014)
- Current Price is **$18**

Program Details

- Primarily covers transportation, electric, thermal, industry
- Covers about **85%** of GHG emissions
- Revenue is invested into efficiency and clean energy programs

Outcomes

- Raised **$9.3B** for investment
- Emissions declined **16%**
- **33.2%** growth in advanced energy jobs

Key Lessons

- Investment of revenue is a key part of program success at lower price levels
- Comprehensive GHG programs can be effective in reducing GHG emissions while preserving economic growth

Case Study: Swedish Carbon Fee

Background

- Implemented as part of 1991 national tax reform
- Initially set at **$28** per metric ton CO2e
- Current price is about **$123**

Program Details

- Primarily covers transport and building thermal
- Covers about **40%** of GHG emissions
- Revenue is not invested and applied to the general fund (reducing other taxes)

Outcomes

- Emissions declined by **26%**
- **54%** of final energy use is renewable

Key Lessons

- High price can be effective in reducing GHG emissions while preserving economic growth, even without investment
- Limited scope limits total impact

Clarifying Questions

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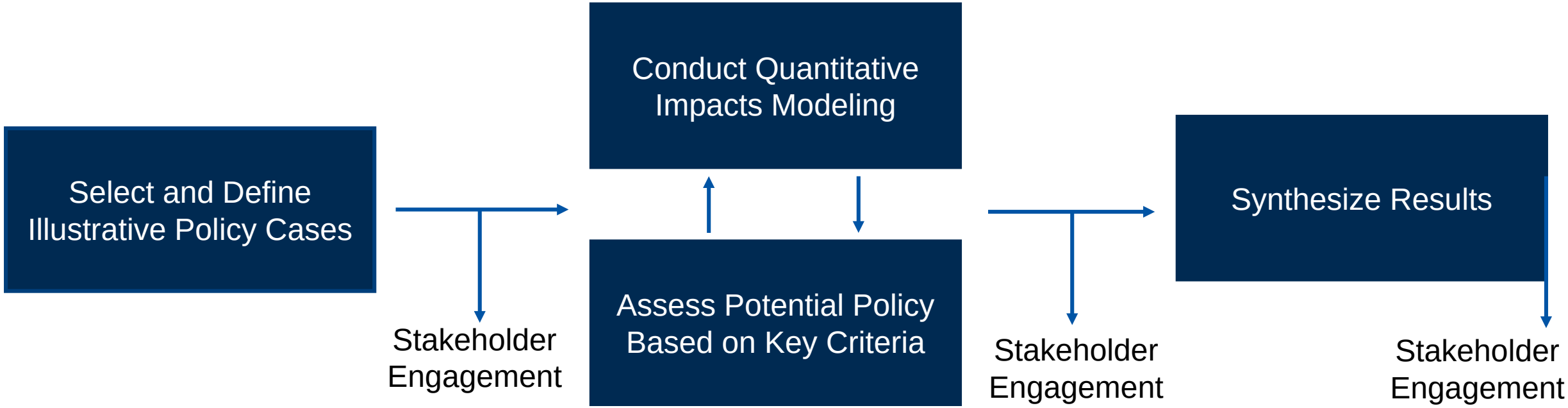
Policy Evaluation and Modeling

Analytical Approach



Selecting Pricing Levels to Study

Pricing levels are meant to be illustrative and informative for the study.

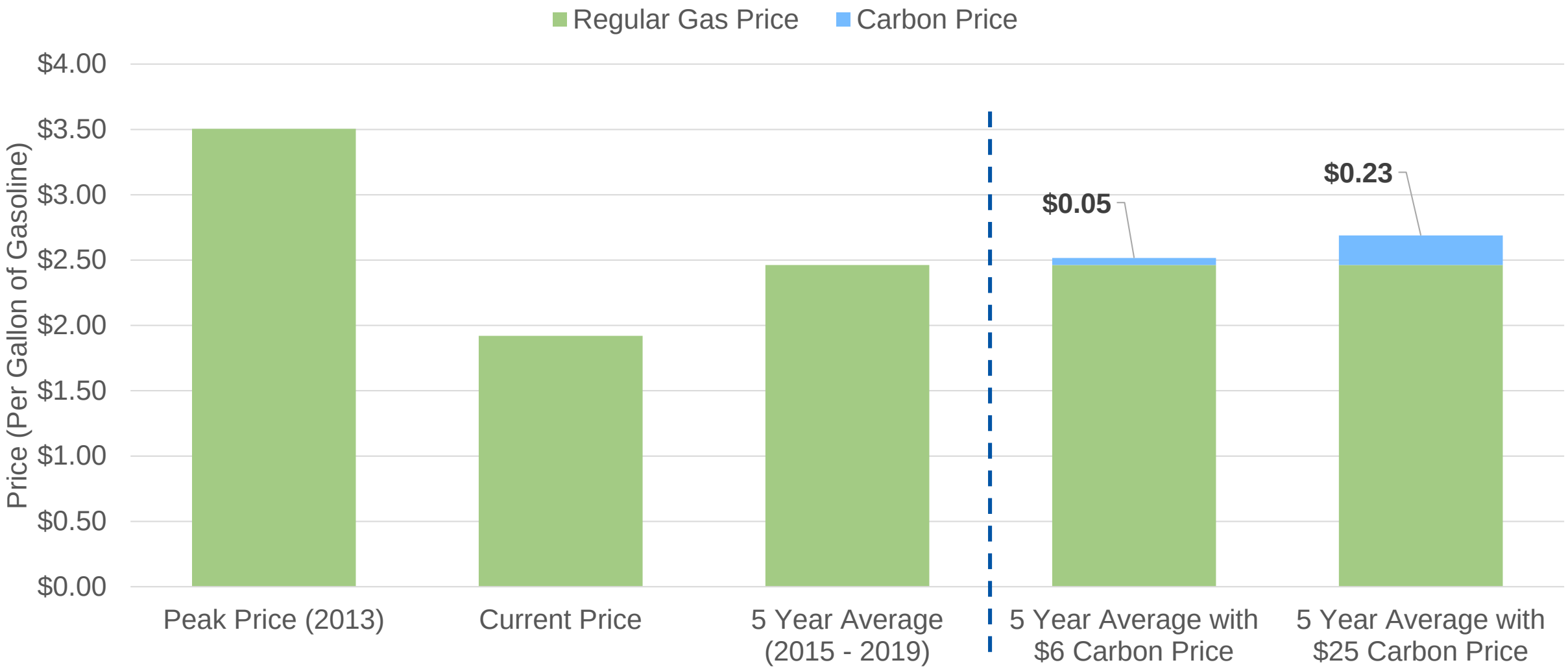
Low Price

- *Generates revenue for investing in decarbonization programs*
- Applied to specific sectors
- $6 per metric ton of CO_2e in 2021
- Increasing 5% annually above rate of inflation
- Price corresponds to RGGI
- GHG reductions will be driven by reinvestment

High Price

- *Provides a mechanism to change behavior*
- Applied to all sectors
- $25 per metric ton of CO_2e in 2021
- Increasing 5% annually above rate of inflation
- Price corresponds to EU ETS
- GHG reductions driven by both reinvestment and behavior change
- Rebate to return some funds to RI citizens

Contextualization: Impact on Gas Prices



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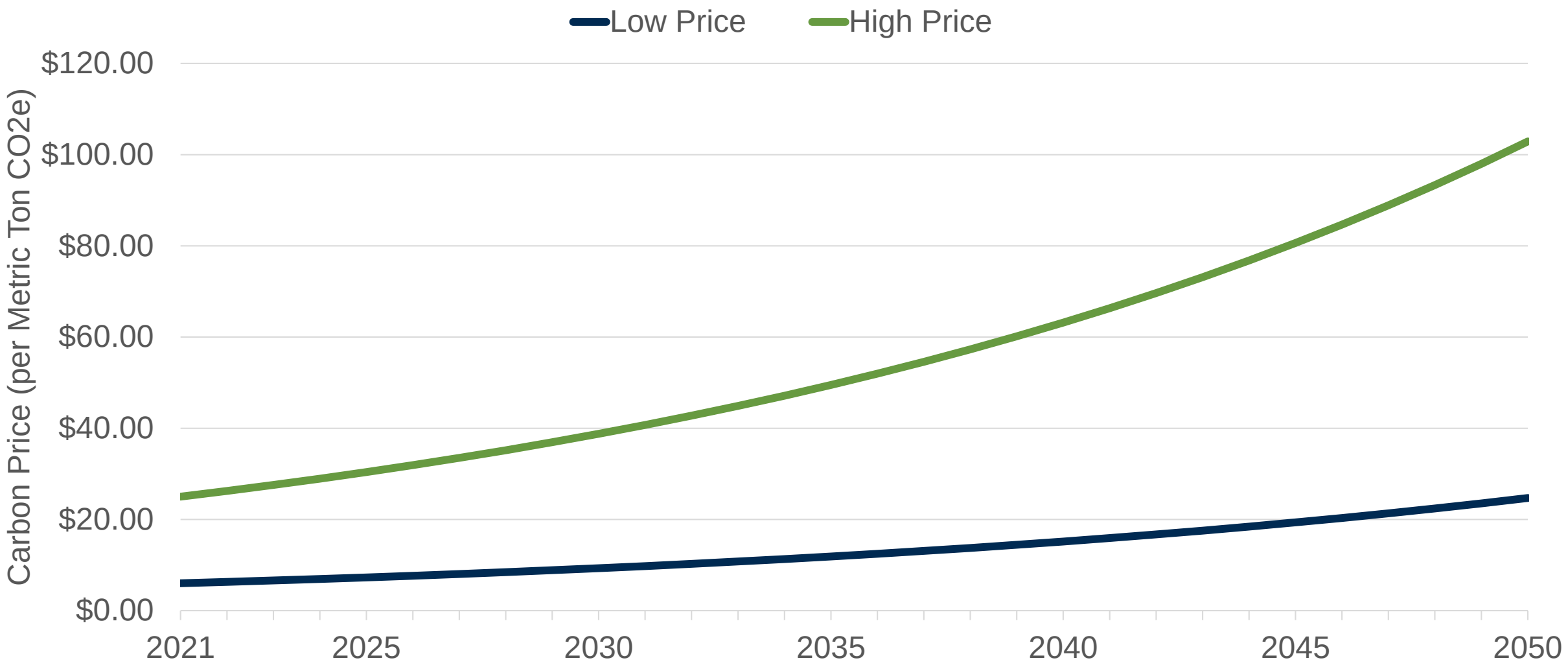
Pricing Levels Over Time



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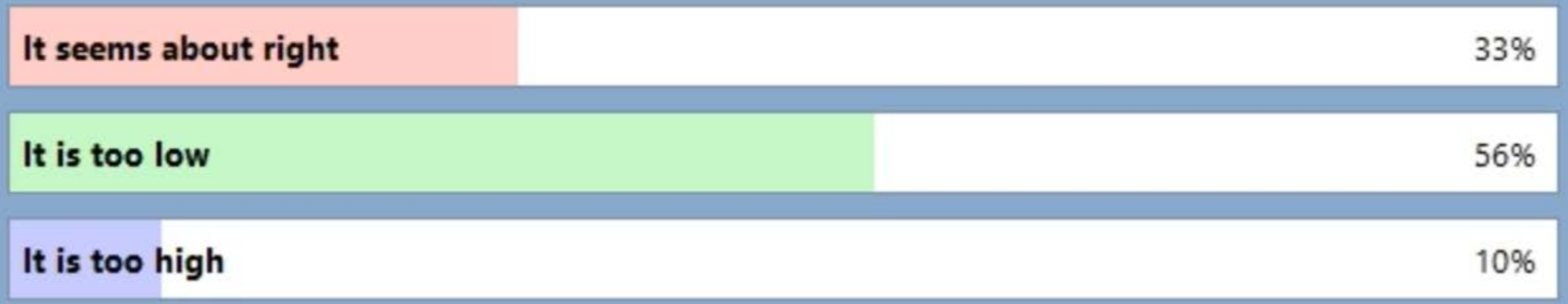
Poll: From your perspective, please rate the appropriateness of the ***low price*** for this study.

A. It seems about right
B. It is too low
C. It is too high

From your perspective, please rate the appropriateness of the low price for this study.

Poll Results (single answer required):



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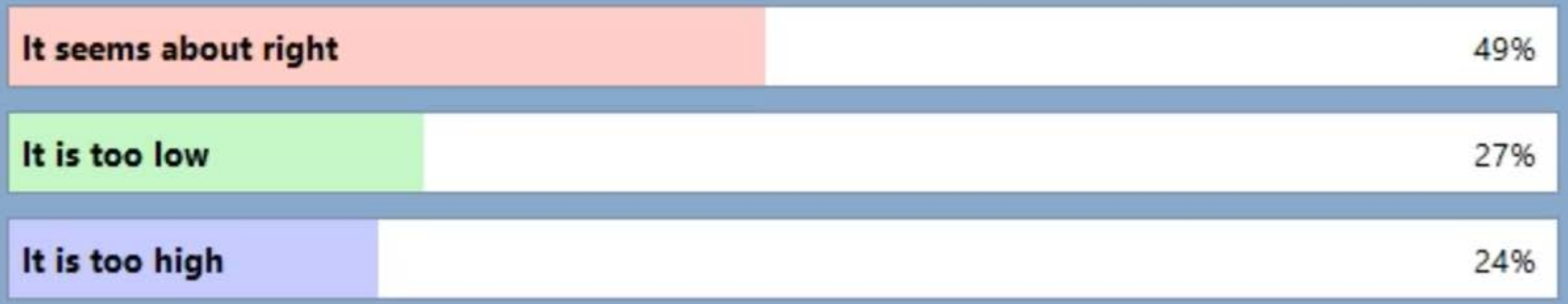


Scenario 1: Low CO_2 Price – Transportation

Low price applied to the transportation sector

- **Transportation and Climate Initiative**
  - Proposed cap-and-invest program
  - Aligns with estimated starting price range: $6 to $22
  - Regional cooperation

- **Transportation Investment**
  - Incentives for light duty zero emissions vehicles (ZEV)
  - Low carbon and ZEV buses, trucks, freight programs
  - Public transit
  - Active transportation

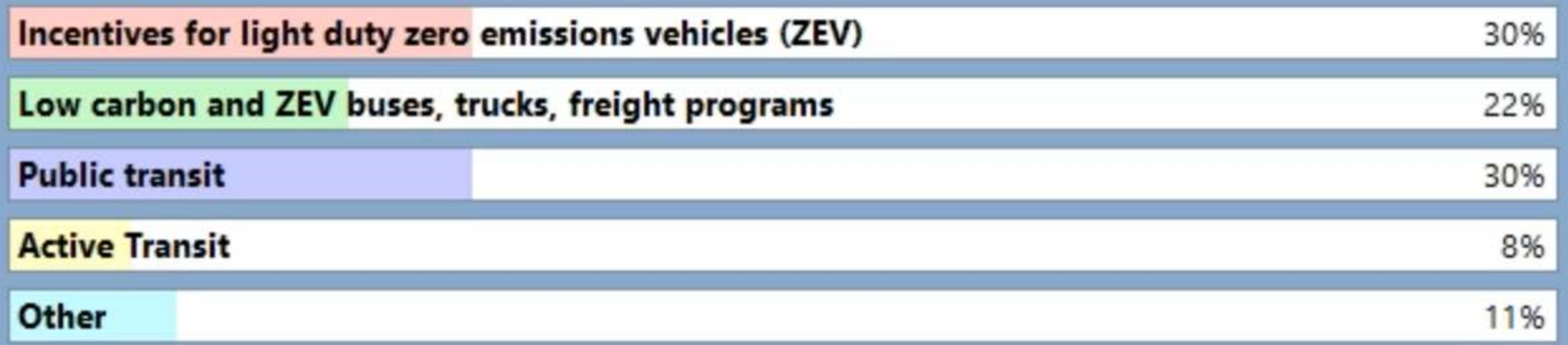
- **Goals Informed by Recent Decarbonization Studies**
  - Transportation and Climate Initiative preliminary analysis (2019)
  - RI Greenhouse Gas Emissions Reduction Plan (2016)
  - Deeper Decarbonization in the Ocean State (2019)

Poll: Which transportation investment category is most important to you?

A. Incentives for light duty zero emissions vehicles (ZEV)
B. Low carbon and ZEV buses, trucks, freight programs
C. Public transit
D. Active transit
E. Other

Which transportation investment category is most important to you?

Poll Results (single answer required):



Scenario 2: Low CO_2 Price – Building Thermal

Low price applied to the thermal sector

- Study to differentiate impacts on residential and commercial subsectors
- Regional Cooperation

- **Thermal Investment**
  - Energy efficiency
  - Carbon-reducing heating equipment incentives (e.g., heat pumps)
  - Rhode Island Low Income Home Assistance Program (LIHEAP) or similar program

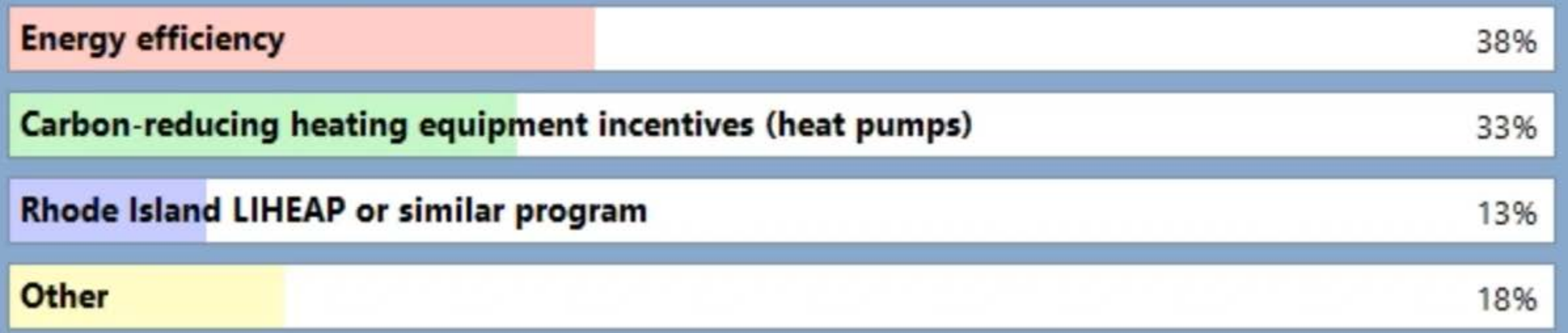
- **Goals Informed by Decarbonization Studies**
  - Rhode Island Greenhouse Gas Emissions Reduction Plan (2016)
  - Deeper Decarbonization in the Ocean State (2019)
  - Heating Sector Transformation in Rhode Island (2020)

Poll: Which building thermal investment category is most important to you?

A. Energy efficiency
B. Carbon-reducing heating equipment incentives (e.g., heat pumps)
C. Rhode Island Low Income Home Assistance Program (LIHEAP) or similar program
D. Other

Which building thermal investment category is most important to you?

Poll Results (single answer required):



Scenario 3: High CO_2 Price and Rebate

High price applied to transportation, thermal, and electricity sectors

- **Regional Cooperation**

- **Investment**
  - Investment is assumed to occur at the same levels as the low price scenarios
  - Current RGGI investments used for electric sector

- **Rebate**
  - Total amount available for rebate is any revenue remaining after investment
  - Policy analysis will review different rebate approaches

Clarifying Questions

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Policy Assessment

Qualitatively assess policy scenarios on several criteria

Modeling Approach

4. Model Impact of Carbon Pricing and Investment

Carbon pricing policies impact energy system through two mechanisms: **elasticity of demand**, and **programmatic investment.**

Low prices primarily impact energy use by **programmatic investment**

- E.g., transportation-sector funding spent on EV incentives, EV infrastructure, transit, etc.
- Model using consumer adoption models (e.g., MA3T)

Higher prices will **also** have an impact through **elasticity of demand**

- Consumers use less of a fuel as it gets more expensive
- Near term behavioral change (e.g., driving less, choosing to telework)
- Longer term investment choices (e.g., which vehicle to buy, or whether to buy one at all)
- Model with Carbon Tax Assessment Model

4. Model Impact of Carbon Pricing and Investment

Integrate the results into **self-consistent** pictures of Rhode Island in each policy case

- E.g., vehicle investment choices are driven by the **combination** of relative fuel prices (elasticity) and availability of incentives and fueling infrastructure (programmatic)
- Track stock and use of vehicles and building equipment using Synapse's EV-REDI, Building Decarbonization Calculator, and M-SEM tools
- Evaluate economic impacts with IMPLAN, supplemented with "example household" analysis

Example: New York electrification analysis

Figure 3. EV sales a % of new vehicle sales, LDVs only

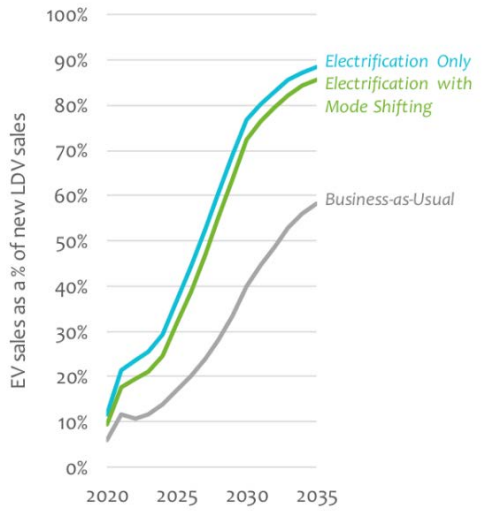
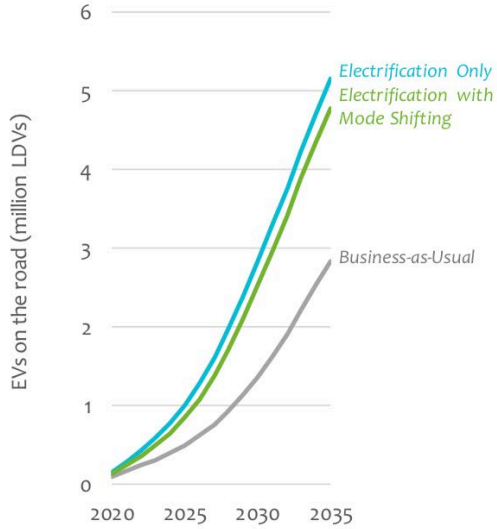


Figure 4. EVs on the road, million LDVs



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Next Steps

We Welcome Your Input

Please send your feedback to:

- **Jesse Way**, *of Cadmus*, (jesse.way@cadmusgroup.com);
- **Chris Kearns,** *of the Rhode Island Office of Energy Resources* (christopher.kearns@energy.ri.gov);
- **Elizabeth Stone,** *of the Rhode Island Department of Environmental Management* (elizabeth.stone@dem.ri.gov).

Please submit your feedback and questions by **Friday, May 29**. Thanks!

Key Feedback Questions

- Are the carbon prices set at appropriate levels for this study?
- How should revenue investment be prioritized in the transportation and building thermal sectors?
- Is there additional criteria that should be assessed in the qualitative policy analysis?

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Thank You

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Questions?

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