MASSACHUSETTS INTERAGENCY RATES WORKING GROUP

A Collaboration to Advance Near- and Long-Term Rate Designs that Align with the Commonwealth's Decarbonization Goals

LISTENING SESSION #1 – MAY 6, 2024

Executive Office of Energy and Environmental Affairs

MASSACHUSETTS CLEAN ENERGY CENTER®

DOER Massachusetts Department of Energy Resources

OFFICE OF THE ATTORNEY GENERAL COMMONWEALTH OF MASSACHUSETTS

AGENDA

I. Opening Remarks

II. Interagency Rates Working Group (IRWG) Introduction

III. Presentation from E3

IV. Public Comment

V. Future Stakeholder Opportunities

CONTEXT & PURPOSE

- Existing electric rates jeopardize the Commonwealth's clean energy goals as they remain a barrier to building and transportation electrification
- Massachusetts Interagency Rates Working Group (IRWG) was formed to **advance near- and long-term electric rate designs that align with the Commonwealth's decarbonization goals** by prioritizing the reduction of energy burden while incentivizing transportation and building electrification
  - Includes representatives from the Executive Office of Energy & Environmental Affairs (EEA), the Massachusetts Clean Energy Center (MassCEC), the Department of Energy Resources (DOER), and the Attorney General's Office (AGO)

SCOPE OF WORK

I. Electric Rates Assessment

- Status of current electric rates in MA
- Existing legal, policy, and regulatory parameters
- Alternative rate structures offered in other jurisdictions

II. Near-Term Rates Strategy (up to 5 yrs)

- Identify existing rate option barriers
- Propose alternative rate offering(s) that can be utilized during / prior to full AMI implementation

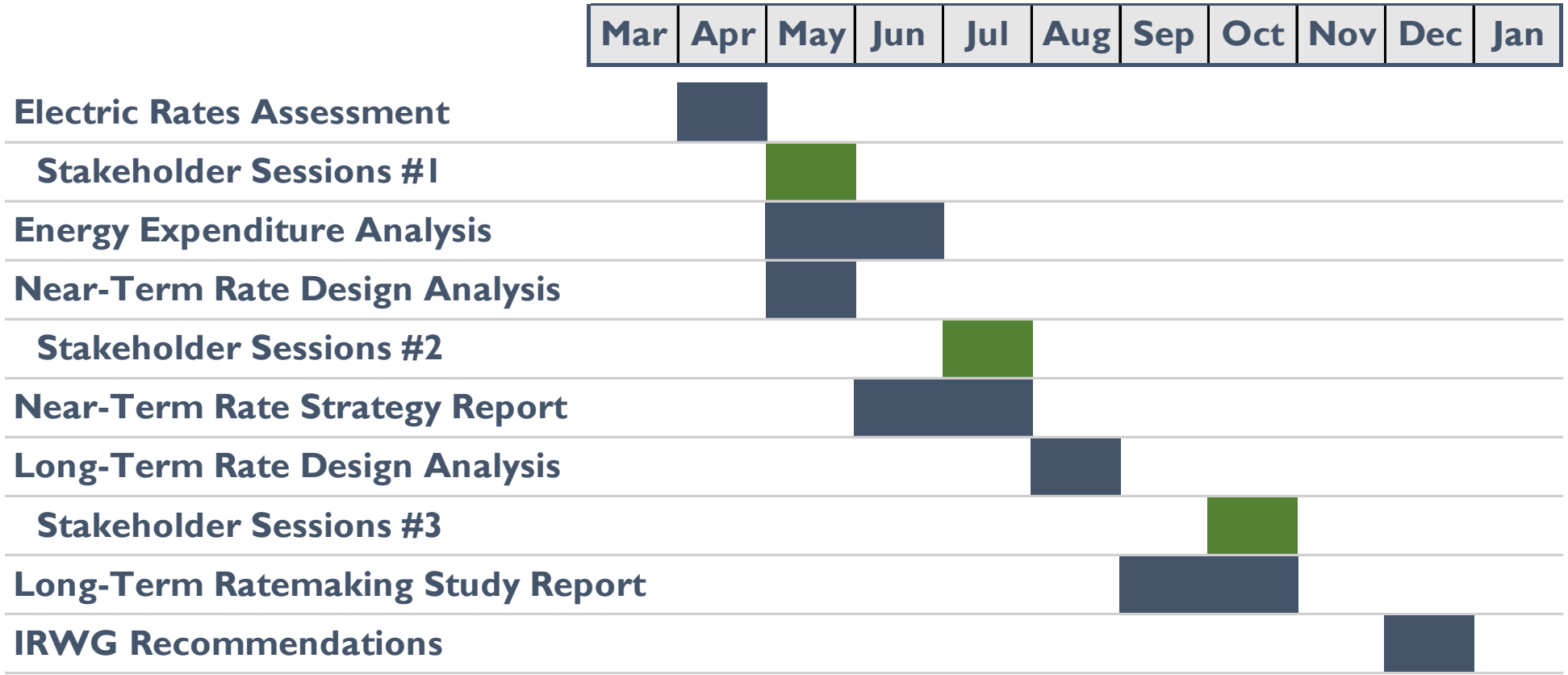
III. Long-Term Ratemaking Study (5-10 yrs)

- Address regulatory/ratemaking mechanisms
- Recommend AMI-enabled rate designs
- Consider long-term energy affordability

RATE DESIGN PRIORITIES

- **Reduce Energy Burden and Support Electrification** using new rate structures that will promote energy affordability and incentivize transportation and building electrification
  - Minimize or mitigate barriers for ratepayers to electrify end-uses
  - Create rate design features targeted to reducing the energy burden for ratepayers, particularly for low- and moderate-income ratepayers and vulnerable populations
- **Increase Distributed Energy Resources (DER) Opportunities and Penetration** to advance decarbonization and electrification
  - Promote DER and equitably allocate costs (e.g., the costs of interconnection, incentive programs, etc.) through rate design
- **Integrate Distribution System Planning** into the utility's business-as-usual operations and investments
  - Pursue least-cost distribution system upgrades that accommodate transportation and building electrification and other new loads
- **Promote Operational Efficiency** to facilitate the transition to a distributed grid
  - Utilize price signals to achieve effective load management, including peak demand reduction
  - Improve grid reliability, communications, and resiliency

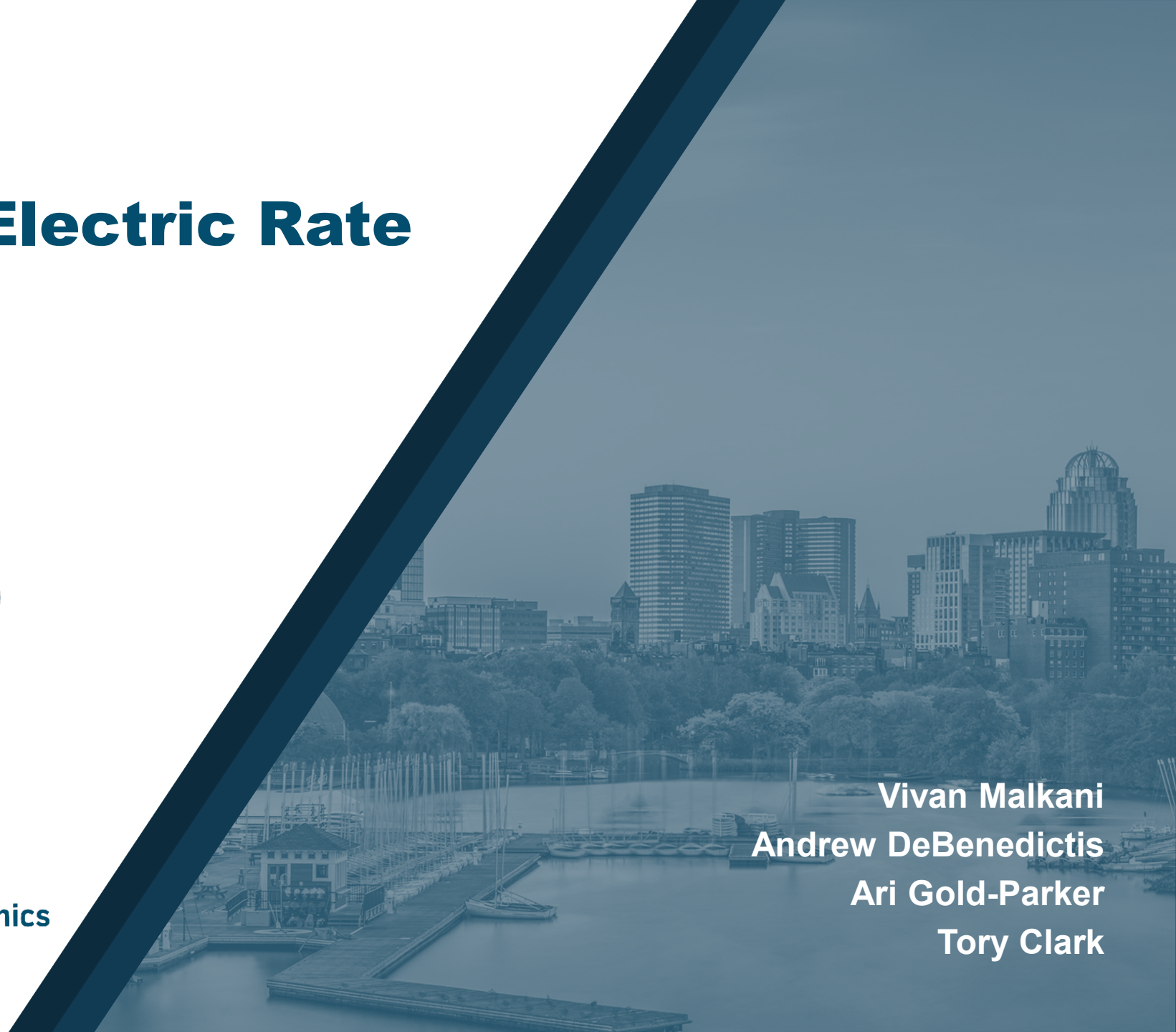
EXPECTED TIMELINE



Massachusetts Electric Rate Design Study

Study Context and Scope

May 06, 2024



Vivan Malkani
Andrew DeBenedictis
Ari Gold-Parker
Tory Clark

Energy+Environmental Economics

About Energy & Environmental Economics (E3)

Technical and Strategic Consulting for the Clean Energy Transition

Our parent company: WILLDAN

~110 consultants across 4 offices with expertise in economics, engineering, policy, & modeling

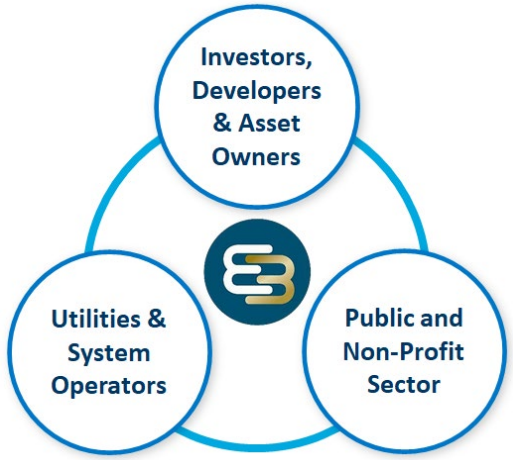

San Francisco


New York


Boston


Calgary

300+ projects per year across our diverse client base



Example E3 Projects

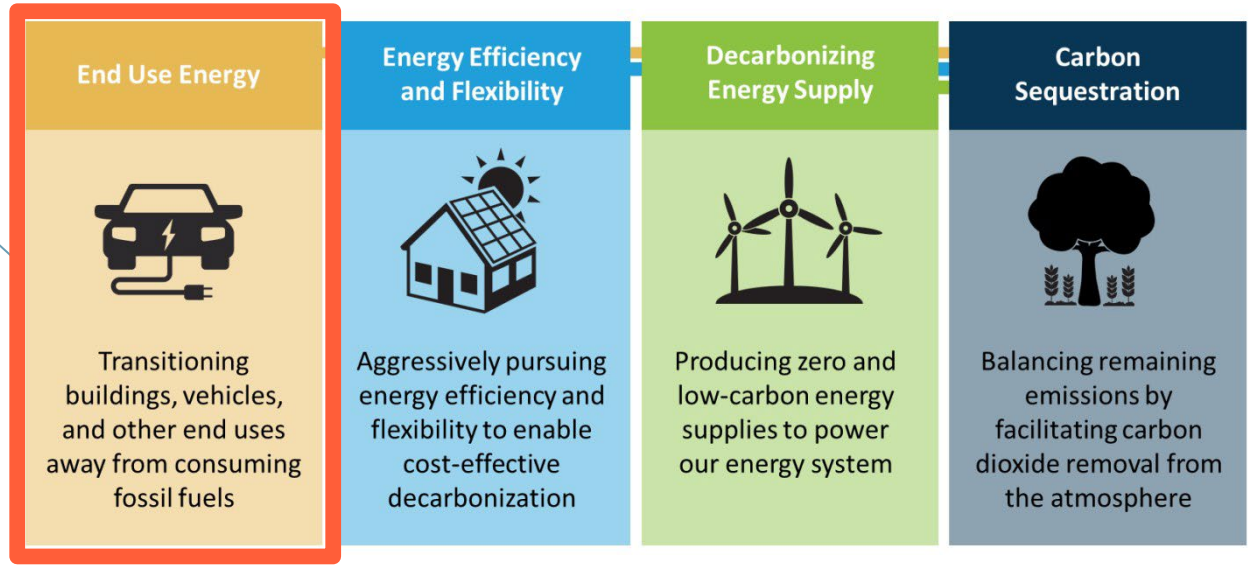
- **Massachusetts Storage Roadmap** – Supported MassCEC/DOER to develop the *Charging Forward* report on current and future use cases for energy storage in Massachusetts
- **CA Income-Based Fixed Charge Model** – Supporting California PUC in electric rate design proceeding exploring use of income-graduated fixed charges
- **Massachusetts Future of Gas Utility Support** – Conducted decarbonization pathways study for MA local gas distribution companies for DPU "future of gas" 20-80 regulatory proceeding
- **NYSERDA Building Electrification and Efficiency Model (BEEM)** – Worked with NYSERDA to analyze impacts of measure adoption across thousands of building types

Overview

- **Role of building and transportation electrification in meeting MA climate goals**
- **Electrification and energy affordability**
- **Overview of today's electric rates in MA**
  - Understanding electricity bills
  - Understanding utility cost recovery through rates
- **Restating key study research objectives**
- **Alternative rate structures to explore in the near-term and long-term**
  - Example 1: Lowering volumetric rates
  - Example 2: Time-varying rates
- **Modeling framework**
  - Household energy expenditure model (HEEM) overview
- **Next steps**

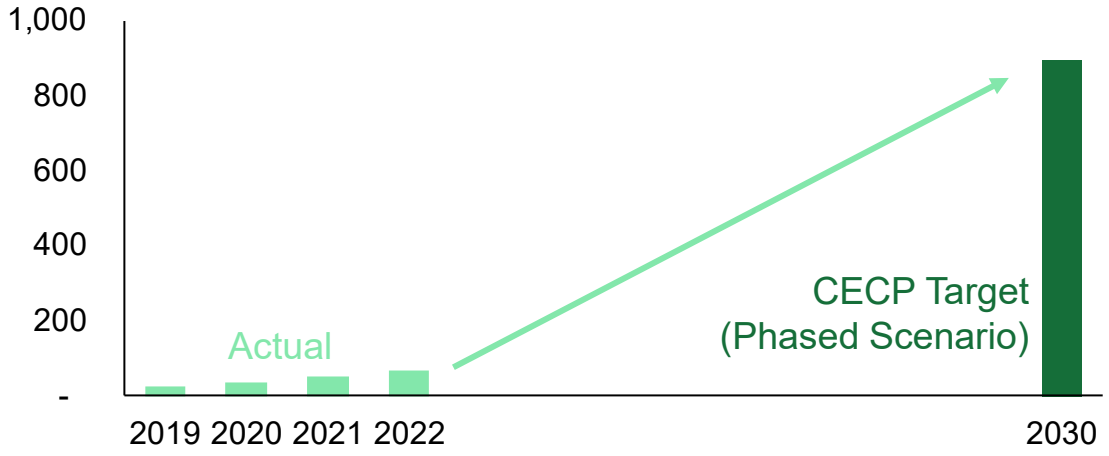
Transportation and building decarbonization are pillars of MA's climate goals as defined by the Clean Energy and Climate Plan

2030 statutory greenhouse gas reduction limits:
Transportation - 34%
Residential heating and cooling - 49%
Compared to 1990 levels

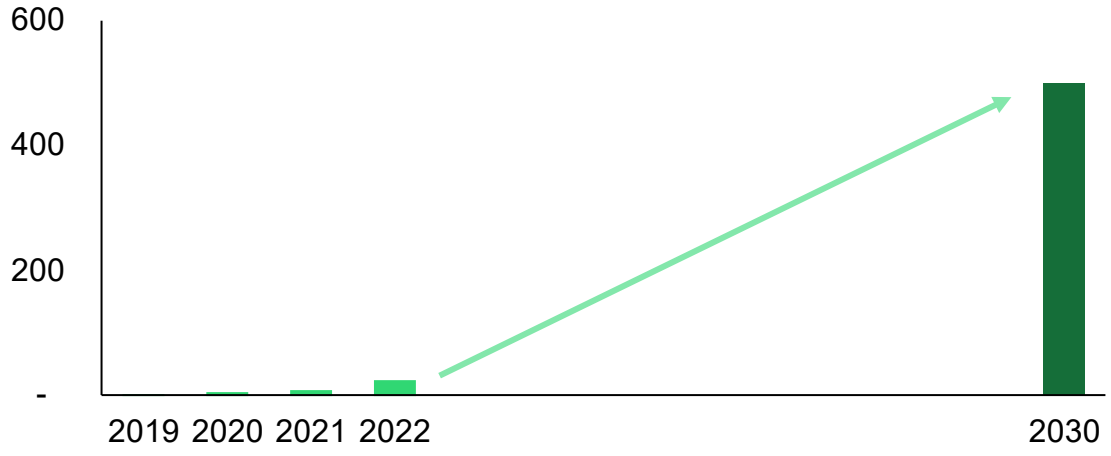


2050 economy-wide net-zero emissions limit, with 85% gross emission reduction limit
Compared to 1990 levels

Registered Light-Duty Electric Vehicles (1,000s)*



Electric Heat Pumps Installed (1,000s)*

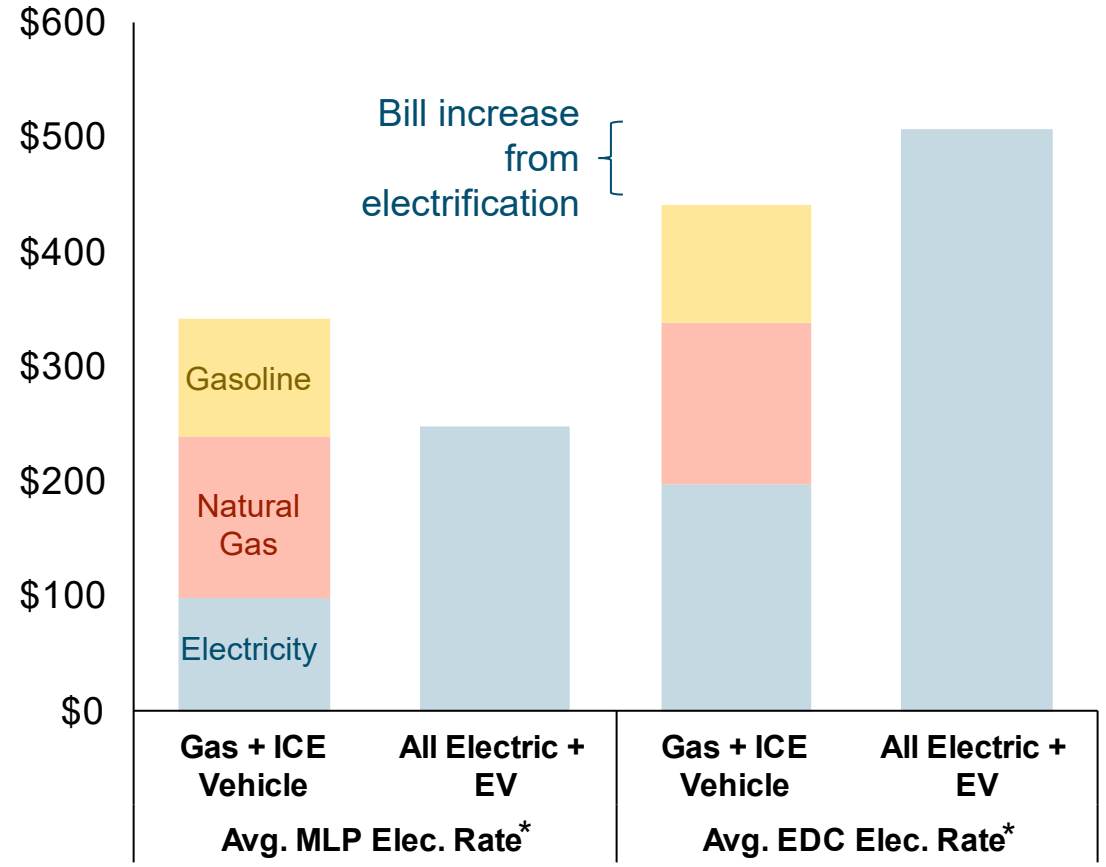


*Executive Office of Energy and Environmental Affairs - Clean Energy and Climate Metrics Tracker

Electrification required to achieve decarbonization may worsen affordability under current MA rates

- Massachusetts' Climate and Clean Energy Plan identified building and transportation electrification as crucial strategies to achieve economy-wide decarbonization
- However, bill increases resulting from electrification present energy affordability challenge and present an obstacle to clean technology adoption needed to achieve decarbonization
- With today's electric rate structures, increasing electric load may lead to potentially significant increases in monthly energy burden, despite high efficiency of electrified technologies

Illustrative MA home monthly energy expenditure
$/month

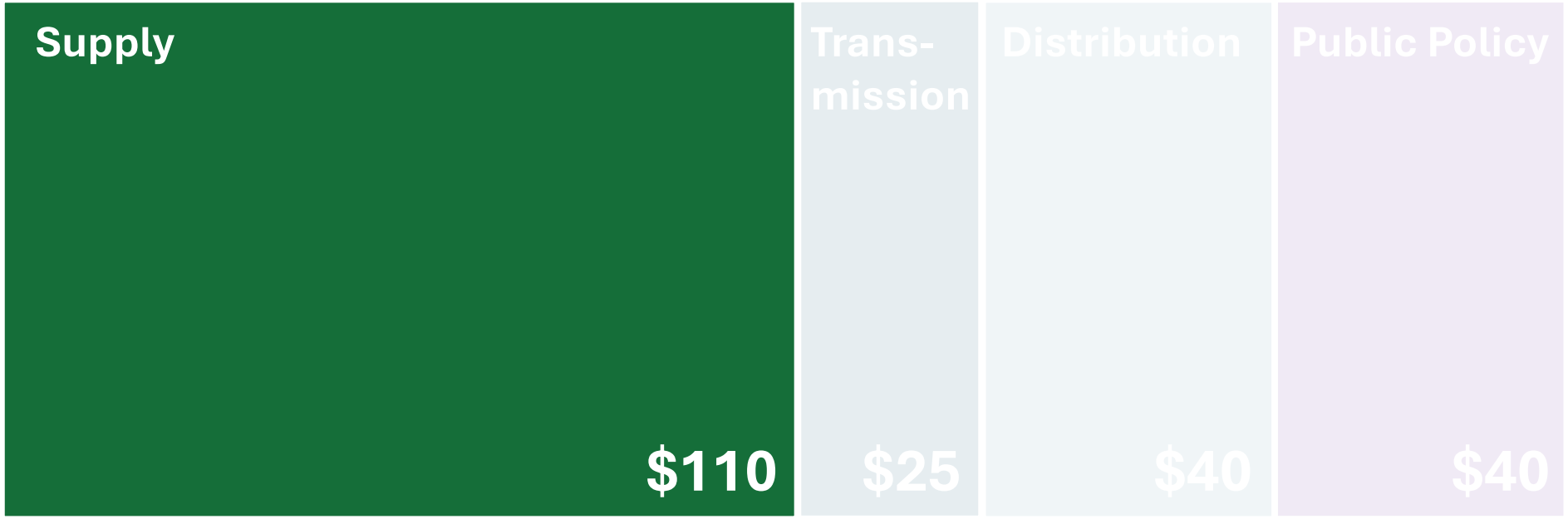


*MLP = municipal light plant, EDC = electric distribution company

Electric bills cover costs of grid hardware, supporting labor, program funding, and electricity itself

Example monthly electricity bill, 600 kWh/month customer
$/month

Total bill: $215

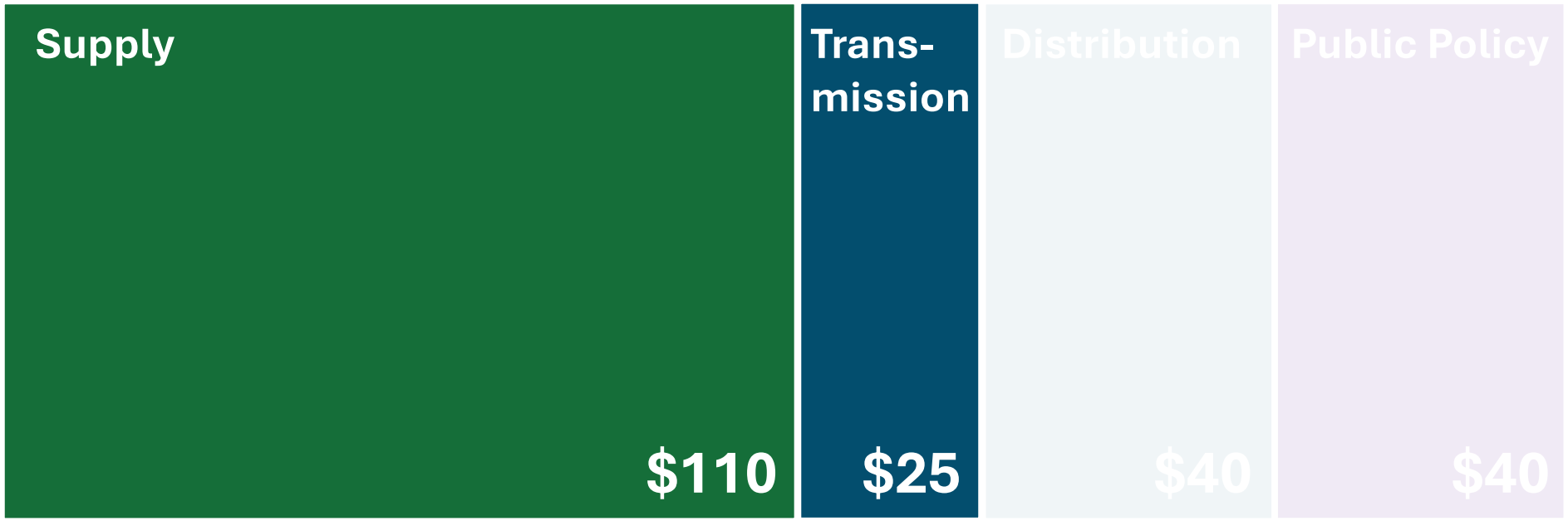


Wholesale cost of electricity generated or procured
Service provided by: Utilities, municipal aggregation, or competitive supply

Electric bills cover costs of grid hardware, supporting labor, program funding, and electricity itself

Example monthly electricity bill, 600 kWh/month customer
$/month

Total bill: $215



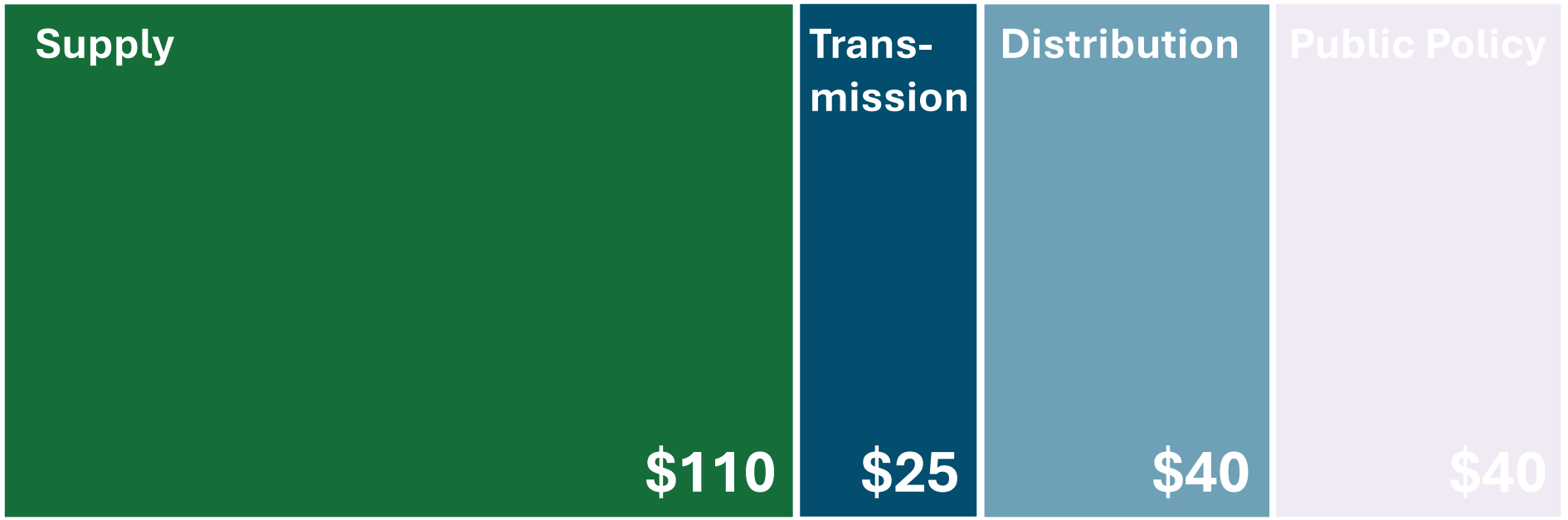
Cost of building and operating transmission system connecting generators & distribution systems
Service provided by: Utilities, ISO-NE

Wholesale cost of electricity generated or procured
Service provided by: Utilities, municipal aggregation, or competitive supply

Electric bills cover costs of grid hardware, supporting labor, program funding, and electricity itself

Example monthly electricity bill, 600 kWh/month customer
$/month

Total bill: $215



Cost of building and operating transmission system connecting generators & distribution systems
Service provided by: Utilities, ISO-NE

Wholesale cost of electricity generated or procured
Service provided by: Utilities, municipal aggregation, or competitive supply

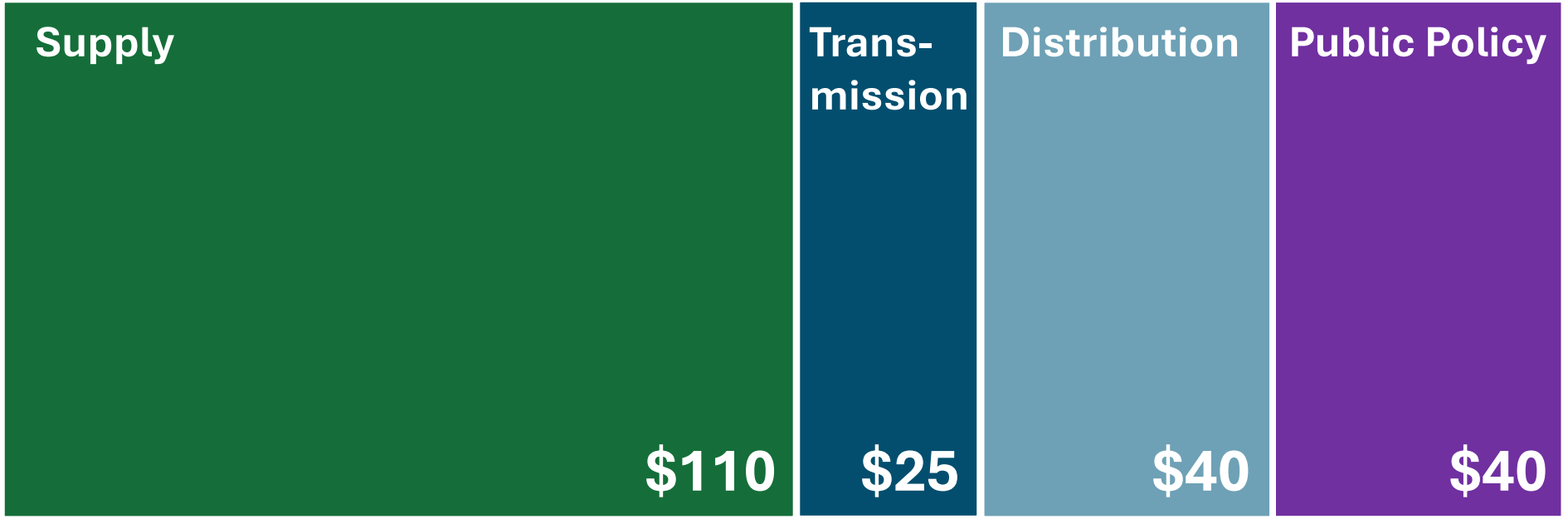
Cost of building and operating distribution system delivering electricity to homes and businesses
Service provided by: Utilities

Electric bills cover costs of grid hardware, supporting labor, program funding, and electricity itself

Example monthly electricity bill, 600 kWh/month customer
$/month

Total bill: $215

Cost of building and operating transmission system connecting generators & distribution systems
Service provided by: Utilities, ISO-NE



Funding for programs including bill assistance, energy efficiency, clean energy, etc.
Service provided by: Variety of state and utility programs

Wholesale cost of electricity generated or procured
Service provided by: Utilities, municipal aggregation, or competitive supply

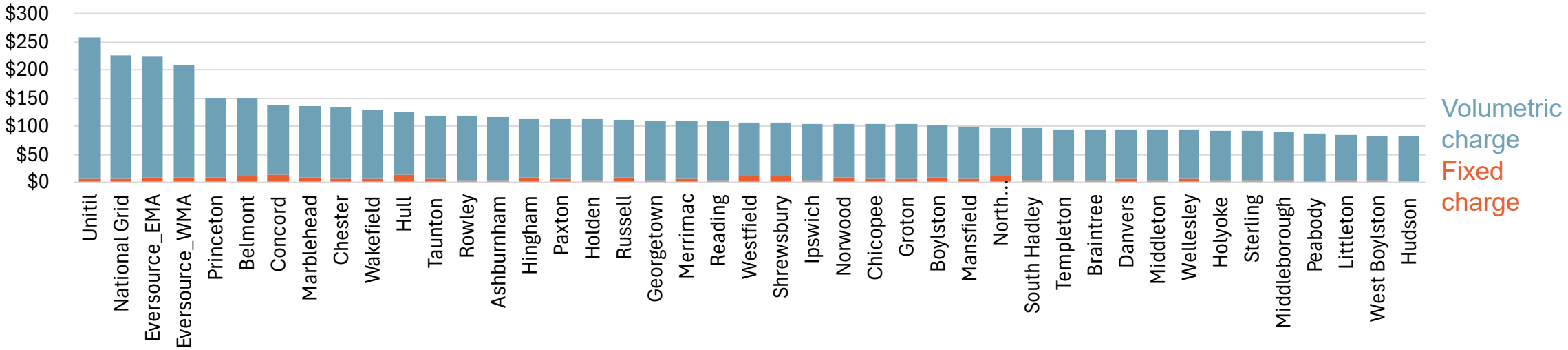
Cost of building and operating distribution system delivering electricity to homes and businesses
Service provided by: Utilities

Electric rates recover costs through a combination of fixed and volumetric charges

+ **Residential electric rates are composed of volumetric ($/kWh) and fixed (monthly $/customer) components**
  - Historically, electric system costs were driven by the price of fossil fuels, and volumetric rates provided a strong price signal for conservation
  - Today, there are key questions about whether rate designs are impeding electrification of vehicles and buildings

Example 2023 monthly electricity bills for 600 kWh/month customer

$/month



Rate design changes the way customers pay for electricity, but does not change the total amount of revenue that utilities collect

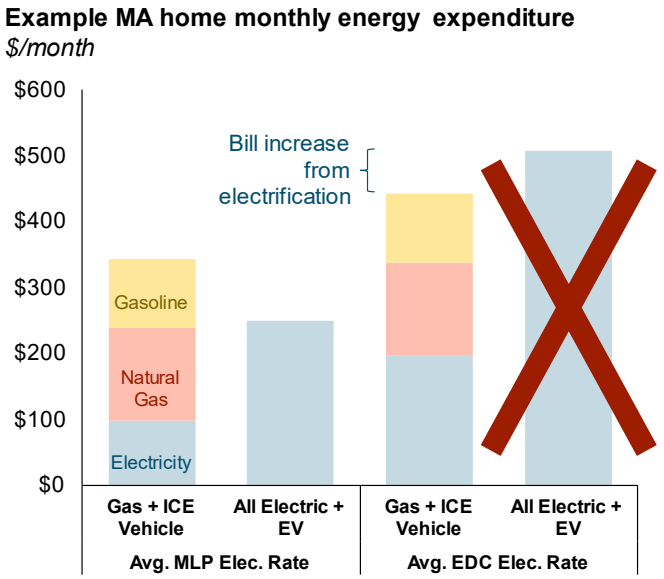
This study will provide guidance to realign electric rate structures with the grid and policy goals of the future

- **Interagency Rates Working Group goal is to advance near- and long-term electric rate designs that prioritize the reduction of energy burden while incentivizing transportation and building electrification**
- **Key components of this study will include:**
  - Exploring the bill impacts of existing and new rate designs across a wide range of representative MA residents
    - Task will include assessment of existing electric rates in the state as well as novel rate structures offered in peer jurisdictions
  - Identifying a potential roadmap of near-term and long-term rate design options for the Commonwealth
    - Task will include synthesis of policy, technology, and regulatory ratemaking considerations in MA in the near- and long-term

Other rate designs may improve electrification signals without compromising affordability

Current Rates

High volumetric rate structures



Future Alternatives

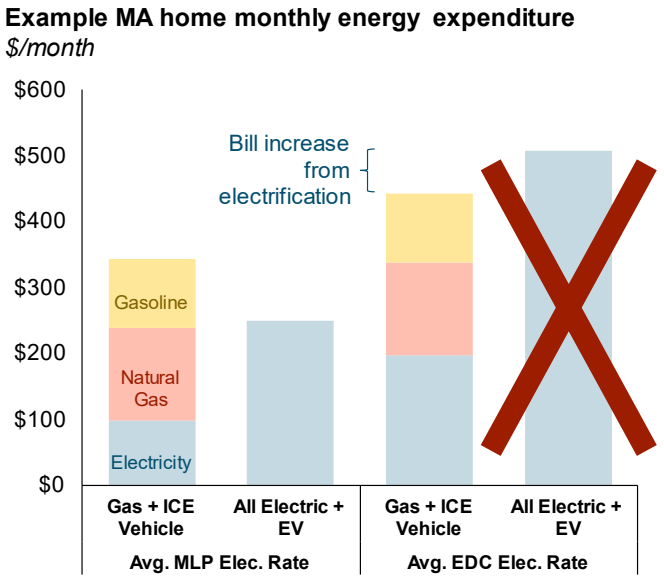
Low volumetric rate structures

Time-varying rate structures

Other rate designs may improve electrification signals without compromising affordability

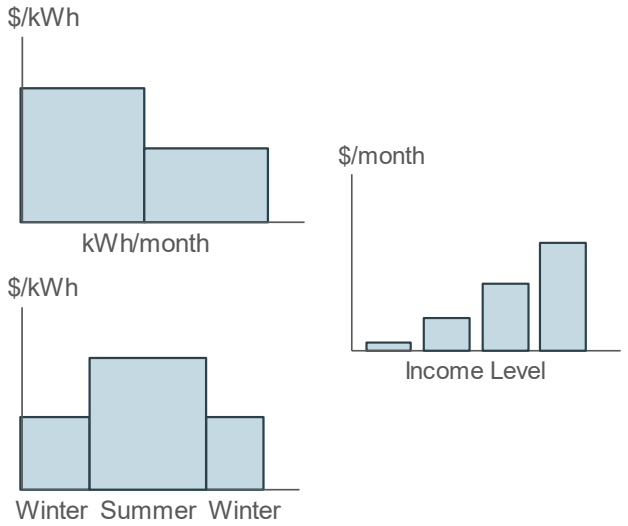
Current Rates

Higher volumetric rate structures

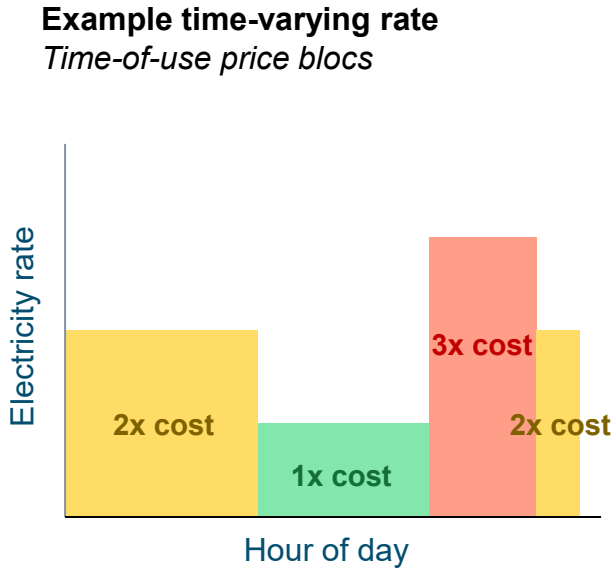


Future Alternatives

Reduced volumetric rate structures



Time-varying rate structures



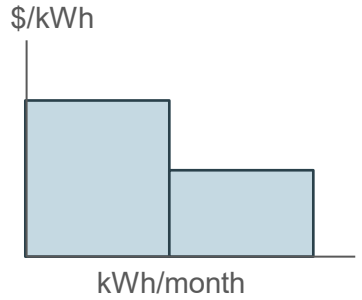
Reminder: Rate design changes the way customers pay for electricity, but does not change the total amount of revenue that utilities collect

Example 1: Lowering volumetric charges

Lower volumetric rates

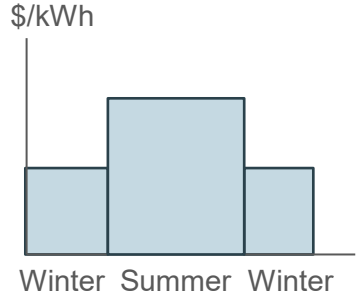
Need to recover missing revenue elsewhere

Charge less per-kWh for high usage (Declining block rates)



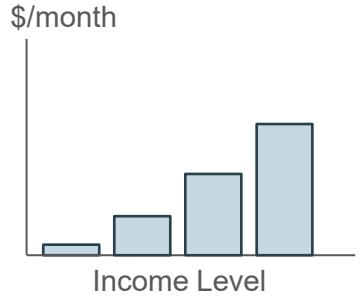
Costs that do not depend on usage already recovered by first X kWh

Differentiate summer vs winter charges (Seasonal rate)



Many system costs determined by peak usage during summer months (in near-term)

Increase fixed charges



Income graduation can mitigate affordability concerns with fixed charges

Note: These elements are not mutually exclusive, and could apply to all customers or to **technology-specific** rates for EV and/or heat pump owners

Example "heat pump" rate:

Central Maine Power: Raise fixed cost ($22/mo to $38/mo) and reduce winter-time volumetric rates when electric heating consumption is highest

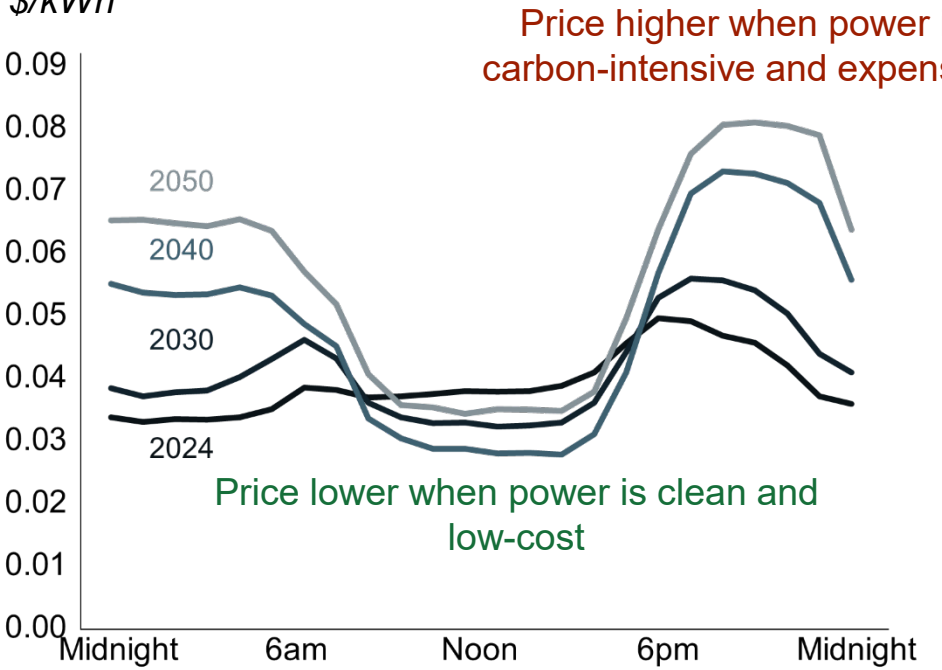
- May through October: $0.14 / kWh
- November through April: $0.004 / kWh (a 97% lower volumetric rate)

Example 2 (longer term): Using time-varying rates (TVR) to better align rates with costs

+ **TVR aligns customer and utility costs, providing price signal to shift and/or reduce consumption away from key hours of constrained supply**
  - Requires advanced metering infrastructure (AMI) to track hourly usage, widespread deployment expected by 2027-2028
+ **For example, Hawaiian Electric "Shift and Save" volumetric rates follow a 1:2:3 ratio**

2021 MA Average daily wholesale electric supply cost*

$/kWh

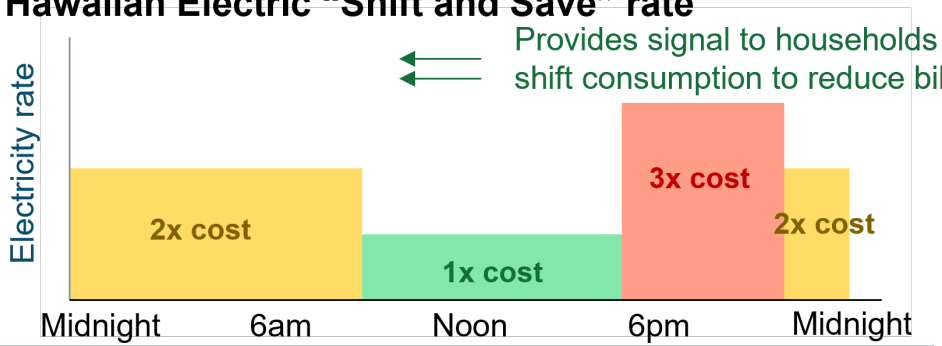


Example TVR rate

Hawaiian Electric: three blocks of time-varying costs to incentivize load shifting and peak

- **1x costs during daytime**, when generation costs and emissions are lowest due to high penetration of solar
- **2x costs overnight**, when electricity generation relies on fossil fuels, i.e. more expensive and emissions-intensive than daytime
- **3x costs during evening peak**, i.e. period of maximum grid stress and emissions intensity

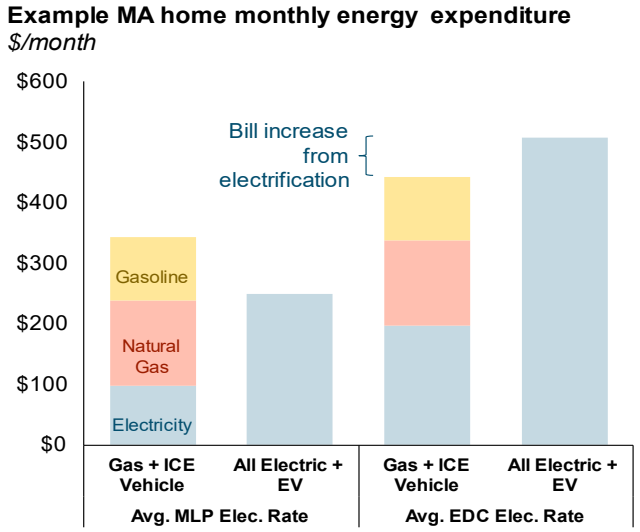
Hawaiian Electric "Shift and Save" rate



*MA Avoided Energy Supply Costs, 2021

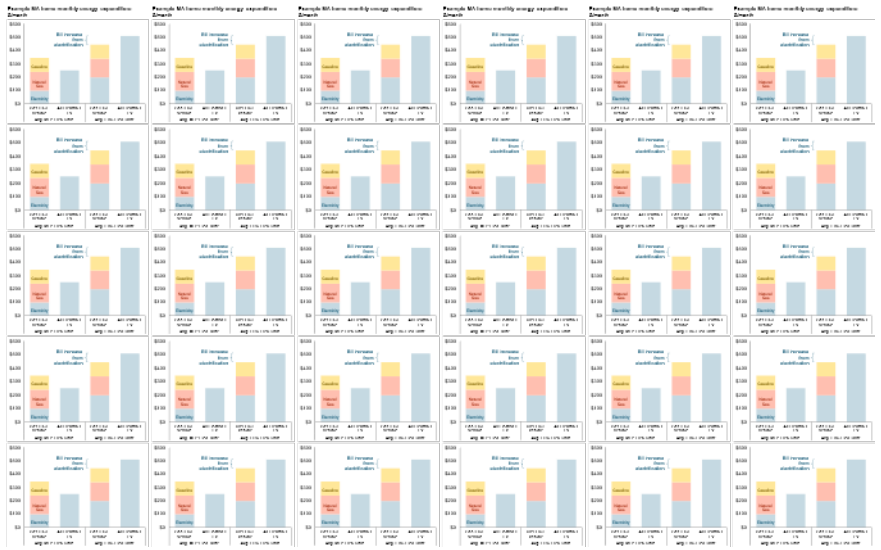
Understanding energy affordability impacts across a variety of customers is crucial to exploring different rate designs

- "Average" customer bill impacts obscure the range of customer experiences and the connections between impacts and key drivers



Understanding energy affordability impacts across a variety of customers is crucial to exploring different rate designs

- "Average" customer bill impacts obscure the range of customer experiences and the connections between impacts and key drivers
- E3 will develop a household energy expenditure model (HEEM) to better understand impacts across a wide swathe of residential customers



Proposed HEEM customer segmentation

Housing Type	Region	Heating Source	Building Electrification	Air Conditioning	Vehicle Electrification	Distributed Energy Resources	Bill Discount Program
Small single-family, Old Vintage	Western MA	Gas	None	None	None	None	No
Small single-family, New Vintage	Central MA	Electric	Partial HP – w/ FF Backup	Yes	EV	Solar	Yes (if available)
Large single-family, Old Vintage	Boston Area	Heating Oil	Whole Home Electrification			Storage	
Large single-family, New Vintage	Fitchburg	Propane				Solar & Storage	
Multi-family (2-4 units), Old Vintage	North Shore						
Multi-family (2-4 units), New Vintage	Cape Cod						
Multi-family (5+ units), Old Vintage							
Multi-family (5+ units), New Vintage							

Next Steps

- **Continue developing database of existing rates, pilots, and low-income bill programs in MA across utilities**
- **Continue HEEM development, focusing on energy expenditure for existing rates**
  - Model will eventually explore energy expenditure across new revenue-neutral rate designs
- **Conduct literature review of electrification-friendly rates in peer jurisdictions, plus relevant policy, regulatory, and technology ratemaking considerations**

INSTRUCTIONS FOR PUBLIC COMMENTS

- Please use the "raise hand" function on Zoom if you have a comment you wish to make on behalf of yourself or your organization, we will operate on a first-come, first-served basis.
- Speakers will be asked to identify themselves by name and affiliation and will have up to 3 minutes to comment.
- Written comments are also welcome! Please send written comments to Rates.WG@mass.gov. All written comments will be considered public and may be posted on the IRWG website. For written comments on the Public Listening Sessions, please include the subject line: "Listening Session #1."

FUTURE STAKEHOLDER OPPORTUNITIES

- The IRWG expects to host subgroup meetings to discuss further subject matter specific topics in greater detail; tentatively, we expect to host three sessions aimed at the following topic areas
  - Consumer and advocacy organizations
  - Distributed generation/distributed energy resource developers/providers
  - Electric distribution companies, utilities, suppliers
- Please email Rates.WG@mass.gov with the name, title, organization, and email address(es) of any interested parties for the above sessions, including the subject line: "IRWG Subgroup Interest"

THANK YOU!

MASSACHUSETTS INTERAGENCY RATES WORKING GROUP

A Collaboration to Advance Near- and Long- Term Rate Designs that Align with the Commonwealth's Decarbonization Goals

Appendix

Energy+Environmental Economics

HEEM model will support evaluation of key affordability results across a wide swath of customer types