

AGENCY OF NATURAL RESOURCES

TESTIMONY ON S.5

Julie Moore, Secretary

March 22, 2023

Agenda

- GWSA Charge
- Climate Action Plan and the Thermal Sector
- Points of Concern with S.5
 - Process
 - Limited analysis of costs and impacts
 - Critical data gaps
 - Administrative complexity
 - Ability to ensure equitable distribution of clean heat measures
 - Timeline and procedural equity
- On-going Implementation Efforts

Global Warming Solutions Act (GWSA), Act 153 of 2020:

- Enacted: September 23, 2020
- Created Climate Council and required [Climate Action Plan](#) (CAP)
- First meeting of the Vermont Climate Council: November 20, 2020
- Council is comprised of:
 - Eight members of the Administration
 - Eight members appointed by the Speaker of the House
 - Seven members appointed by the Senate Committee on Committees
- Council work supported by five Subcommittees
 - Cross-Sector Mitigation, Rural Resilience and Adaptation, Agriculture and Ecosystems, Just Transitions and Science and Data
- Initial Climate Action Plan adopted: December 1, 2021

GWSA Charge to the Climate Council

*“...prioritize the **most cost-effective**, technologically feasible, and equitable greenhouse gas emissions reduction pathways and adaptation and preparedness strategies informed by scientific and technical expertise.” 10 VSA 592(d)(1)*

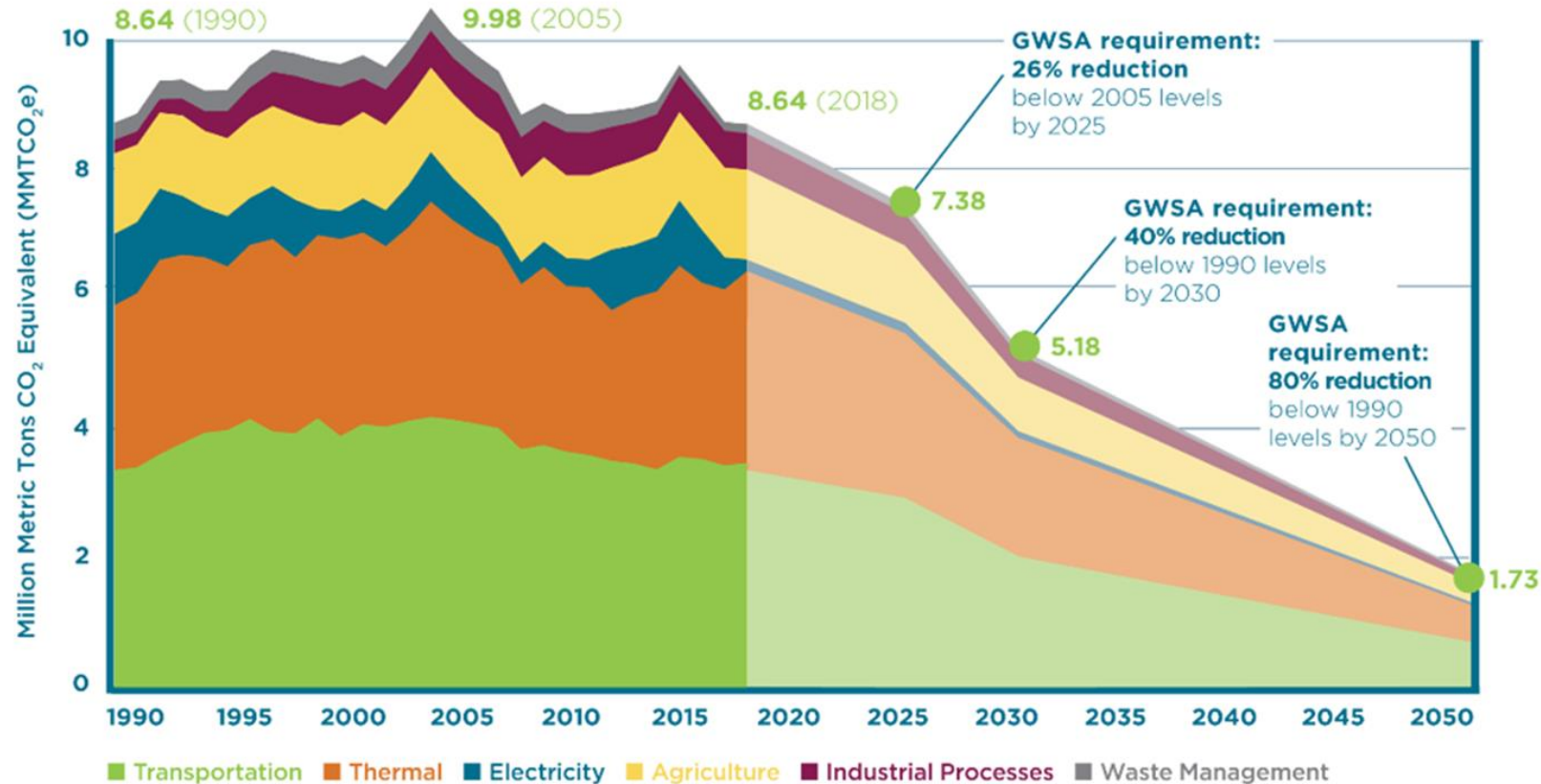
1. Reduce greenhouse gas emissions from the transportation, building, regulated utility, industrial, commercial, and agricultural sectors;
2. Encourage smart growth and related strategies;
3. Achieve long-term sequestration and storage of carbon and promote best management practices to achieve climate mitigation, adaptation, and resilience on natural [and] working lands;
4. Achieve net zero emissions by 2050 across all sectors;
5. Reduce energy burdens for rural and marginalized communities;
6. Limit the use of chemicals, substances, or products that contribute to climate change; and
7. Build and encourage climate adaptation and resilience of Vermont communities and natural systems.

The Vermont Climate Action Plan

- Aims to cut climate pollution 40% below 1990 levels by 2030
 - ◆ Approximately half of 2005 levels
- Prioritize those who are most affected
- Developed in a coordinated fashion with the Comprehensive Energy Plan
- Will be updated at least every 4 years
- Implementation section to inform decision-making
- Requires development of a framework for measuring progress

Climate Action Plan and the Thermal Sector

- Compared to 2018 levels, to achieve the requirements of the GWSA, needed emissions reductions from the Thermal Sector are:
 - 27% by 2025
 - 48% by 2030
 - 88% by 2050



Source: Vermont Agency of Natural Resources, Vermont GHG Emissions Inventory and Forecast (1990-2017), 2021.

Climate Action Plan and the Thermal Sector

- Thermal Sector Pathways & Strategies in the CAP:
 - Expand weatherization (“weatherization at scale”)
 - Develop and implement a Clean Heat Standard
 - Performance standard driving transition to less carbon-intensive heating practices
 - Incentivize adoption of clean, energy-efficient heating options, such as heat pumps and modern wood heat
 - Institute a rental property efficiency standard (RPES)
 - Regularly update and ensure compliance with the statewide residential building energy code
- CAP analysis of Clean Heat Standard was limited:
 - Impact: “TBD based on program design”
 - Equity: “Can be designed to mitigate the disproportionate energy burdens and negative distributional effects of existing heating fuel costs on low- and moderate-income Vermonters.”
 - Cost-effectiveness: “TBD based on program design”

Climate Action Plan and the Thermal Sector

Pathways Analysis Report provides scenario modeling that *...is beneficial for visualizing the scale and pace of transformation necessary to achieve emissions reductions. Results presented ... are intended to inform design of GWSA compliant policies.*

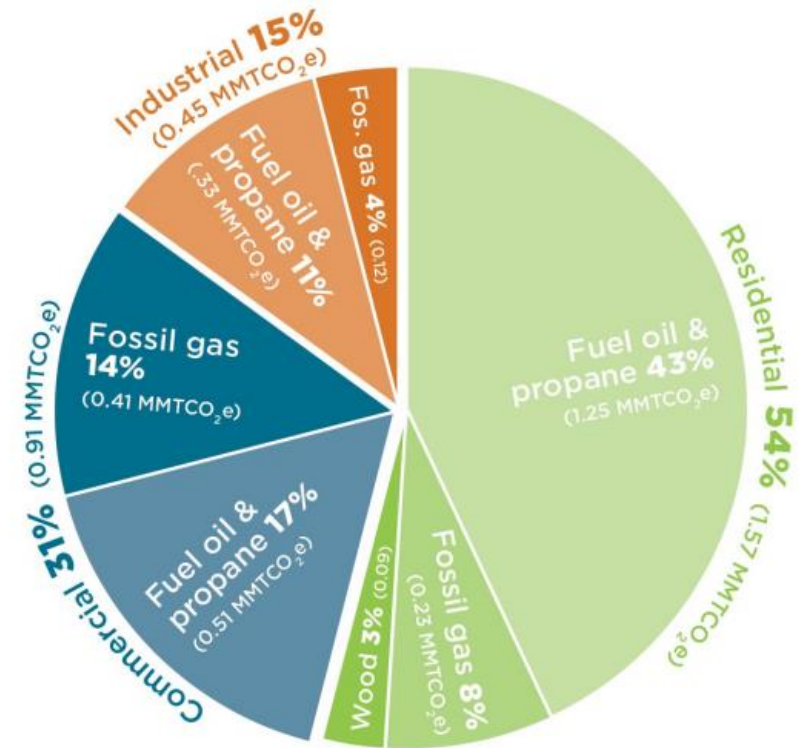
Specific to the 2030 Building/Thermal Sector reductions the Pathways Report notes:

- *Securing workers and businesses to meet this volume of activity is going to require innovation, fresh thinking, increased funding, and hard work.*
- *There will be numerous challenges to meeting the level of building performance upgrades in the mitigation scenario by 2030, including the pace and scale for heat pumps and the pace for delivery of weatherization. Another important element ... will be financing to help make the initial costs of upgrades affordable...*

Climate Action Plan and the Thermal Sector

- Pathways Analysis Report assumes emissions reductions between now and 2030 are primarily anticipated to occur in the residential sector
 - Heat pump technologies are not currently resolved in the commercial sector

Vermont thermal GHG emissions by sector and fuel type



Source: Vermont Agency of Natural Resources, Vermont Greenhouse Gas Emissions Inventory and Forecast (1990-2017), 2021. There is a small amount of emissions from wood heating in the commercial sector, but it is too small to show up on this pie chart

Climate Action Plan and the Thermal Sector

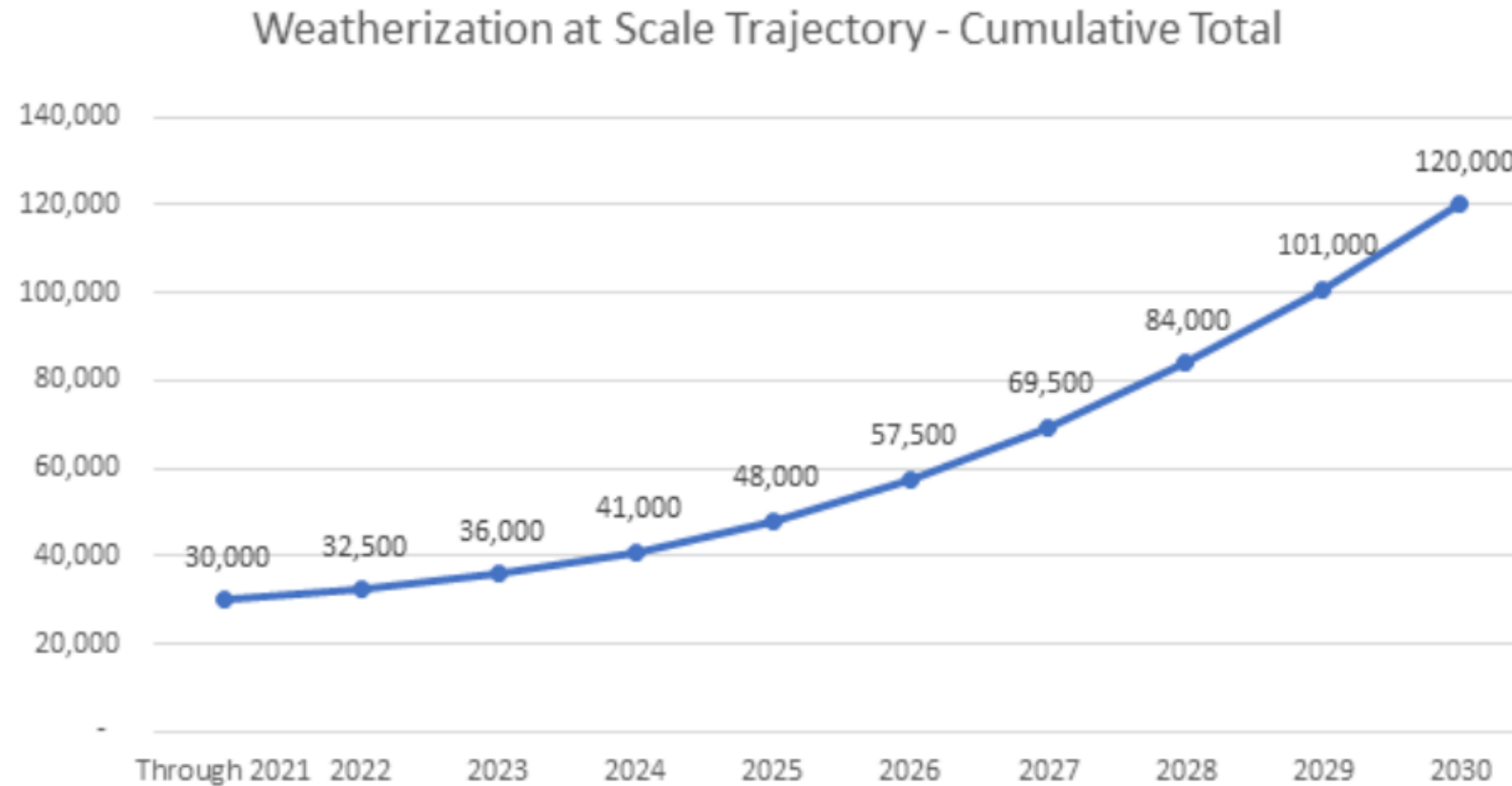
[Pathways Analysis Report](#) quantified actions needed to meet GWSA requirements and found:

Residential	2025	2030
Homes Weatherized	69,000	120,000
Heat Pumps Installed	96,224	177,107
Heat Pump Water Heaters Installed	63,247	136,558
Homes with Advanced Wood Heat	12,898	14,992
Homes with Biofuels	12,112	21,086

For perspective, from 2015-2020, Vermonters installed:

- ~30,000 heat pumps
- ~13,000 heat pump water heaters

Climate Action Plan and the Thermal Sector

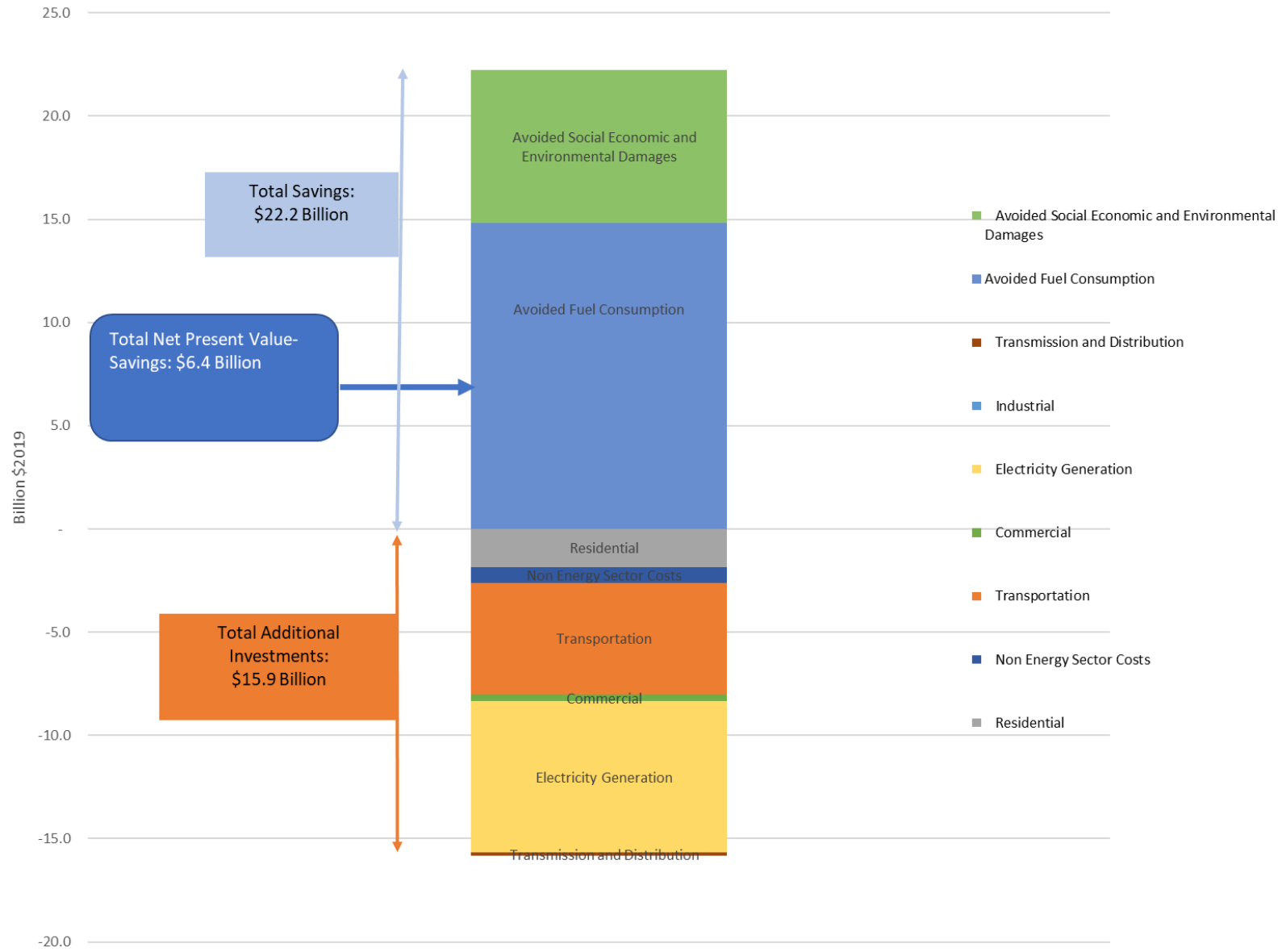


- Vermont currently weatherizes approximately 2,000 homes per year
- By 2050, nearly 3/4s of Vermont housing units (243,500) will need to be weatherized

Climate Action Plan and the Thermal Sector

- Other thermal sector measures included in the Pathways Analysis Report:
 - Increased use of biofuels and advanced wood heat
 - Wood heating and biofuels are projected to serve roughly 1/5 of the residential energy demand in 2050
 - Expanded use of biofuels is primary driver of reduced emissions from commercial and industrial buildings

CAP Mitigation Savings and Investments vs. Baseline (Including Social Cost of GHGs)
 Net Present Value 2015-2050 (2019\$), 2% Discount Rate

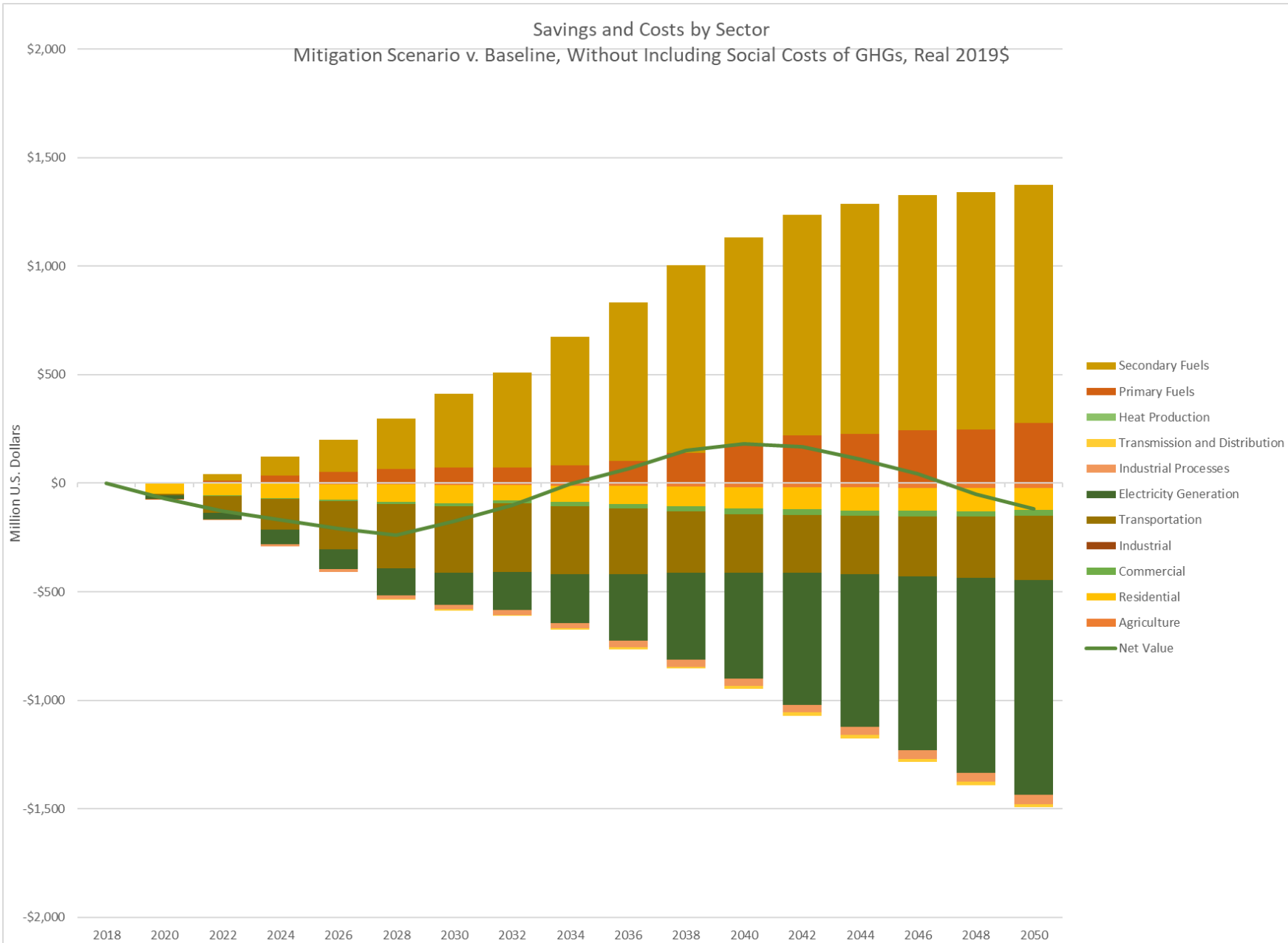


Transitioning to a clean energy economy will require upfront investments to achieve long-term benefits.

- Pathways Report

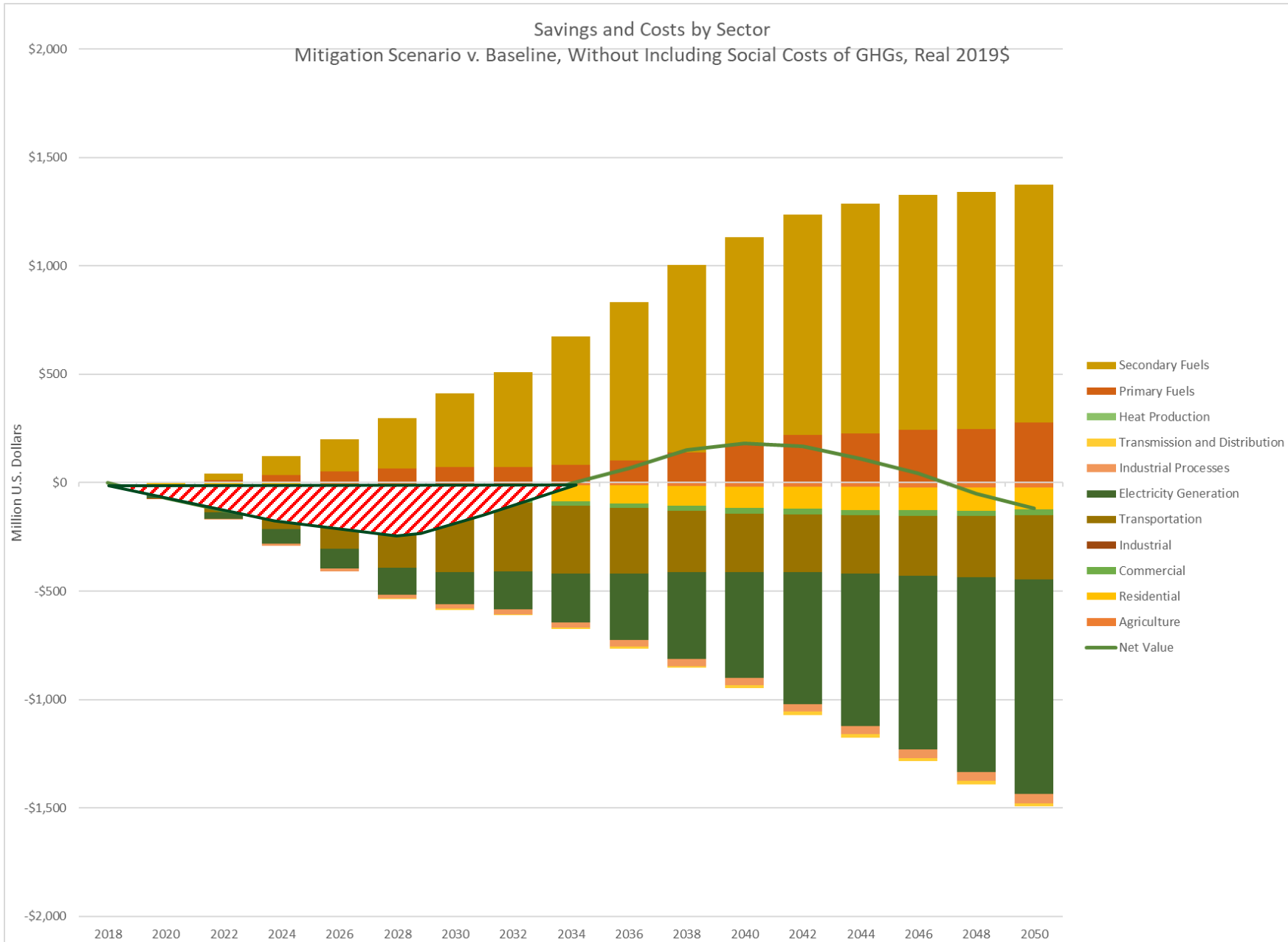
Savings and Costs by Sector

Mitigation Scenario v. Baseline, Without Including Social Costs of GHGs, Real 2019\$



Savings and Costs by Sector

Mitigation Scenario v. Baseline, Without Including Social Costs of GHGs, Real 2019\$



Limited Analysis of Costs and Impacts: Scale of Clean Heat Measure Implementation

S.5 directs that the annual requirement for clean heat measures be set at a pace sufficient for Vermont's thermal sector to achieve GHG reductions consistent with the GWSA (§ 8124(a)(1))

Drawing from the Pathways Report, this effectively requires the following by 2030:

- 85,000 homes weatherized
- 145,000 heat pumps installed
- 125,000 heat pump hot water heaters installed

Directional Estimate of Gross Building/Thermal Sector Costs Required by GWSA thru 2030

85,000 homes weatherized @ \$10,500 each	= \$890 million
145,000 heat pumps @ \$5000 each	= \$725 million
125,000 heat pump hot water heaters @ \$3,000 each	= \$375 million

Estimated gross cost: \$2.0 billion

Does not include administrative costs

- State Government
- Default delivery agent

Not dissimilar from *Pathways Report* estimate of net costs in the residential sector from 2020-2030 of \$1.6 billion to meet the GWSA requirements, which includes fuel cost savings

Directional Estimate of Revenue Required to Meet 2030 GWSA Building/Thermal Sector

Efficiency Vermont incentives for residential sector clean heat measures generally average 75% for low- and moderate-income Vermonters

- Given the timeline envisioned by S.5, reasonable to assume that higher level of incentive will be required to ensure uptake
- Assume 90% cost-share will be needed to ensure pace to 2030
- *Unmet investment need (thru 2030): \$1.8 billion*

Assume federal funding programs (ARPA, IIJA, IRA, CDS) provide \$75 million per year (for 8 years) for clean heat measures, or \$600 million

- *Total needed investment remaining: \$1.2 billion*

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Directional Estimate of Revenue Required to Meet 2030 GWSA Building/Thermal Sector

Continuing... *total needed investment remaining: \$1.2 billion*

Assume fuel suppliers will “absorb” (rather than pass along) 25% of the cost to obtain clean heat credits

- *Total needed investment remaining: \$900 million*

Absent dedicated state revenue, under the CHS, it is reasonable to expect that fuel suppliers will look to raise this revenue balance from fuel sales

- CHS takes effect January 1, 2026, leaving 5 years to meet 2030 GWSA requirements
- *\$900 million / 5 years = \$180 million/year*

Vermont sells about 250 million gallons of fossil heating fuels per year

- To raise \$180 million per year on 250 million gallons could raise the price of a gallon of heating fuel by 70 cents per gallon
- As the amount of fossil fuel consumed annually in Vermont drops over time (as a result of the CHS), the adder on remaining fossil fuel sales likely to increase

Act 62 (2019) – Report on All-Fuels Energy Efficiency

Fuel tax is set in statute and has not been adjusted since 2016

Fuel tax rate is 2 cents per gallon on the sale of fuel oil, kerosene, propane, and other dyed diesel fuel; raises \$4-4.5 million per year

- Funds are mostly spent to support the low-income Weatherization Assistance Program Trust Fund; some funds also allocated to LIHEAP

To expand weatherization, Act 62 Report recommended increasing the tax on the sale of fuel oil, kerosene, propane, and other dyed diesel fuel, from the current 2 cents per gallon to:

- 4 cents per gallon in 2021
- 6 cents per gallon in 2023

No legislative action was taken as a result of this study

Critical Data Gaps

Fuel data

- Currently, Tax collects aggregate data on “Number of GALLONS of heating oil, propane, kerosene, and other dyed diesel fuel delivered in Vermont” (Form FGR-615)
 - Sales of natural gas and coal are tracked separately
- Impacts ability to establish/appropriately value clean heat credits

Regulatory relationship with “obligated entities”

Supporting Vermonters queued for clean heat measures

Rate of deployment of clean heat measures

- Can this be achieved thru passive incentives?
- Does this allow comprehensive, whole-home solutions?

Administrative Complexity

Differences between Greenhouse Gas Emissions Inventory and proposed framework for Clean Heat accounting in S.5

Clean Heat credits

- Calculating clean heat credits
- Establishing clean heat credit system
- Verifying early action credits

Carbon intensity of fuels

Equitable Distribution of Clean Heat Measures

Climate Action Plan: *The Climate Council recommends that the legislature include requirements to deliver a high fraction of clean heating solutions to low- and moderate-income households in the early years.*

S.5: *...each obligated party shall retire at least 16 percent [or clean heat credits] from customers with low income and 16 percent from customers with moderate income.*

Equitable Distribution of Clean Heat Measures

Climate Action Plan states: *To ensure that the CHS minimizes negative effects on energy-burdened Vermonters, the program will need to incorporate income-sensitive policies from its beginning.*

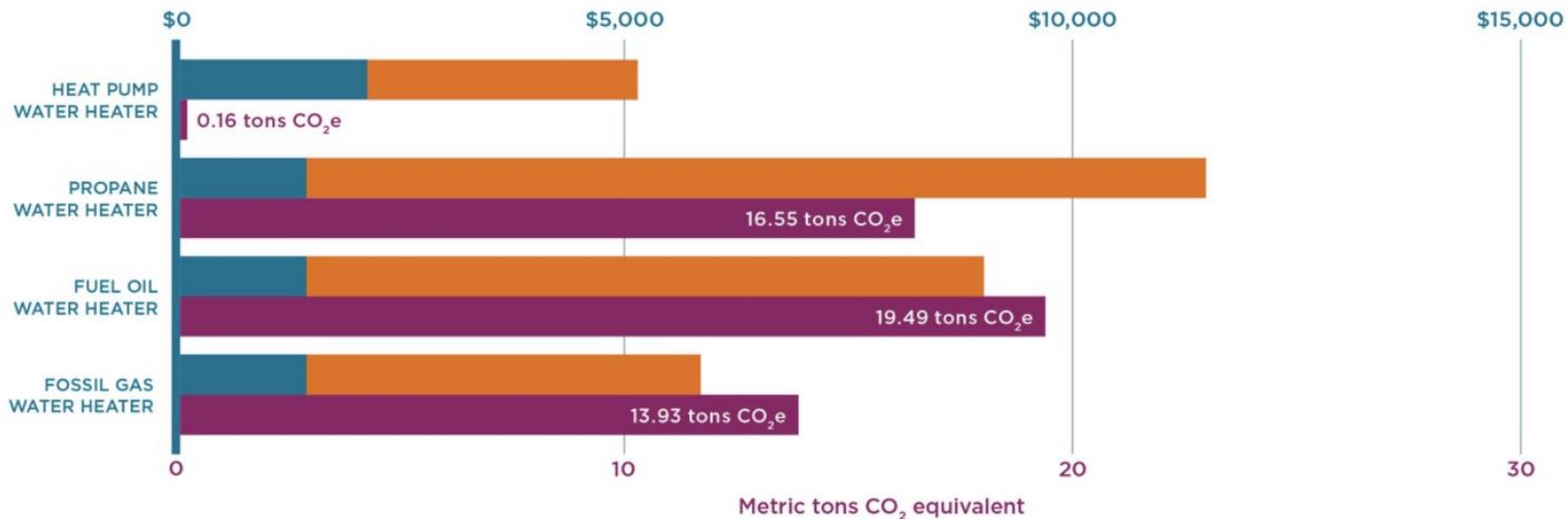
2021 Vermont Personal Income Tax returns

- Vermont MHI was about \$68,000 in 2021
 - ~63% of Vermont filers fall under that threshold
- 120% of Vermont MHI is considered moderate-income; was about \$81,000 in 2021
 - ~71% of Vermont filers are under that threshold

The only income sensitivity requirement in S.5 is that at least 32% of clean heat measures are delivered to 71% of the population

Costs and emissions from home water heating

■ Equipment cost ■ Lifetime fuel cost (12 years) ■ GHG emissions in tons CO₂e for 12 years

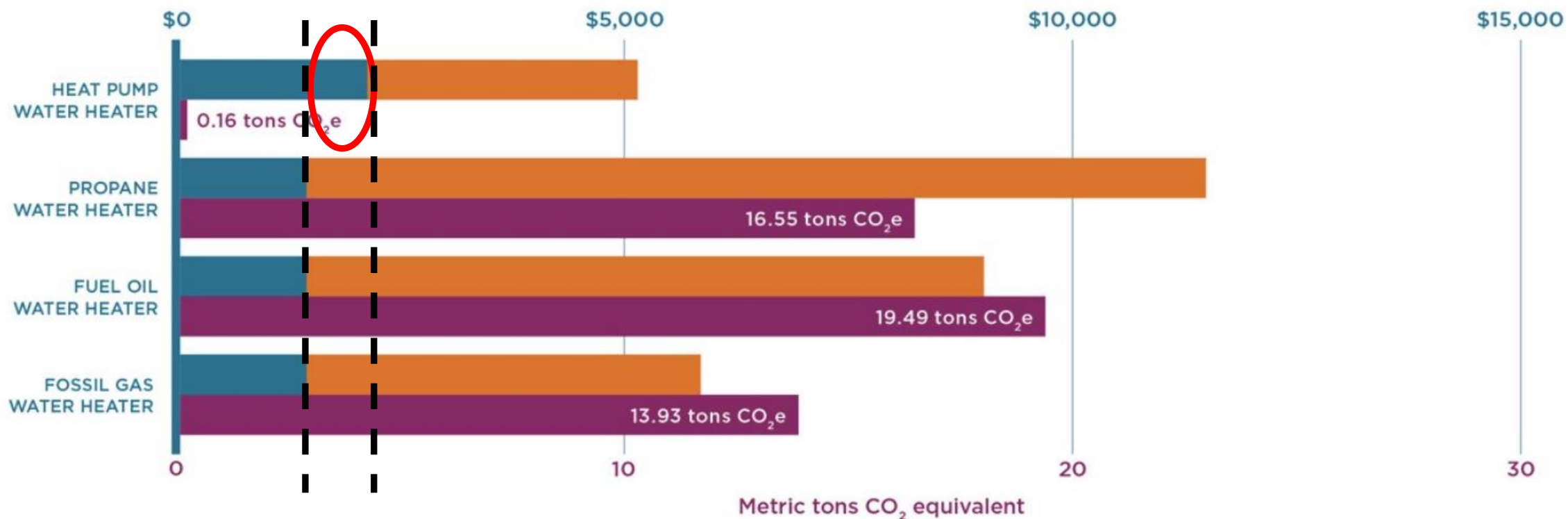


Notes: Fuel costs used were the May 2022 Green Mountain Power rate of \$0.177/k@h, the average of the 2021/22 heating season for propane at \$3.16/gallon, fuel oil at \$3.61/gallon, and wood pellets at \$300/ton, and the listed rates for fossil gas from VGS for Aug 2022. **Sources:** For CO₂e values of VT electricity and wood pellets: Vermont Agency of Natural Resources, 2021. For fossil fuel CO₂e values: EIA, 2022. For fuel costs: PSD, 2022. For electricity rates GMP 2022. Equipment pricing from the TAG TRM where available. Additional pricing sources can be shared on request.



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Public Engagement and Procedural Equity

S.5 allows 16 months (August 31, 2023 - January 15, 2025) for the PUC to:

- Conduct pre-rulemaking engagement with stakeholders
- Draft rules
- Formally solicit and address public comments
- Prepare and submit final proposed rules to the implement the Clean Heat Standard to the General Assembly

Timeline is inconsistent with the Guiding Principles developed by the Just Transitions Subcommittee of the Climate Council

- *Planning and implementation must balance being time bound and honoring the varied ways of learning, understanding and agreement that exist in different cultures and communities*

Necessary Due Diligence

S.5 is akin to the creation of Efficiency Vermont in 2000

Critical to understand upfront costs and practical challenges, in addition to long-term benefits

Climate Action Plan notes: While a central goal of the GWSA is to reduce GHG emissions, it will be critical to understand the effects of various GHG reduction policies on all Vermonters, especially those who struggle with the costs associated with housing and energy use.

Proposed timeline will impact procedural equity and meaningful opportunities for local communities to participate in program planning and design

Implementation Efforts: Climate Action Office

- Climate work is occurring throughout state government, involving many agencies:
 - Public Service
 - VTrans
 - Vermont Emergency Management
 - Agriculture
 - Buildings & General Services
 - Human Services (DCF and VDH)
 - Commerce and Community Development
 - State Climatologist (UVM)
- Climate Action Office established in the FY23 budget to:
 - Coordinate statewide efforts
 - Track progress over time towards meeting GWSA requirements

What has happened since the Climate Action Plan was adopted?

The Administration has...

- Completed rulemaking to adopt California's Advanced Clean Cars II (ACC II) Regulations, Advanced Clean Trucks, the Heavy-duty Low NOx Omnibus Rule, and the Phase 2 Greenhouse Gas Rule for Trucks and Trailers.
 - Filed with the Secretary of State in December 2022
- Worked to deploy nearly \$250 million in federal funds (ARPA) and state one-time monies in climate action:
 - Weatherization
 - EV charging stations and purchase incentives
 - Electrical system upgrades
 - Municipal energy resilience
 - Buyouts of flood vulnerable properties
 - Expanded cost share for agronomic practices
 - Tree planting

What has happened since the Climate Action Plan was adopted?

The Administration has/is...

- Reviewing and strategically pursuing competitive federal funding opportunities under IJA and IRA
 - Many state agencies will be eligible applicants for various funding solicitations
 - Other Vermont entities will be able to pursue certain opportunities directly
 - Federal guidance for many programs is under development
 - Currently, there is limited information/instructions or timeline estimates for when final programs will be announced
- Submitted a Notice of Intent to Participate in EPA's Climate Pollution Reduction Grant program
 - Under Phase 1, Vermont will receive a "presumptive allocation" of \$3 million
 - EPA expects to announce further funding opportunities in late-2023

What has happened since the Climate Action Plan was adopted?

The Administration has/is...

- Completed and working on a number of significant technical analyses needed to understand GHG benefits, costs and net savings over time of different climate initiatives
- Developing a Municipal Climate Toolkit for Vermont municipalities to use to assess climate preparedness
 - Includes the Municipal Vulnerability Index which will help identify communities that may be most adversely affected by climate change
 - Will be completed Summer 2023

What has happened since the Climate Action Plan was adopted?

The Administration is...

- Redefining and expanding public engagement around climate action
 - Building relationships and communication channels that will help Vermonters work collaboratively on future climate action
 - Enhancing awareness around climate action efforts in the state, with a particular focus on communities experiencing impacts and other frontline communities
 - Seeking to engage a diverse group of voices and viewpoints in the implementation of climate-related initiatives across government
- Coordinating efforts with the ANR Environmental Justice Unit

What has happened since the Climate Action Plan was adopted?

The Administration is...

- Identifying the means to accurately measure the impact of climate action work being led by various state agencies
 - Developing an RFP for a tool to evaluate and track implementation progress for key strategies to reduce GHG emissions, as well establishing quantitative metrics for resilience and adaptation, in line with the Global Warming Solutions Act requirements
- Preparing update to Vermont's Greenhouse Gas Emissions Inventory and Forecast
 - Expect to release next Inventory report (1990 – 2020) in April 2023
- Undertaking an analysis to understand the cost implication of policy strategies, including a Clean Heat Standard, to meet the thermal sector share of the GWSA requirements
- Working with sister agencies/departments (Tax, DMV, PSD) to understand currently available information on the type and volume of fossil fuel deliveries into Vermont and identify changes needed to ensure timely, accurate data

Thank you.

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