

1 (11) Pathways for Mitigation

2 Buildings

3 Summary Statement

4
5 Vermont’s buildings pose both a challenge and opportunity to equitably meeting Global
6 Warming Solutions Act (GWSA) emission reduction goals. The state’s housing stock is
7 dominated by homes built before 1975, with over a quarter of them built before 1939.¹ Thermal
8 energy use for these buildings produces over a third of the state’s GHG emissions and represents
9 roughly 35 percent of our energy expenditures.² Commercial and industrial buildings produced
10 nearly 14% of the state's GHG emissions in 2017.³ Importing fuel to heat our buildings is a
11 significant drain on Vermont’s economy. It also exposes Vermont families and businesses to
12 substantial global fuel-price volatility, and disproportionately burdens lower-income Vermonters
13 with energy related expenses.⁴

14 Replacing carbon intensive fossil fueled heating sources with available, lower carbon alternatives
15 will significantly mitigate these challenges and contribute to Vermont meeting its climate goals.
16 It will also stimulate Vermont’s economy because more of the money Vermonters spend on
17 heating will stay in state. According to the Energy Information Administration (EIA), in 2018,
18 Vermont spent over \$769 million on fossil fuels for heating. The Vermont Agency of Commerce
19 and Community Development reports that 63% of those expenditures left the Vermont economy
20 entirely.⁵ By spending energy dollars on relatively lower carbon-intensive electricity and wood, a
21 greater share of that money will stay in-state, help employ Vermonters, and strengthen our
22 economy.⁶

¹ Vermont Housing Needs Assessment, Vermont Housing Finance Agency (“VHFA Housing Needs Assessment”), February 2020, p. 2.

² Energy Action Network “Annual Progress Report for Vermont ANNUAL 2020/2021,” p. 24 (EAN 2021); see also, https://dec.vermont.gov/sites/dec/files/aqc/climate-change/documents/Vermont_Greenhouse_Gas_Emissions_Inventory_Update_1990-2017_Final.pdf

³ “Vermont Greenhouse Gas Emissions Inventory and Forecast 1990-2017” May 2021

⁴ Energy Action Network Clean Heat Working Group. October 2021. Review Draft “Clean Heat for a Cooler Planet: The Clean Heat Standard”

⁵ See Section 4 Energy and Economy

⁶ For wood heat, an average of 80 cents per dollar stays in state. EAN 2021, p. 25

23 In addition to increasing reliance on fuels with a lower carbon intensity, improving the efficiency
24 of Vermont’s buildings will help reduce the heating demands facing Vermonters. Thermal
25 modernization of our buildings to reduce GHG emissions and doing so in a way that recognizes
26 the economic challenges faced by the most vulnerable Vermonters in keeping homes, businesses,
27 and other buildings heated and comfortable is essential. With a focus on the most burdened
28 households and businesses, Vermont can begin to address its climate challenges and pair up
29 clean fuels options and weatherization programs to deliver comprehensive low-carbon building
30 solutions.

31 **Ability to Pay – Burdened Vermonters**

32
33 Taking these steps can be expected to benefit the Vermont economy broadly but must also be
34 designed to minimize adverse effects on low-income households, especially Vermonters most
35 burdened by energy and housing-related costs. The expressions “energy burden” and “housing
36 burden” describe the percent of household income that one spends on energy or on housing.⁷
37 While a central goal of the GWSA is to reduce GHG emissions, it will be critical to understand
38 the effects of various GHG reduction policies on all Vermonters, especially those who struggle
39 with the costs associated with housing and energy use.

40 Efficiency Vermont has studied energy burden in the state and determined that, on average,
41 Vermonters spend about 10 percent of their income, or roughly \$5,800 annually, on *energy*
42 expenses. However, the actual energy burden that Vermonters face ranges statewide from 6% to
43 as much as 20%.⁸

44 When one considers the cost of housing and energy, Vermonters face an even greater challenge.
45 According to the Vermont Housing Finance Agency (VHFA), over 35% of all Vermont
46 households (90,000) in the state are “cost-burdened” by their *housing* costs, meaning that either
47 rent or mortgage, insurance, taxes and utilities consume at least 30% of their income.⁹

⁷ “What is the impact of energy burden in Vermont?” (“Energy Burden in Vermont”) Rebecca Foster, Director
Efficiency Vermont October 13, 2019.

⁸ Ibid

⁹ VHFA Housing Needs Assessment, p. 2

48 Furthermore, of these cost-burdened Vermont households, over a third (39,000) spend in excess
49 of 50% of their income for housing.¹⁰

50 **Renters**

51

52 Of Vermont’s roughly 330,000 homes, about a quarter of them (80,000) are used or intended for
53 renters.¹¹ Chittenden County has the highest rate (36%) of rental housing in the state. While the
54 median construction year for owned homes in Vermont is the mid-1970s, median construction
55 year for Vermont rental housing is significantly older, 1964.

56 In addition to the number of relatively old rental properties, a large portion of the Vermonters
57 who rent, roughly 80%, are categorized as low-income, according to Efficiency Vermont and
58 VHFA.¹² One quarter of all Vermont’s renters pay between 30-49% of their income for housing,
59 and another quarter pays 50% or more of their income for housing, i.e., rent and the cost of
60 utilities.

61 Given the quality of buildings, the cost of fuels, and the number and income status of
62 Vermonters who rent, it is critical that GWSA buildings and thermal policies incorporate social
63 equity into all recommendations. These solutions will need to minimize adverse effects on low-
64 income households and those most burdened by high energy bills.

65 Vermont has decades of experience developing policies and designing and implementing
66 weatherization, energy efficiency, and clean energy initiatives that reduce energy use in
67 buildings throughout the State – including residential, commercial, and industrial buildings of all
68 sizes and types. Substantial work has been done (and is ongoing), including:

- 69 • Developing and periodically updating building energy codes
- 70 • Explaining the importance of code enforcement and seeking to ensure codes are being
71 enforced
- 72 • Training architects, engineers, and builders on energy-efficient new construction and
73 renovation practices

¹⁰ U.S. Census Bureau 2017 American Community Survey 5-year estimates from [housingdata.org](https://www.housingdata.org)

¹¹ VHFA Housing Needs Assessment, p. 1

¹² “Vermont Energy Burden Report,” Justine Sears and Kelly Lucci, October 2019; Vermont Housing Finance Agency. <https://www.housingdata.org/profile/rental-housing-costs/renter-cost-burden>

- 74 • Benchmarking buildings to increase awareness of building performance
- 75 • Including training on the economic and comfort advantages of energy efficient buildings
- 76 in realtor training
- 77 • Offering weatherization, energy efficiency, and clean energy rebates, incentives, and
- 78 services through Efficiency Vermont, electric and gas utility companies serving Vermont,
- 79 and the Home Weatherization Assistance Program administered by the Office of
- 80 Economic Opportunity and delivered by the four Community Action Agencies and the
- 81 Northeast Employment Training Organization.

82 All these initiatives should be continued and potentially expanded and enhanced in the future.
83 However, it is clear from multiple analyses completed by the Energy Action Network (EAN),
84 modeling conducted during development of this Climate Action Plan, and others that significant,
85 additional initiatives are needed beyond what is already underway in order to meet the GHG
86 reduction requirements established in the GWSA.

87 Presented below are two major pathways recommended for reducing GHG emissions from
88 buildings in Vermont. One focuses on improving building efficiency and the other focuses on
89 setting a pathway to lower the carbon content of the fuels Vermonters have been using in
90 buildings. In keeping with the GWSA’s focus on ensuring equitable access to affordable energy
91 for all Vermonters, these strategies and actions will both reduce GHG emissions from energy
92 used in new and existing buildings and will help address inequities in energy costs, energy
93 burdens, and those underserved by current offerings. The two major pathways are
94 complementary; each makes the other work more effectively. One final note, it is important to
95 recognize that because this is a plan, it is designed to create an outline for action. It does not go
96 into the level of detail that will be required for actual program development and implementation.

97 **Pathway 1 – Reduce energy use in buildings by at least 25% through cost-**
98 **effective and affordable weatherization and energy efficiency improvements,**
99 **as well as through use and enforcement of energy codes.**

100 Beyond reduced GHG emissions, weatherization delivers multiple benefits for residents: lower
101 monthly energy bills; improved housing affordability; enhanced home comfort; boosted health
102 outcomes; improved resilience during temporary energy disruptions; reduced building

103 maintenance cost; and, for homeowners, increased home value. Weatherization also provides
104 immediate cost savings to residents and improves the effectiveness of other energy
105 improvements.

106
107 Vermont has extensive experience delivering weatherization, fuel assistance, housing, funding,
108 and financing programs. However, many more buildings need to be weatherized, creating the
109 need to scale and to increase coordination among programs and offerings. Vermont also needs to
110 support the expansion of a workforce capable of delivering the amount of weatherization
111 services required.

112
113 **Strategy 1 - Develop and implement a multi-year statewide Weatherization at Scale**
114 **initiative**

115 Weatherization at Scale is a statewide, multi-year initiative envisioned by a diverse Working
116 Group of weatherization, energy efficiency, fuel supplier, and other stakeholders. It builds upon
117 Vermont's deep technical expertise delivering weatherization services to nearly 30,000 homes
118 during the past several decades. Modeling conducted for this Climate Action Plan indicates that
119 at least 90,000 additional homes need to be weatherized by 2030 to contribute to meeting the
120 GWSA reduction target for that year. This is an ambitious target that will require significant and
121 ongoing support in the form of funding, training, materials procurement, and other resources.
122 The Weatherization at Scale initiative identifies feasible strategies for recapitalizing Vermont's
123 weatherization investment to fund home retrofits for low- and moderate-income households over
124 the next decade. The weatherization work should recognize energy efficiency broadly. It should
125 include traditional energy efficiency measures, electrical, health, and safety measures needed to
126 comply with codes, and needed infrastructure upgrades such as wiring and service panels to
127 enable electric vehicle charging, the adoption of heat pumps for space and water heating, and
128 other strategic electrification opportunities.

- 129 • Coordinated Workforce Development - To deliver the necessary level of weatherization,
130 Vermont will need to further develop its weatherization workforce. This will require a
131 long-term, stable funding stream that gives the private sector certainty to invest in

132 training crews and purchasing equipment knowing a market will exist to support long-
133 term investments. Extensive work will be needed to recruit, train, place, and retain a
134 diversified workforce to better include women, BIPOC, and New American communities.
135 It will also be important to ensure that the quality of weatherization jobs remains high
136 and is not undermined as weatherization activities ramp up rapidly to help meet the
137 GWSA 2030 GHG reduction targets. Weatherization workforce development is an
138 essential need and a cross-cutting issue that should be coordinated with workforce needs
139 in other sectors.

- 140 • Enhanced Energy Coaching and Navigation Services - In order to better inform all
141 Vermonters of available energy programs and services, the state should provide outreach,
142 coaching, and navigation services to Vermonters with low and moderate incomes for the
143 State’s energy savings programs, including thermal and transportation energy efficiency
144 programs.
- 145 • Tariff On-Bill Financing (TOBF) – TOBF provides up-front investment capital for use by
146 a person or business with a utility account to reduce energy bills, for example by
147 investment in a weatherization project. It is not a loan to the person – i.e., landlord or
148 tenant – but instead an obligation assigned to the utility account itself. The funds
149 provided by the utility or a third-party are paid back over time through a special tariff
150 “attached to the meter” that serves the building. The program can and should be designed
151 to ensure that the energy bill savings that are expected to result from the efficiency
152 measure being financed are greater than the amount that will be charged via the tariff.
153 Utilities adopting a TOBF program and energy coaches working with low- and moderate-
154 income customers should also consider measures to prevent unintended consequences
155 such as any increased likelihood of service suspension due to unpaid utility bills. A
156 TOBF pilot is currently underway by Burlington Electric Department and successful
157 TOBF programs have been developed and implemented in other jurisdictions that are
158 deemed to provide both energy and cost savings, and adequate consumer protection for
159 utility customers.^{13 14}

¹³ <https://www.burlingtonelectric.com/on-bill-financing/>

¹⁴ <https://www.energy.gov/sites/default/files/2021-07/financing-energy-improvements-utility-bills-market.pdf>

160 As weatherization work proceeds it will be necessary to track the status of both the number
161 of weatherization projects completed and the effectiveness of those projects in increasing
162 building energy efficiency and in reducing GHG emissions. Real-time information on market
163 activity will help inform program design and implementation improvements. In addition, it is
164 reasonable to expect that program approaches and offerings will change over time as
165 technologies, measures, and delivery methods improve.

166 Funding weatherization services to meet GWSA goals will place greater demands on the
167 organizations that currently deliver weatherization services in Vermont. and all can all expect
168 to experience these effects. However, it is also reasonable to expect that a weatherization
169 funding commitment, especially one that is stable and long-term, will stimulate new entrants
170 into the market to provide similar services, expanding Vermont’s capacity to meet these
171 demands, and creating employment and other economic opportunities.¹⁵

172 Finally, this work will need to meet Vermonters where they are. It should make it as easy,
173 efficient, and affordable as possible for them to make these investments and avail themselves
174 of potential financial incentives and financing to do so.¹⁶

| Lead Implementer: Legislature, designated state agencies | |
|---|--|
| Action 1 - Adopt legislative or administrative recommendations consistent with those set out by the Weatherization at Scale Working Group (WWG) with the goal of weatherizing 90,000 additional homes by 2030¹⁷ and allocate the funding needed to achieve the goal | Impact – To date, approximately 30,000 buildings have been weatherized in Vermont. Modeling indicates that at least 90,000 additional homes need to be weatherized by 2030 in order to meet the GWSA reduction requirement for the Buildings sector |

¹⁵ According to the “Vermont Clean Energy 2015 Industry Report,” in 2015 Vermont passed legislation creating a 75 percent RPS by 2032, along with Hawaii, the highest RPS target in the United States. Between 2015 to 2016, solar jobs in Vermont grew by 29 percent, with an additional 400 solar jobs created in the state. https://publicservice.vermont.gov/sites/dps/files/documents/Renewable_Energy/CEDF/Reports/VCEIR%202015%20Final.pdf. Page 3.

¹⁶ To facilitate the most rapid, inclusive, comprehensive uptake of energy improvements, it is essential to connect Vermonters with appropriate programs and services, especially more low-income and historically overburdened Vermonters

¹⁷ EAN Weatherization at Scale Network Action Team "Weatherization at Scale Comments for Comprehensive Energy Plan and Climate Action Plan" memorandum to the Vermont Public Service Department and Vermont Climate Council, October 22, 2021 <https://www.eanvt.org/events-and-initiatives/weatherization-action-team/>

| | |
|---|--|
| | <p>Equity – The Weatherization at Scale initiative envisioned by the Working Group would target those most vulnerable and historically underserved as a focus of the State’s efforts to significantly ramp-up weatherization activity. In addition, an On-Bill Repayment approach is envisioned that would prioritize homes with the highest energy burden and would scale incentives based on income. Aligning the initiative costs and benefits with low/moderate income residents and communities will ensure that weatherization services will be directed to those who most need to reduce energy costs, increase comfort, improve health impacts, and benefit from improved housing durability.</p> |
| | <p>Cost-Effectiveness – Expected to be high, but awaiting modeling results from Cadmus/EFG</p> |
| <p>Timeline to Implement – One calendar year to allow for legislative action and any required rule enactment</p> | <p>Co-Benefits</p> <ul style="list-style-type: none"> - Reduces energy bills - Increases comfort - Improves health <p>Technical Feasibility - Yes</p> |
| <p>Action 2 - Appoint a member of the administration to be responsible for coordinating executive agency weatherization workforce development efforts to: ensure the scaling up of workforce necessary to achieve the GWSA targets; to increase coordination among the wide variety of public and private entities involved in worker recruitment, training, placement, and retention, and; to avoid duplication of efforts across state government (enabling, cross-cutting action)</p> | <p>Impact – Enables achievement of weatherization target in Action 1</p> <p>Equity – Can improve equity as long priority is placed on measures that address unemployed/underemployed/displaced workers</p> <p>Cost-Effectiveness - N/A</p> |
| <p>Timeline to Implement – 1st quarter 2022</p> | <p>Co-Benefits – Same as Action 1</p> <p>Technical Feasibility - Yes</p> |
| <p>Action 3 - Authorize implementation of a plan for coordinating and enhancing energy and financial coaching services for Vermonters with low and moderate incomes</p> | <p>Impact - Enables achievement of the weatherization target in Action 1</p> |

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| who could benefit from the State’s energy savings programs that is consistent with recommendations from the Energy Counseling Savings Work Group and their legislative report and allocate the funding to achieve the plan goals and objectives. | Equity – This action is specifically targeted to low/middle income households |
| | Cost-Effectiveness – N/A |
| Timeline to Implement – 1st quarter 2022 | Co-Benefits - Provides support and assistance to those most in need |
| | Technical Feasibility - Yes |
| Action 4 - Through legislation, encourage electric and gas utilities to offer their customers on-bill financing tariffs | Impact - Enables achievement of weatherization target in Action 1 |
| | Equity – Facilitates performance of retrofits in low/middle income households |
| | Cost-Effectiveness – TBD based on program design |
| Timeline to Implement - During upcoming legislative session (No later than May 2021) | Co-Benefits – Creates a new funding mechanism that does not require personal debt |
| | Technical Feasibility - Yes |

175

176 **Strategy 2 - Institute a rental property efficiency standard (RPES)**

177 Addressing rental property thermal efficiency is a complementary strategy to Weatherization at
178 Scale. It specifically seeks to ensure that the market for rental property contributes to meeting the
179 GWSA GHG emissions reduction goals. Expecting to equitably improve the efficiency of
180 Vermont’s rental housing cannot wait for efficiency investments to occur at the time of sale. Nor
181 can Vermont expect building energy performance labeling alone to spur sufficient improvements
182 in the efficiency of rental housing. Renters, by definition, are not in a position to invest in
183 improving the efficiency of buildings owned by others, even with improved access to
184 information or incentives. And because the typical lease has the renter assume responsibility for
185 energy costs, landlords have limited motivation to make such investments in the absence of an
186 efficiency standard. Addressing rental property thermal efficiency by providing support to
187 landlords for a period of years can help them reduce emissions without creating undue harm to

188 tenants, many of whom are cost-burdened Vermonters.¹⁸ It not only emphasizes solutions that
 189 mitigate the high energy burden experienced by low to moderate income households living in
 190 rented properties. It recognizes that landlords are better positioned to make basic improvements
 191 to the efficiency of the buildings they lease.

| Legislature, designated state agency | |
|---|---|
| Action 1 – Authorize the adoption of efficiency standards for rental properties, beginning with expanding the definition of “fit for human habitation” in 9 V.S.A. § 4457(a) by developing and passing legislation requiring owners of [a TBD minimum number of units] of rental housing to ensure that the efficiency of their rental units meets minimum standards [TBD efficiency code level] by December 31, 2030 and allocate the funding to provide technical and financial support during implementation of the standard. | Impact – Complementary policy to Weatherization at Scale (Strategy 1/Action 1) |
| | Equity – Designed to benefit the approximately 80% of VT renters who are characterized as low income. Compliance with and enforcement of RPES may result in rent increases. Incentives or grants may be needed to ensure this does not occur. |
| | Cost-Effectiveness – Not modeled yet. Will depend on specifications in the rental property efficiency standard |
| Timeline to Implement - During upcoming legislative session (No later than May 2022) | Co-Benefits <ul style="list-style-type: none"> - Creates a new mechanism and technical assistance for landlords to improve livability and affordability for their tenants - Reduces energy bills - Increases comfort - Improves health - Creates local jobs |
| | Technical Feasibility - Yes |

192

193 **Strategy 3 - Improve the energy performance of all new buildings in Vermont**

194 New buildings, and their associated energy use, last for decades. New construction offers either
 195 an opportunity for gains in building efficiency and related energy savings, or a potential lost
 196 opportunity for new housing stock. High efficiency construction techniques are well established
 197 and easier and less costly to implement than efficiency retrofits in existing buildings. High

¹⁸ Likewise, to better ensure continued rental property affordability, program designers could explore the conditioning of the receipt of program support on the agreement to limit subsequent rent increases due to property improvement.

198 efficiency/low leakage building envelopes are also much better suited to support non-combustion
 199 technology such as heat pumps.

| Public Service Department | |
|---|---|
| Action 1 - Regularly update the statewide residential building energy code, resulting in achieving a Zero Energy Ready building energy code by 2030. | Impact - Complementary policy to Weatherization at Scale (Strategy 1/Action 1) |
| | Equity - Compliance with and enforcement of building energy codes results in more energy efficient buildings and can result in lower emissions as well as reduced energy bills. However, complying with codes may increase construction or renovation costs. Especially for affordable housing, incentives or grants may be needed to help ensure that increased construction or renovation costs do not result in higher rental fees. |
| | Cost-Effectiveness - Not modeled |
| Timeline to Implement – Next update scheduled for September 2023; every three years after that | Co-Benefits <ul style="list-style-type: none"> - Ensures new construction will incorporate new energy efficient and clean energy options as best practices and technology continuously improve - Reduces energy bills - Increases comfort - Improves health - Creates local jobs |
| | Technical Feasibility - Yes |
| Action 2 - Develop and fund a state-level Energy Code Circuit Rider initiative that provides code training and enforcement assistance to municipalities to ensure awareness of and compliance with existing and future building energy codes | Impact - Complementary policy to Weatherization at Scale (see Strategy 1/Action 1). Impact could be further enhanced if additional and expanded training were offered as well to engineers, architects, and builders. However the need for municipal assistance was deemed a priority for most urgent action during development of this CAP. |
| | Equity – Does not directly address equity. However, improved building efficiency resulting from increased code |

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| | compliance and enforcement will reduce energy use, decrease energy bills, and increase comfort and health. However, complying with building energy codes may increase construction or renovation costs. Especially for affordable housing, incentives or grants may be needed to help ensure that increased construction or renovation costs do not result in higher rental fees. |
| | Cost-Effectiveness – N/A |
| Timeline to Implement - by September 2023 | Co-Benefits - Provides technical assistance and support needed especially by small municipalities that do not have the capacity and staffing to achieve this on their own. |
| | Technical Feasibility - Yes |

200

201

202 **Pathway 2 - Reduce building-related carbon emissions by reducing the carbon**
 203 **content of the fuels they use**

204 Today, over 70 percent of Vermont’s thermal energy use is fossil-based. About 40 percent of this
 205 is fossil gas and propane, while nearly a third is heating oil. For the last decade, Vermont has
 206 spent roughly \$2 billion a year on fossil fuels, with 75 percent of those dollars leaving the state.
 207 In order to meet GWSA emission reduction goals, Vermont needs to transition away from its
 208 current carbon-intensive building heating practices to lower carbon alternatives. It also needs to
 209 do this equitably, recognizing economic effects on energy users, especially energy-burdened
 210 ones, the workforce currently providing these services, and on our overall economy.

211 **Strategy 1 - Implement a Clean Heat Standard**

212 A Clean Heat Standard (CHS) encourages fossil fuel providers serving Vermonters to
 213 decarbonize the fuels they supply. It is a performance standard that would be applied to all major
 214 suppliers of heating fuels in Vermont with the purpose of driving the market toward greater
 215 adoption of low-carbon fuels. As a performance standard, a CHS enables suppliers to choose the
 216 most beneficial ways to transition from current practices. It is also designed to allow Vermont’s

217 energy users to exercise their choices in how they transition to less carbon-intensive heating
218 practices.

219 Because Vermont imports 100% of the fossil fuels we use for heating, the CHS would be applied
220 upstream at the wholesale level – that is, on the state’s only regulated natural gas supplier
221 (Vermont Gas Systems), and on the large-scale fossil fuel companies that deliver fuels to
222 Vermont’s numerous fuel dealers. Fossil heat wholesalers would be required to deliver clean
223 heat solutions to Vermont customers on a percentage basis that rises over time. The wholesalers
224 could meet the standard through a wide range of actions – through their own activities or by
225 purchasing credits from the activities of others. Energy efficiency and weatherization activities
226 as well as low emissions clean heating options including advanced wood heat, biofuels, biogas,
227 district heating, and solar thermal would be eligible as would increased electrification of heating
228 through the use of heat pumps for space and water heating.

229
230 To ensure that it does not negatively affect energy-burdened Vermonters, the CHS would need to
231 incorporate policies to minimize adverse effects on low-income customers, and potentially on
232 other customer segments for which there may be equity concerns. The program will need to
233 focus on low- and moderate-income households using fossil fuels to ensure they understand the
234 benefits of the CHS and are positioned to take advantage of them This could include
235 disconnection policy, fuel assistance, housing, or other programs to improve energy affordability
236 for low-income households. Because the CHS provides a path for fuel deliverers to comply and
237 transition into the provision of cleaner energy services, the CHS design is fair to traditional fuel
238 suppliers and their employees.

| Legislature | |
|---|---|
| Action 1 - Adopt legislation authorizing the Public Utilities Commission to administer a Clean Heat Standard consistent with the recommendations of the Clean Heat Standard Working Group¹⁹ | Impact – TBD based on program design; potentially high if required emissions reductions are indexed to building/thermal sector share of GWSA reduction targets |

¹⁹EAN Network Action Team – Clean Heat Standard Working Group - <https://www.eanvt.org/events-and-initiatives/clean-heat-standard/>

| | |
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| | <p>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. Works in concert with complementary programs, such as low-income weatherization and fuel assistance programs, to assist in the transition to cleaner heating solutions.</p> |
| | <p>Cost-Effectiveness – TBD based on program design</p> |
| <p>Timeline to Implement - Legislation by the end of the current session (May 2022) followed by up to 12 months for administrative process, including program design, orders, or rulemaking</p> | <p>Co-Benefits</p> <ul style="list-style-type: none"> - Provides choice in how to meet GWSA targets - Reduces energy bills - Creates a predictable and stable marketplace as fossil fuel businesses transition to clean energy services - Improves health - Creates local jobs |
| | <p>Technical Feasibility - Yes</p> |

239

240 **Strategy 2 – Transition the water heater market in Vermont to ensure the availability of**
 241 **water heaters whose total cost of ownership is lower than other models, and which can be**
 242 **controlled by electric utilities to help manage their power grids at low cost**

243 The electrification of energy uses currently powered by fossil fuels represents one of Vermont’s
 244 greatest opportunities to avoid building related GHG emissions. In addition to reducing
 245 emissions from combustion and saving consumers money, electrification is a low-cost and
 246 underused opportunity for utilities to actively manage and optimize their grid operations.
 247 Controllable water heaters will also improve Vermont’s ability to adopt greater amounts of
 248 variable renewable resources. This strategy seeks to leverage the ability of water heaters,
 249 replaced at a rate of approximately 25,000 per year,²⁰ to store energy in the form of heat and
 250 allow electric utilities to manage their operation to realize both emission reductions and
 251 consumer savings.

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| Department of Public Service | |
| Action 1 - With neighboring states, require electric water heaters for sale to have a | Impact – Complimentary policy to establishing a Clean Heat Standard. |

²⁰ EAN 2021, p. 25

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| modular demand response communications port | Would enable the transition of fossil-fuel water heaters to state-of-the art, energy efficient water heaters whose heating can be timed to off-peak times of electricity use. |
| | Equity – Appliance standards do not typically address equity directly. However, the programs developed to implement such a standard can (and should) be. For example, any incentives created to stimulate market demand for controllable water heaters could be income sensitive and could prioritize equipment switch-outs in frontline and impacted communities. |
| | Cost-Effectiveness – Deemed to be high based on modeling results from Cadmus/EFG. |
| Timeline to Implement – Initiate discussion with neighboring states no later than July 2022 | Co-Benefits – An initial step towards creation of a stable and predictable marketplace as fossil fuel businesses and equipment suppliers transition to clean energy services |
| | Technical Feasibility – Yes |

252

253 **Summary**

254 It is important to note that, while the weatherization at scale suite of actions and the clean heat
255 standard are interdependent, both strategies support the other, making each more effective at
256 meeting the GWSA’s just transition goals. Cleaner and more efficient heating appliances will
257 work more effectively in homes that are more capable of maintaining internal temperatures.
258 Likewise, as weatherization proceeds, the CHS will encourage the adoption of lower carbon
259 fuels, producing opportunities for consumers to secure carbon reduction gains immediately.
260 Furthermore, weatherization and energy efficiency improvements as well as an increase in
261 managed electrification of heating²¹ would be eligible for CHS credits. So, not only do they
262 promote each other, but the relationship also helps in funding weatherization.

263

²¹ Managing electrification load will be a critical strategy for enabling Vermont to accommodate the level of electrification and amounts of variable renewable energy envisioned in this Plan. See “Load Management and Grid Optimization” section of Electricity Sector Mitigation Pathways.

