



Testimony on S.5

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'Is there no way,' said I, 'of escaping Charybdis, and at the same time keeping Scylla off when she is trying to harm my men?'

– Ulysses in Homer's The Odyssey, Book XII

The Ethan Allen Institute ("EAI") is a public policy research and education organization founded in 1993. Our mission is to cultivate peace and prosperity by promoting policies based on principles of free enterprise, constitutional government, and individual liberty. We have had thousands of supporters over the years, and we attempt to give voice to Vermont's voiceless, numbering in the hundreds of thousands.

This presentation will review (i) sources for estimating upfront costs for household climate measures, (ii) a comparison of ANR Secretary Julie Moore's upfront costs to those of EAI, (iii) a sensitivity of resultant enactment time windows, and (iv) the consequent conflict of moral imperatives.

I. A review of sources for estimating upfront costs for household climate measures

Weatherization:

ANR Secretary Julie Moore – 85,000 homes @ **\$10,500** each¹

Iowa Low-Income Weatherization Program – The Iowa Weatherization Assistance Program weatherized 926 homes at an average household cost of **\$16,792** in 2020 (\$17,815 in 2022) .²

Ethan Allen Institute – 85,000 homes per Julie Moore; **\$17,815** per Iowa Weatherization Assistance Program

Heat Pumps:

ANR Secretary Julie Moore – 145,000 heat pumps @ **\$5,000** each³

Massachusetts Clean Energy Center – Ran a heat pump installation pilot program from May 2019 through June 2021 in which whole home heat pumps were installed in 168 homes of which 126 were existing buildings. The median project cost per home was **\$20,000**.⁴

¹ Agency Of Natural Resources, Julie Moore, Secretary, Testimony on S.5, January 26, 2023, p. 9, accessed on February 12, 2023 at <https://legislature.vermont.gov/Documents/2024/WorkGroups/Senate%20Natural%20Resources/Bills/S.5/Witness%20Documents/S.5~Julie%20Moore~ANR%20Testimony%20on%20Bill~1-26-2023.pdf>

² Report On The Impacts And Costs of Iowa's Low-Income Weatherization Program, CY 2021, accessed on February 12, 2023, https://humanrights.iowa.gov/sites/default/files/media/Wx_SLICE_Final_Report_CY2021.pdf

³ ANR, Julie Moore, Secretary, Testimony on S.5, January 26, 2023, p. 9

⁴ <https://www.masscec.com/blog/masscec-pilot-showcases-success-whole-home-heat-pumps>

I. A review of sources for estimating upfront costs for household climate measures (cont.)

Diversified Energy Specialists – examined 622 conversions in Massachusetts from 2014 to 2019. Conversion of an existing home with median size of 1,912 sq. ft. resulted in a median conversion cost of **\$21,572** (\$23,572 in 2022). Of these conversions, 92.8% retained an additional heat source. And 81% of those with two heating sources used heat pumps as the backup heat source.⁵ [This suggests changeover renovations do not offer price protection].

Efficiency Vermont – Colin Santee, Program Manager, testified last week before a Vermont House Committee that for a “three-bedroom residential... **\$18,000 to... \$40,000** for heat pumps depending...”⁶

Ethan Allen Institute – 145,000 homes per Julie Moore; **\$23,572** per Diversified/Massachusetts.

Heat Pump Water Heaters:

ANR Secretary Julie Moore – 125,000 hot water heat pumps @ **\$3,000** each.⁷

Ethan Allen Institute – 125,000 homes per Julie Moore; \$3000 per Julie Moore + electrification upgrade \$1,000 for a total of **\$4,000**.

⁵ <https://www.senatenj.com/uploads/DES-Heat-Pump-Study-NORA.pdf>

⁶ Testimony of Colin Santee, Efficiency Vermont, House Corrections & Institutions, February 8, 2023, accessed on February 12, 2023, at timestamp 1:35:44 <https://www.youtube.com/watch?v=lfsfddswB-k>

⁷ ANR, Julie Moore, Secretary, Testimony on S.5, January 26, 2023, p. 9

II. A comparison of ANR Secretary Julie Moore's upfront costs to those of EAI

Actions	Sec. Julie Moore (millions)	Per unit	EAI Base (millions)	Per Unit @ 2022 Zero inflation	EAI w/Inflation (millions)	Per Unit 5 yr avg @3% window	Comments
Weatherization 85,000 homes	\$890	\$10,500	\$1,514	\$17,815	\$1,810	\$21,290	
Heat Pumps 145,000 homes	\$725	\$5,000	\$3,418	\$23,572	\$4,085	\$28,170	
Heat Pump Water Heaters 125,000 homes	\$375	\$3,000	\$500	\$4,000	\$597	\$4,779	
Subtotal before Adjustments	\$2,000		\$5,432		\$6,492		
Wt. Avg 145,000 homes		\$13,793		\$37,462		\$44,772	
State Gov costs admin	0		\$326 or 6%		\$400 or 6%		New industry to regulate
Default Delivery Agent	0		\$180 or 3%		\$200 or 3%		Same as credit card processing fee
Homeowner 90% cost share	(\$200) or 10%		(\$594) or 10%		(\$709) or 10%		
Unmet	\$1,800		\$5,344		\$6,383		

II. A comparison of ANR Secretary Julie Moore's upfront costs to those of EAI (cont.)

<i>Actions</i>	<i>Sec. Julie Moore (millions)</i>	<i>Per unit</i>	<i>EAI Base (millions)</i>	<i>Per Unit @ 2022 Zero inflation</i>	<i>EAI w/Inflation (millions)</i>	<i>Per Unit 5 yr avg @3% window</i>	<i>Comments</i>
Federal Subsidies \$75MM p.a. for 8 years via ARPA, IJJA, IRA, CDS	(\$600)		(\$300)		(\$300)		Divided Congress curtails spending after 4 years-Moore admits funds are "not hardwired"
Subtotal	\$1,200		\$5,044		\$6,083		
Fuel Dealers 25% contribute or "absorb"	(\$300)		\$0		\$0		Not likely or possible given margins, total FD yearly net profit=\$25mm
Subtotal	\$900		\$5,044		\$6,083		
Total Net Wt. Avg 145,000 homes		\$6,207		\$34,786		\$41,951	
Over 5 years PA	\$180		\$1,009		\$1,216		
Cost/250MM gallons	\$0.70		\$4.04		\$4.86		Per MCota, if surcharge is only on 100 million gallons of thermal fuel alone the numbers are 2.5X higher

III. A sensitivity of resultant enactment time windows

The Clean Heat Standard at § 8124 mandates a yet-to-be determined number of credits to be purchased by obligated parties (fuel dealers):

Number of Credits Mandated Sold [§ 8124 (a)(1)]	Homes @WtAvg	Surcharge per gallon	Years To Complete	Meets GWSA 10 V.S.A. § 578(a)(2) and (3)
\$90 million p.a.	2,587	\$0.35 per gallon	56 years	No
Moore: \$180 million p.a.	5,174	\$0.70 per gallon	28 years	No
\$250 million p.a.	7,187	\$1.00 per gallon	20 years	No – TIPPING POINT
EAI: \$1,009 million p.a.	29,005	\$4.04 gallon	5 years	Yes

Through future legislative refinements, the actual amount of money raised through credit purchases under S.5 will be determined. This amount will indirectly fund improvements. It will also be passed back to the consumer of heating fuel through a surcharge.

From our calculations of actual upfront costs, it will take 28 years to enact climate measures if only \$0.70 is passed through as a fuel surcharge. This will only improve 5,174 homes per year when GWSA is understood to require 29,005 per year. Recently it seems in the press that some have objected to \$0.70 and said it was too heavy a surcharge to pass through.

However, actual upfront costs will require the pass through of a surcharge of \$4.04 per gallon to achieve compliance in only five years.

Legislators appear to have decided to feather in credit purchase levels, see how the structure works, and try to pass through only moderate amounts in surcharges.

III. A sensitivity of resultant enactment time windows (cont.)

The breakdown in the structure occurs when changeover renovations fail to occur as needed under GWSA because of unsubsidized upfront costs. The lack of changeovers will force the raising of the surcharge beyond moderate levels.

Remember the pool of subsidies provided by legislation in 2022 was only \$80 million. There currently is no state financing or revenue to subsidize changeovers beyond the implicit financing which the fuel dealers will provide.

As others have testified, the low- and moderate-income households will not be among the first to renovate their homes. They simply don't have the money and they may not be able to borrow the nominal \$45,387 to complete the job and enjoy lower heating costs. For 60% of Vermonters, changeover renovations will equal or exceed their total annual income. See Vermont income quartiles below:

INCOME GROUP	Top 20%						
	Lowest 20%	Second 20%	Middle 20%	Fourth 20%	Next 15%	Next 4%	Top 1%
INCOME RANGE	Less than \$21,200	\$21,200 - 39,100	\$39,100- 59,500	\$59,500- 94,000	\$94,000- 196,000	\$196,000- 460,000	Over \$460, 100
AVG. INCOME IN GROUP	\$11,500	\$29,200	\$49,200	\$74,800	\$131,100	\$279,700	\$993,600

Source: "Who Pays?," *Institute on Taxation and Economic Policy*, October 2018

Despite legislative intentions for low- and moderate- income to renovate first under 16% + 16%, there simply isn't enough money within the low- and moderate-income households and within a moderate surcharge to prime the pump of the credit structure. The program may start with the wealthy, but a majority of Vermonters will never be in a position to participate.

III. A sensitivity of resultant enactment time windows (cont.)

In an effort to provide capital for the homes of low- and moderate-income to changeover first, the \$1.00 surcharge level will have to be exceeded. Once exceeded, we predict (based on discussions with out-of-state fuel dealers) that there will be an increase in non-compliant fuel purchases, thereby exacerbating the cost being spread over fewer regulated gallons sold. This is what we call the Carbon Doom Spiral. It is the unanticipated future of the massive \$5 billion off-balance sheet financing known as the Affordable Heat Act.

In the Cadmus Pathways report the savings of the Climate Action Plan ("CAP") was reported as \$6.4 billion NPV.⁸ The savings attributed to social carbon alone is \$7.4 billion, so all of the savings are found in social carbon.⁹ The social carbon model was presented in Energy Futures Group report of August 2021.¹⁰ However, the model used to calculate social carbon used 2.0% as a discount rate. The discount rate reflects the cost of capital or the cost of borrowing. Since that time borrowing rates have risen.

⁸ Cadmus Group and Energy Futures Group, "Vermont Pathways Analysis Report 2.0" February 11, 2022, 5 and 72

⁹ Ibid., 73

¹⁰ David Hill, Elizabeth Bourguet, Chris Neme, Gabrielle Stebbins, "Social Cost of Carbon Model Review," Energy Futures Group, Inc., August 18, 2021

III. A sensitivity of resultant enactment time windows (cont.)

In August 2021, the effective fed funds rate (“EFFR”) was 10 bps. This implies a premium used of 190 bps above the risk free EFFR for a total of 2.0% used in the discount rate. Today the EFFR today is 4.58%, an increase of 45 times from 10 bps.¹¹ At the other end of the yield curve, the 30 Year Treasury has gone from 1.8% to 3.8%.¹² Without seeing the actual model, which is not public, it is clear the increase in EFFR, if used, should mean the appropriate discount rate today is 4.58% plus the premium of 190 bps or 6.48%. Using the long bond, the rate would be 4%. Therefore, the appropriate discount rate using the methodology in the report is not 2%; it is somewhere between 4.0% to 6.8%, with 6.0% being appropriate for underlying structural rates.

This increase in borrowing costs, leading to an increase in discount rate combined with our findings on increased upfront costs, flips the results of the CAP model. All savings disappear. Assuming out-year flows in the social cost of carbon model are even flows, not chunky flows, the \$7.4 social cost savings will likely decline to \$2.2 to \$3.7 billion in social cost savings. Given the additional \$3 billion in time-zero cost identified with upfront improvements, this means the model is now likely \$800 million of economic cost, not benefit, to Vermonters under the Affordable Heat Act. We would need to see the non-public model but from the information presented, there are no economic savings under the Affordable Heat Act. There may be progress towards climate goals, but the program will not produce *any* economic savings for Vermonters.

¹¹ See Federal Reserve Bank of New York, accessed on February 14, 2023, <https://www.newyorkfed.org/markets/reference-rates/effr>

¹² See Yahoo Finance, accessed February 14, 2023, at <https://finance.yahoo.com/quote/%5ETVX/history?period1=1627689600&period2=1676332800&interval=1d&filter=history&frequency=1d&includeAdjustedClose=true>

IV. The consequent conflict of moral imperatives

Once begun, the Carbon Doom Spiral will punish low- and moderate-income Vermonters with higher and higher fuel charges and no greater ability to fund changeover renovations. There will be no promised price protection for them. And as renovations lag, climate goals will be missed.

The “carrot and stick” approach will be just sticks with no carrots. This new heat standard will increase income inequality and will become a new system which oppresses low- and moderate-income Vermonters. The Affordable Heat Act will increase, not diminish, suffering.

The moral imperatives of climate change and equity are in conflict within the Affordable Heat Act, leaving legislators a choice between Scylla and Charybdis. In fact, the credit system as designed pits climate goals against the welfare of a majority of Vermonters. We suggest that climate change is a moral imperative but equity, which in its broadest sense is respect for the humanity of others, is a categorical imperative.

The promise of savings through the Affordable Heat Act rests on flawed economic models and a misplaced belief that fuel dealers have the funds to finance the entire energy changeover. Ultimately the cost of the \$5 billion program will come to rest on those doing the bulk of the upfront improvements, namely low- and moderate-income Vermonters. We know the Affordable Heat Act is immoral because it is regressive; please recognize that the program will not deliver on climate goals. The passage of the Affordable Heat Act in its current form will not solve our climate issues, it will only begin to compound them.



Thank You

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