



Global Warming Solutions Act Testimony from the Vermont Sierra Club

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The Global Warming Solutions Act (GWSA), H. 688, is a crucially important bill, because it addresses head on the critical climate solutions element missing in our state: accountability for greenhouse gas (GHG) reduction goals. Congratulations are due to all those who have contributed to the redrafting that's happened over the last few months.

Great progress has been made, in clarifying the overall direction of this effort, developing the concept of a government/citizen Council, and clarifying the opportunity for enforcement through citizen suits. There are a few areas where we find opportunities for improvement.

OVERALL GOALS AND OFFSETS

1.5, not 2.0. The bill calls attention to the goals of the Paris Climate Agreement. However, while the bill identifies the goal of avoiding a 2°C temperature increase, the Paris Agreement calls for a maximum of 2 degrees, but *with a strong preference for no higher than 1.5°C*. There is good reason for this, with a huge additional body of science since the time of the accord that shows why the stronger goal is critical. In my testimony before this committee in 2019, I shared a chart that compared the effects of the two temperature limits. There's another example, cited in the same International Panel on Climate Change (IPCC) report, that is particularly evident today. This states that with the lower limit, we would expect to see deep heat waves, droughts, and fires, affecting major areas of the southern hemisphere. The water crisis in southern Africa last year, and the 120 degree heat wave and catastrophic fires in Australia are examples of this. With a global 2°C increase, according to this report, we can expect the same effect repeated broadly in the mid-latitude northern hemisphere -- that's us.

We should not settle for that as an acceptable target. We should be striving to hold to 1.5, and calling on the rest of our United States to do the same.

Recommendation: On page 3, line 14, after “average temperature to below 2°C,” add, “with a strong preference for staying below 1.5°C.”

Clarify 80% target, Net Zero, Offsets. There is some confusion in the bill’s language surrounding the targets of “not less than 80%” by 2050, or net-zero carbon emissions, and how this works with “alternative reduction mechanisms” (offsets). We’re concerned that it could be interpreted that the intent is to fall short of 80% reduction through the use of offsets. Another interpretation is that the true target is net-zero, but with the provision that 20% of that could be handled through offsets. We recommend stating clearly from the start that the target for 2050 is net zero, with some of that accommodated by alternative reduction measures.

We’re also concerned about the amount of permitted offsets. There is a troubled history in carbon-capping programs regarding how offsets are managed, often leading to impacts on certain communities, or other unintended consequences. The new language demanding that offsets be real, enforceable, additional, and permanent is very helpful. But while alternative reduction mechanisms represent an important safety valve providing an alternative form of compliance, these offsets tend to be imperfect. We strongly suggest limiting offsets to 10% based on net-zero, and setting the reduction target at not less than 90% of current emissions.

Recommendation: p. 6, line 10, change item (3) to read:
“(3) net zero, and not less than 90% after any offsets, from 1990 greenhouse gas emissions by January 1, 2050 pursuant to the State’s 2016 Comprehensive Energy Plan.”

We recommend language stating that any offset projects (1) not extend or create adverse impacts for affected communities, (2) even if out of state, the offset projects be reasonably expected to meet all Vermont environmental permitting standards and (3) are not already counted for compliance in any other greenhouse gas related program, whether mandated or voluntary..

Recommendation: p. 19, after (i)(2), line 14, add
“(3) no offset projects shall be approved if it (1) extends or creates adverse impacts for affected communities, or (2) even if out of state, can not be reasonably expected to meet all Vermont environmental permitting standards, or

(3) if any portion of the project is committed as a greenhouse gas reduction credit in any voluntary or required program.”

As a final note on the topic of offsets, or alternative reduction mechanisms: In other similar regulatory programs, the regulatory program often includes a process for the review and acceptance of proposed offset projects, which are then offered to regulated entities as a compliance option, for a market-based fee. We simply raise the question: is the mention in H.688 of potential use of offsets sufficient to empower ANR to incorporate this in its rulemaking, or does this require further clarification in the law?

Nature-based carbon dioxide removal. (Forests and soils) The IPCC makes a very strong science-based statement that recommends removing from the atmosphere substantial amounts of greenhouse gas. The IPCC report shows that simply achieving net-zero carbon emissions offers only a small chance of avoiding a dramatic increase in impacts. To improve our chances, and reduce the exposure of our children and grandchildren to those far greater risks, we must additionally remove about 15% of the carbon currently in our atmosphere. While there are emerging technologies that hope to serve this purpose, we in Vermont are blessed with a great opportunity to tap co-benefits for ecosystem protection. The best way to do this is by enhancing the amount of sequestration by our forests, wetlands, and soils. We know there is great potential and that the science is complex. This should be added as a distinct carbon reduction target and opportunity, and it should be added to the agenda of the Climate Council. We also suggest that this would be a great opportunity for investment in research and development, partnering academia with farmers and forest landowners to develop and share best practices for the particular needs of our state.

Recommendation: We strongly recommend a goal of 15% (of current emission levels) carbon sequestration *beyond net zero*.

Note below our recommendation related to subcommittee structure.

VT GREENHOUSE GAS INVENTORY (GHGI)

The carbon accountability addressed by the GWSA hinges on the Vermont Greenhouse Gas Inventory. Since this will be the tool for measuring success and compliance, it is critical that the inventory be completed with robust scientific precision. Are there ways to accomplish this that improve the quality and timeliness of the GHG snapshot? Could the infusion of additional attention and resources capture opportunities to make this a better tool? Should there be more public insight into the creation of targets that will have

the force of law? With the GWSA, Vermont is setting a wholly new standard. Our measures of the past are insufficient. It is critical that we ensure the integrity and validity of this new accounting from the start, rather than coming back later to make fixes. Particularly as we succeed in the electrification of transportation and thermal energy, the missing carbon sources described below will become the dominant feature of our GHG profile. These factors should be incorporated into the Vermont Greenhouse Gas Inventory.

- **Confusion about statutory basis.** There are two different sets of statutory guidance referenced in this bill. First, in section 3, 578(a), (p. 6 line 2), the bill references Section 582 as the basis for the inventory. But then in section 4 about guidelines for the Plan (p. 10 line 1 etc.), there appears to be a different set of GHGI guidelines. Are the Council, and the Plan, bound by the language in 582, or are they free to work with the more general language of this section 3? This relationship should be clarified.
- **Mandate Rulemaking.** There is already language, in 582(e), that suggests ANR *may* clarify in rulemaking the process by which the GHG Inventory is conducted. Then, in 582(g), the language changes to *shall*. The rulemaking process is valuable because it offers the advantage of transparency and the opportunity for input by all interested citizens, businesses, and so on. With the increased importance of the inventory as a regulatory metric, this is all the more important. We recommend turning this “may” into a “shall”. (see current language copied below)
- **Missing elements.** There are a few ways in which the GHG inventory, at least partially, overlooks important issues regarding GHG emissions attributable to particular groups of sources. This skews our accounting, and makes it impossible to chart an accurate path to zero emissions. As our state moves toward electrification of all energy needs, especially transportation and thermal energy, these hidden sources are likely to become the dominant sources of greenhouse gas emissions. Even though that will take decades to develop, it is important to set the parameters now. We feel it should be clarified in this law that these previously overlooked factors must be part of the accounting:
 - **Methane emissions**, including leakage (blow-off) from extraction, storage, distribution, and delivery, should be part of the accounting. This comes up in two ways: in our regional mix of imported electricity, and in our in-state use of natural gas (NG), primarily for heat. Science tells us that methane is a very powerful greenhouse gas; measured over a 20

year period, about 86 times as potent as the same amount of CO₂. Studies show that the true, overall climate impact of fracked methane is *double* the impact of its direct combustion emissions (the CO₂ at the point of use). Sorting this out and establishing accurate accounting should be part of the ANR GHG Inventory rulemaking.

- **Hydroelectric facilities** have a range of GHG impacts. Smaller systems with smaller reservoirs have minimal GHG impact. Larger systems with large reservoirs and significant ponding (with fluctuating water levels in the reservoir) can have a major GHG impact. Many of the projects of this scale, with the permanent (and very non-renewable) ecosystem damage they entail, would ever receive a permit here in Vermont. Our GHG inventory process should account for both the *lost carbon sink* due to forest removal, and also *reservoir emissions* of CO₂ and CH₄. For out-of-state sources where we have limited opportunity for verification, a conservative default value should be applied.
- **Biomass energy** represents a complex challenge. One thing is very clear: biomass energy is not carbon-neutral. While there is some benefit due to the fact that biomass carbon emission has only relatively recently been taken out of the atmosphere, and will grow back over a century, it still implies a heavy carbon cost on our forests, and studies demonstrate that in the short term, producing electricity from woody biomass emits even more carbon dioxide (not to mention other forms of pollution) than electricity from coal. The actual impact is highly dependent on a number of factors, such as harvest practices and forest type, but in any case, the price to our atmospheric carbon system is substantial, and the GHG inventory should accurately reflect biomass carbon emissions from any specific source.
- **Liquid fuels**, including gasoline, diesel fuel, and heating oil, come with emissions due to extraction, refining, and transportation. These should all be incorporated in the GHG inventory.
- By not addressing these difficult GHG-emission concerns, the current GHGI grants special preference to emitters that fall into these categories. This is like having a law about a speed limit, but exempting all purple cars. Now that the GHGI will serve as the critical basis for accountability, it's critical that all of these GHG-producing sources be fully evaluated.

- **Timing:** With the possibility of adjustments being made to the GHGI through rulemaking, it would be wise to front-load this process. Sufficiently focused, it shouldn't require oversight from a 21 person Climate Council to bring the inventory to where it needs to be. Inventory-specific rulemaking could be completed quickly, and in time for the 2021 edition. This would improve long-range planning for reduction of all greenhouse gasses.

Recommendation: Include language (~p. 10, line 1; 591(b)(3)(A)) to make it clear that the 582 language continues to guide the process.

Recommendation: Add, 582(b)(5), "The GHG Inventory shall incorporate to the fullest extent feasible the quantities and global warming implications related to life-cycle fugitive emissions of methane associated with natural gas; lost carbon sinks and reservoir emissions from large hydroelectric facilities; lifecycle emissions associated with biomass energy; and life cycle emissions from liquid fuels."

Recommendation: ANR be directed to undertake rulemaking under 582, with consideration of its use to support the GWSA, with a timeline to submit a final rule by January 1, 2021.

RESILIENCE, ADAPTATION AND RESTORATION

Since this was a missing element in the now historic H.462, we applaud the inclusion of adaptation and resilience in H. 688.

There are a few important aspects of climate adaptation that merit specific mention, and inclusion in the charge for the Climate Council and Plan.

- **Ecosystem support.** This includes recognizing the importance of migratory routes and habitat connectivity. It includes a response to exotic/invasives species, but also recognizing that climate migration may involve a new way to think about invasives. This includes recognizing the role of climate change in engendering endangered and threatened species. (Climate change and habitat loss are combining to power a mass extinction of epochal proportions.) There is also a strong overlap between ecosystem support and the co-benefits of carbon sequestration.
- **Agricultural adaptation.** Clearly, the issue in recent times for many farms has been too much water, with disastrous consequences for farms that have seen crop loss due to flooding, or long term erosion damage to farm fields. We have also seen periods of drought that hurt farmers. The expanding growing season is likely changing the limits of what we can grow in our state. There are also

important opportunities for new ways to understand the dynamics of our soils, which can lead to improved soil quality, enhanced carbon sequestration, and reduced impacts on water pollution. Vermont is blessed with an active community of expertise on this.

- **Our food supply.** We currently import the large majority of our food. It turns out that with climate change some of our most important food source regions are drying out. As we increasingly rely on growing our food right here in Vermont, this can mean new opportunities for growers and food processors. Expecting an increase in people moving to our state, this also means increasing pressure on conversion of farmland to other uses. This calls on us to look at opportunities to conserve farmland now so when the time comes, our children and grandchildren will have access to good food.

Recommendation: We recommend incorporating a new element of the charge and subcommittee lists, focusing on nature-based sequestration, ecosystem support, agricultural adaptation & resilience, and food supply.

Recommendation: 592(b), p. 13 line 19, after economy, add “and natural communities.” There are also numerous other points in H.688 where this phrase should be included.

RELATIONSHIP TO OTHER REGULATORY PROGRAMS

There should be a strong link between the greenhouse gas targets established through H.688 and other related regulatory programs.

- any consideration by the Public Utilities Commission (PUC) of Certificates of Public Good (§ 248). This should include a mandate that stranded costs that develop as a result of achieving net-zero targets be absorbed by the regulated entity and not by taxpayers.
- Act 250.
- The energy planning and siting processes involving towns and regional commissions. Going forward, regional and municipal energy plans should meet not only the renewable energy goals, but also the carbon reduction targets established through H.688.

CAN RULEMAKING SOLVE ALL OF OUR PROBLEMS?

The emphasis of the GWSA is on agency rulemaking. This is helpful, but it has limits. Some of our success at responding to climate change will depend on the nature and

scale of incentive programs instead of rules. Some of our success will depend on leadership, educational, and cultural change efforts that serve to fully engage all Vermonters in becoming part of the solutions.

We also note that the planning, rulemaking, and implementation set in motion under this bill will take years. With our planet in crisis, we know we have no time to waste. And while we are behind in our commitment under the Paris agreement to reduce our GHG emissions by 26% by 2025, an infusion of funds to supercharge existing programs would quickly put us on track. We recommend, outside the work on H. 688, fast action on a Vermont Green New Deal.

MAKE-UP AND STRUCTURE OF THE CLIMATE COUNCIL

The establishment of a Climate Council is a strong element of H. 688. It reflects the reality that effective response to the climate crisis must be broadly inclusive. Our response has to be respectful of those who are most impacted but less able to respond. It requires creativity and expertise from a wide range of knowledge and experience. Most importantly, it is going to require willing engagement by all of us, beyond anything most of us have experienced in our lifetimes. The closest thing I can imagine are the stories my parents told of the sacrifices everyone willingly made during the mobilization of World War II.

In designing a Council like this, there's a challenge of a balancing act between inclusion and efficiency. Here are a few more talents that would be valuable additions on the Climate Council:

- Regional Planner with experience in resilience.
- Individual with experience in climate education and social transformation.
- Individual who can bring the expertise of health concerns raised by a changing climate.
- Individual who can bring expertise associated with mental health challenges of climate change, including those displaced by climate change who have relocated to our state.
- One person representing farming, with understanding of soil carbon as well as adaptation demands
- One person representing the forest sector, with understanding of forest carbon, sustainable forestry, as well as the needs of the working forest industry.
- Individual with an understanding of the impacts of climate change and needs for adaptation with regard to natural communities

Recognizing that this list could keep growing and quickly become unmanageable, we suggest a robust two-tiered approach. The top level could be roughly as outlined in H. 688 as introduced, perhaps even a bit smaller, and then the subcommittees could include people who bring their wider range of experience and expertise to the table. Not only would this bring in valuable expertise, it will also resonate with the idea that this crisis is not going to be solved by handing it off to a small circle of people. The communication flow and social connection with a larger group of actively engaged contributors will reinforce the all-hands-in nature of the effort. These subcommittees would each include two or more members of the Council. Recognizing that this work is substantial and can't be subject to the uncertain nature of volunteer participation, at least two staff people from the state or regional agencies would be appointed to each subcommittee, and take on this work as part of their job description. Each subcommittee would have as many as ten members. One of the council members would be designated as chair, or co-chair along with one of the staff members.

To repeat from above, we also recommend adding a subcommittee that addresses nature-based sequestration, ecosystem support, agricultural adaptation & resilience, and food supply.

Thank you for the opportunity to offer these comments, and again, thank you for your work on this critical issue.

10 V.S.A. § 552 (11) "Greenhouse gas" means any chemical or physical substance that is emitted into the air and that the Secretary may reasonably anticipate to cause or contribute to climate change, including carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

§ 582. Greenhouse gas inventories; registry

(a) Inventory and forecasting. The Secretary shall work, in conjunction with other states or a regional consortium, to establish a periodic and consistent inventory of greenhouse gas emissions. The Secretary shall publish the Vermont Greenhouse Gas Emission Inventory and Forecast by no later than June 1, 2010, and updates shall be published annually until 2028, until a regional or national inventory and registry program is established in which Vermont participates, or until the federal National Emissions Inventory includes mandatory greenhouse gas reporting.

(b) Inventory updates. To develop the Inventory under this section, the Secretary, in coordination with the Secretaries of Administration, of Transportation, of Agriculture, Food and Markets, and of Commerce and Community Development, and the Commissioner of Public Service, shall aggregate all existing statewide data on greenhouse gas emissions currently reported to State or federal entities, existing statewide data on greenhouse gas sinks, and otherwise publicly available data. Greenhouse gas emissions data that is more than 36 months old shall be updated either by statistical methods or seeking updated information from the reporting agency or department. The information shall be standardized to reflect the emissions in tons per CO₂ equivalent, shall be set out in the inventory by sources or sectors such as agriculture, manufacturing, automobile emissions, heating, and electricity production, shall be compatible with the inventory included with the Governor's Commission on Climate Change final report and shall include, the following sources:

(1) information collected for reporting in the National Emissions Inventory, which includes air toxics, criteria pollutants, mobile sources, point sources, and area sources;

(2) in-state electricity production using RGGI and State permit information;

(3) vehicle miles traveled and vehicle registration data; and

(4) agricultural activities, including livestock and crop practices.

(c) Forecast. The Secretary shall use best efforts to forecast statewide emissions for a five- and ten-year period based on the inventory data and other publicly available information.

(d) Registry. The Secretary shall work, in conjunction with other states or a regional consortium, to establish a regional or national greenhouse gas registry.

(1) Any registry in which Vermont participates shall be designed to apply to the entire State and to as large a geographic area beyond State boundaries as is possible.

(2) It shall accommodate as broad an array of sectors, sources, facilities, and approaches as is possible, and shall allow sources to start as far back in time as is permitted by good data, affirmed by third-party verification.

(e) Rules. The Secretary may adopt rules to implement the provisions of this section and shall review existing and proposed international, federal, and State greenhouse gas emission reporting programs and make reasonable efforts to promote consistency among the programs established pursuant to this section and other programs, and to streamline reporting requirements on greenhouse gas emission sources. Except as provided in subsection (g) of this section, nothing in this section shall limit a State agency from adopting any rule within its authority.

(f) Participation by government subdivisions. The State and its municipalities may participate in the inventory for purposes of registering reductions associated with their programs, direct activities, or efforts, including the registration of emission reductions associated with the stationary and mobile sources they own, lease, or operate.

(g) Greenhouse gas accounting. In consultation with the Department of Public Service created under 30 V.S.A. § 1, the Secretary shall research and adopt by rule greenhouse gas accounting protocols that achieve transparent and accurate life cycle accounting of greenhouse gas emissions, including emissions of such gases from the use of fossil fuels and from renewable fuels such as biomass. On adoption, such protocols shall be the official protocols to be used by any agency or political subdivision of the State in accounting for greenhouse gas emissions. (Added 2007, No. 209 (Adj. Sess.), § 4; amended 2011, No. 170 (Adj. Sess.), § 14.)

USEFUL REFERENCES

GWSA Implementation in MA:

<https://www.mass.gov/files/documents/2019/04/02/GWSA-10-Year-Progress-Report.pdf>

Sierra Club Adaptation & Resilience task force report, [Tackling Climate Change](#).

[Biomass Sustainability and Carbon Policy Study](#), Manomet Center for Conservation Sciences.

[Stefan Rahmstorf on sustainable growth](#), this 15 minute youtube video is an excellent review of current scientific understanding of the state of the climate and climate emergency. In addition to his own scientific research focus, Rahmstorf has consistently been one of the great synthesizers bringing this complex field into an actionable vision.