



## Memorandum

**To:** Jane Lazorchak, Director of Global Warming Solutions Act  
**From:** David Hill and Dan Mellinger, Energy Futures Group, and Liz Hanson, Cadmus  
**Subject:** Vermont Climate Action Plan Monitoring and Evaluation Database  
**Date:** November 28, 2021

### Background

Vermont's Global Warming Solutions Act (GWSA) prescribes a series of aggressive greenhouse gas reduction requirements, in line with what science demands to stave off the worst impacts of climate change. The Vermont Climate Council (VCC) is preparing to release its first Climate Action Plan (CAP) to meet these requirements in an equitable, cost-effective, and technologically feasible way, while also sequestering carbon, protecting natural and working lands, and increasing resiliency. As part of the CAP, the VCC must set forward a framework for assessing progress towards these aims.

Specifically, the GWSA requires that the state track key components of its climate program, including:

- A. The State's greenhouse gas emissions and progress towards meeting reduction requirements;
- B. The effectiveness of the initiatives, programs, and strategies set forth in the CAP;
- C. The effects of climate change on the State's climate, wildlife, and natural resources; and
- D. Progress towards improving existing resiliency of the State's communities, infrastructure, and economy to current and anticipated effects of climate change.

Vermont is fortunate to have a solid foundation to inform this work. Vermont's Energy Action Network (EAN) has long maintained a Vermont Energy Dashboard. EAN's dashboard aggregates efficiency, heat, electricity, and transportation measures implemented at the state and local level in support of Vermont's goal to achieve 90% of its energy needs through increased efficiency and renewable sources by 2050. In addition, the Department of Public Service (DPS), in partnership with EAN and other stakeholders, has just is in the process of updating its data management infrastructure with the aim of developing a sustainably supported and streamlined process for reporting, managing, and transparent sharing of energy-related data in the state. This process has begun to completed a process to map data flows in the energy sector and conduct stakeholder engagement sessions on a with plans for a data infrastructure pilot to be advanced in conjunction with Vermont's Department Agency of Digital Services. Any database developed in support of the CAP can and should be pursued in conjunction with this effort.

This memo seeks to summarize ongoing discussions on how Vermont can track progress on the actions, strategies, and pathways that are intended to drive progress on Vermont's CAP and inform next steps for database development.

### Tracking Objectives

As Vermont seeks to issue its first CAP, members of the Task Force on Monitoring and Evaluation are eager to see the State develop a data infrastructure that can help inform future decision-making on the policies, programs, and initiatives needed to mitigate the impacts of climate change. With regards to

**Commented [MJ1]:** Would like to understand more about how this information is compiled and have a bit more of a sense for how complete it likely is. Going forward, I believe we will need a relatively formal "data infrastructure" for tracking and accounting given the legal cause of action related to measuring progress. Pu another way, I would like to see this framework identify steps for identifying key partners and codifying the reporting relationships between them and the State of Vermont in a formalized way around this work

**Commented [DM2R1]:** Included in the data mapping recommendation.

**Commented [MJ3]:** logic model can be used to show that tnable actions (that we have control over as Vermont) will aggregate to achieve ultimate outcome... we don't have control over other states, global, etc. so need to focus on quantifying actions in a manner that ties to outcomes

what we have learned with the TMDL is that scenario planning and track of actions need to occur similar manner ... need to ensure that the performance metrics we are tracking align with the "drivers" in the emissions inventory

there are other performance measures that are meaningful that are still being tracked, but all needs to boil down to how it is measured to the emissions inventory (is there is a disconnect between EV sales vs gas sales)

project types and scale of implementation vs. are we doing enough what data will help us with the decisionmaking process

**Commented [DM4R3]:** I believe the comments expressed here have been captured in other edits

**Commented [MJ5]:** Because so much of climate action requires changes in individual behaviors, how does this relate to what we (the State) actually has control over (things like projects funded, or "stuff" we regulate). Once we have this framework, it would make sense to couple the pieces we control with broader population level indicators of success - which would in turn inform if the State needed to take further pieces under out control...

**Commented [DM6R5]:** I think this is what the logic model is intended to do. Link the goals, to metrics, to data. Much of the data are going to represent individual actions, e.g. heat pump installs, or EV purchases. I added text in two places below to articulate this point about areas that the State has control over.



the GWSA requirements listed above, they anticipate that a CAP Monitoring and Evaluation Database (database) should:

- Demonstrate progress on meeting emissions reductions requirements (per Requirement A), which should be achievable in the near-term based on the GHG inventory baseline and existing data sources.
- Demonstrate progress on increasing resiliency (per Requirement D), which will require the development of a resiliency baseline and the collection of new data by which the State can measure impacts on communities, infrastructure, and the economy.
- Provide data with which the State can conduct impact evaluations, [as well as performance measures to track outputs and indicators to track outcomes](#), to ensure compliance with the requirement to evaluate the effectiveness of programs (Requirement B).

The Task Force does not recommend that the database be utilized to measure the effects of climate change on the State’s climate, wildlife, and natural resources (Requirement C). Instead, they recommend this remain under the jurisdiction of the Vermont Climate Assessment. Future discussion on how these two resources should be coordinated is warranted.

Based on these objectives, the Task Force has identified four primary goals for the Database, discussed in detail more below.

1. **Policy-Decision Support Tool:** Support the State and its partners in making climate policy decisions with best available information.
2. **Sustainable Data Management:** [Create a data governance plan, flexibly accommodate future data needs, and Streamline and coordinate relevant data and reporting across multiple private and public entities, including establishing a data standard, and annual \(or other frequency\) data compilation and QA/QC process.](#)
3. **Open and Accessible Data:** Provide access to key data sources to organizations and members of the public engaged in climate action that wish to utilize Vermont’s data to support their work.
4. **Public Education:** Inform the public about progress on achieving GWSA commitments, including emissions reductions, sequestration, adaptation, resilience, and equity.

### Policy-Decision Support Tool

The accelerated pace at which Vermont will need to implement the strategies and actions in the CAP is imperative for meeting the reduction requirements in the GWSA. While the State’s GHG Inventory provides essential insights into Vermont’s GHG emissions over time, the data sources upon which it relies inherently means that there will always be a lag in its production. To support policy-decision makers in implementation of the CAPs, which must be updated every four years, the Task Force anticipates it is essential that a database provide more close-to real-time data on key implementation metrics than is currently feasible through the Vermont Greenhouse Gas Inventory. This will mean, for example, the database will be structured to [accept regular real-time updates](#) on activities from implementing organizations and published with minimal lag. It will be important to have the Database and Inventory remain aligned over time, where applicable and feasible. Where not, it will be essential that the VCC and that State articulate the methodological differences that cause any varying results and what insights, if any, policy makers and the public should draw from those variation.

**Commented [MJ7]:** There is need for robust discussion around how this data relates (directly or indirectly) to the inputs for the emissions inventory. For example, is the number of EVs a reasonable surrogate for what is driving the the estimated GHG emissions associated with the light-duty transportation sector? If not, what else should we be tracking as an indicator of progress toward the legally binding requirements of the GWSA?

**Commented [DM8R7]:** Added text below in the details section of the policy-decision support tool.

**Commented [MC9]:** Should this explicitly reference a goal of not increasing reporting burden of entities where possible?

**Commented [DM10]:** These items are reflected in the details below.

**Commented [MJ11]:** Can this be expanded to include identifying and tracking metrics that would help identify barriers to changes in individual behavior needed to achieve larger goals (and inform community based social marketing)?

**Commented [DM12R11]:** Included in the details section below.

**Commented [MC13]:** I don’t think real-time should necessarily be the goal – we’re heard from stakeholders that certain data can’t/doesn’t need to be updated more than annually for example – seems like regular updates would capture the need. For the department, we’re looking at accommodating a variety of frequencies, from annual to quarterly to monthly where it makes sense for the data source

**Commented [MJ14]:** I have significant concerns about suggesting "real-time updates" are something we (or our partners) may be able to commit to. This is not to say "no never" but I recommend deleting this sentence.



To support the development of policy, the Task Force recommends that a logic model be used to help clearly articulate the ways in which the data being collected and reported relates to the goals of the CAP and to the performance measures that the State has control over. A logic model requires the mapping of each of action to a desired result and can help identify what else should we be tracking as an indicator of progress toward the requirements of the GWSA. This will require mapping backwards from the outcomes intended from the policies and strategies delineated in the CAP to the key metrics that must be achieved; to the data with which the State can evaluate progress; and finally, to the data which are available (now or in the future) from implementing organizations and state agencies. For example, to track and report on a Clean Heat Standard, it would be necessary to keep track of the levels of activity across multiple strategies, such as heat pump installations, weatherization and increased consumption of biofuels blends. This would also be supported by select impact evaluations, for example to better understand the energy and emissions impacts and costs from each measure as they are installed and used by customers.

## Sustainable Data Management

Sustainable Data Management is a multi-faceted issue that must be addressed during the development of the database. First, a clear plan for data governance will be necessary to define the availability, usability, integrity, and security of the database. The data governance plan should include a governance team, a set of data standards and policies (including data security), a quality assurance process, and implementation procedures.

Second, the database must be designed to flexibly adapt to changes over time. The data needs may shift to support future CAP updates and/or in response to program evaluations. Developing a solution capable of handling these changes is important to recognize at the onset.

Third, it is essential to create an infrastructure for sustained coordination on data sources. The responsibility for implementing the CAP strategies and actions is likely to span Vermont's agencies and include numerous outside parties. ~~It is therefore essential to create an infrastructure for sustained coordination on data sources.~~ The database infrastructure must ~~This will not only~~ allow for ease of reporting by responsible parties, with limited additional reporting burden, it will also and should support data managers across Vermont state government to share resources that can and should inform key decisions. This may include a pathway for voluntary data reporting by partners, with the goal of obtaining a more complete understanding of the actions that are supported by the CAP.

## Open and Accessible Data

The Task Force recognizes that while the database cannot be all things to all people, actors across Vermont are going to wish to use the data to inform their own decision making. The Task Force recommends that while the database be constructed in a manner that primarily supports State policy design, that it also be structured in a manner that ensures the data is open, accessible, and exportable whenever legally permissible. This is intended to ensure that users can utilize this important data set to conduct their own analysis to suit their needs.

## Public Education

A final goal of the database is to create a narrative for the public from the numbers. To this end, the Task Force recommends that the database be built with the long-term goal of data visualization in mind. In particular, it will be important for the database to support the development of key findings and

**Commented [MJ15]:** What types of data would be collected to identify barriers to adoption of best practices? Demographics, geographic distribution, etc.?

**Commented [DM16R15]:** Included language around barriers in the public education section.

**Commented [MC17]:** John Adams from VCGI would be better able to speak to this, but I think this needs to include a clear plan for data governance (which might be what you are thinking here but wanted to highlight it if not).

**Commented [MJ18]:** Would like to see this include a pathway for voluntary data reporting by partners to obtain a more complete picture for actions that are paid for using sources other than state dollars.



graphics for the first update of the CAP in 2025, including the types of measures that can identify areas where progress is being made and where we are lagging. Furthermore, the database may be useful in tracking metrics that can help identify barriers to changes in individual behavior needed to achieve the goals of the CAP.

**Commented [MJ19]:** This should include the types of measures would be most helpful in identifying areas where progress is being made and where we are falling short

## Recommended Development Steps

The Task Force anticipates a series of steps will be necessary to develop the database:

- **Logic model and metric creation:** once the pathways, strategies, and actions in the CAP are adopted by the VCC, the Task Force recommends that database development begin with mapping the logic models for how Vermont anticipates achieving greenhouse gas reductions, as well as increases in sequestration, resiliency, and equity. As part of these models, the key metrics through which Vermont anticipates driving changes should be clearly identified and linked to the performance measures that the State and its partners have control over.
- **Data mapping:** With these logic models and metrics in place, it will be possible to map the data sources and flows that currently exist, as well as identify gaps in data that will need to be filled. This process should include reviewing work done to date by DPS and EAN to determine the best way to align their efforts with database development efforts. As part of this data mapping process, the Task Force recommends that key data reporting partners be identified, and the reporting relationship codified between them and the State of Vermont.
- **Data governance:** A data governance plan should be drafted, and a governance team identified, to guide the development of the database. The data architecture, database design, storage, and security are all informed by the data governance plan.
- **Infrastructure recommendation and development:** A database infrastructure will be selected and developed based on the objectives and goals listed above, with both near-term and long-term priorities in mind. To the extent possible, this should create sustainable long-term engagement across state agencies managing data to efficiently aggregate data that already exists, rather than developing new reporting or input requirements for staff or reporting entities and be built with readily available tools, so that it is accessible to a wide variety of users.
- **Testing and iteration:** Once developed, the Task Force anticipates it will be important to continue iterating on the database to ensure stakeholder feedback improves its usability over time.

**Commented [MJ20]:** Results based accountability principles could be helpful here. Identify what performance measures we (SoV) have direct control over that impact these indicators.  
How much did we do?  
How well did we do it?  
Is anyone better off?

**Formatted:** Font: Not Bold

## Conclusion

Ensuring that Vermont is making swift and steady progress towards action on the GWSA will require that decision-makers across Vermont state government and its CAP partners have access to up-to-date information on the key metrics anticipated to drive change in the CAP. In doing so, the monitoring and evaluation database will support an evaluation of compliance with the requirements of the GWSA. The Task Force recommends prioritizing this key use case in the near-term, while also ensuring the data is open and accessible to anyone that wants to utilize it and, ultimately, presented in an easily digestible format for the public.

**Commented [MJ21]:** I want to make sure that there is clarity about what our "ultimate indicator of success" is in this space... unlike with water quality, I don't believe there are direct measurements (air samples) that will support an evaluation of compliance with the requirements of the GWSA. As such, how conditions are being modeled (in the inventory) needs to be tied closely to what is being tracked. I don't have enough of an understanding yet to know if there is any sort of direct relationship between the actions being proposed in the GWSA and the data inputs into the emissions inventory. To me, this crosswalk is essential foundational work to developing any tracking framework.