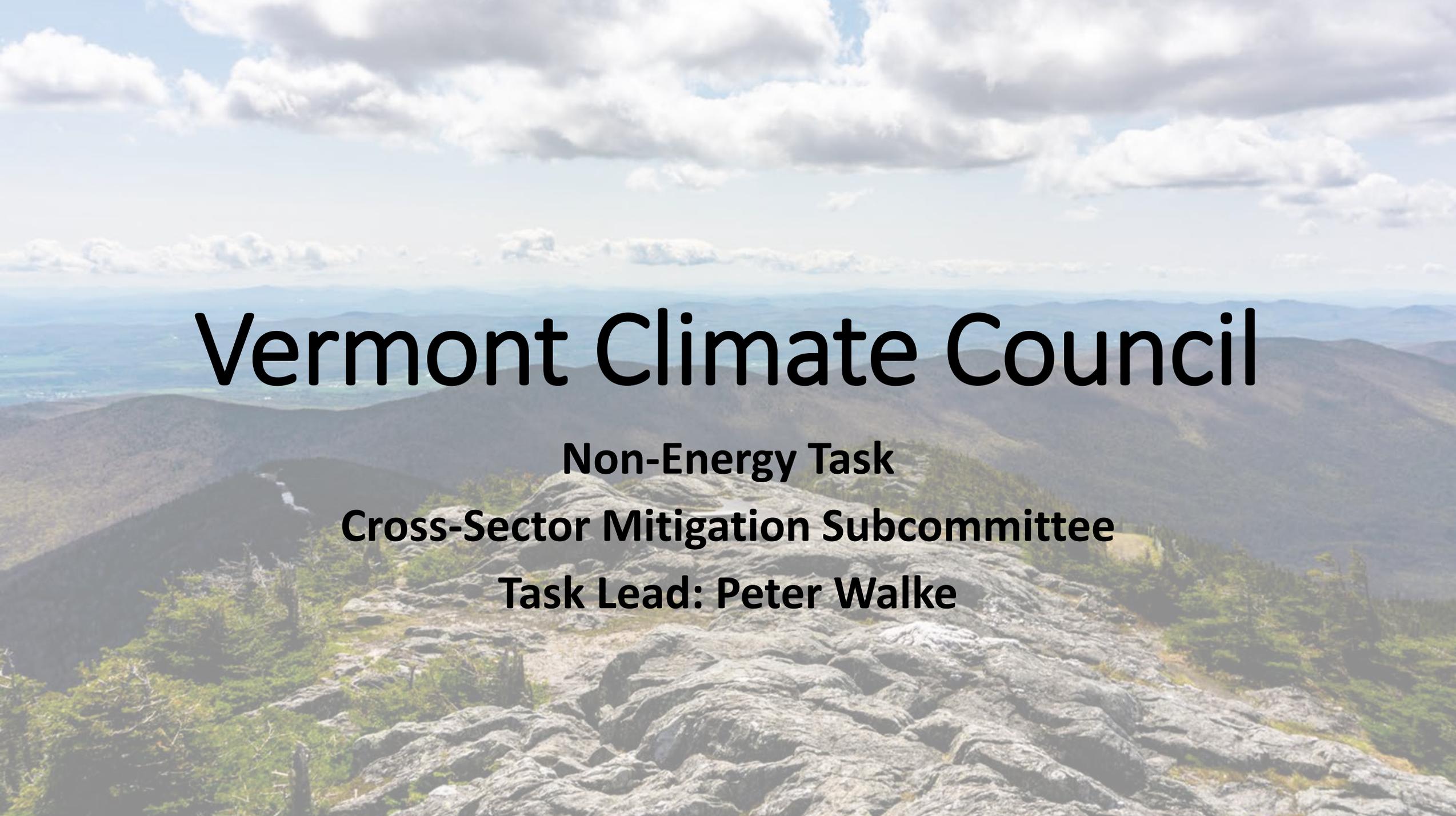


Vermont Climate Council

Building the Climate Action Plan

Initial Suite of Sectoral Pathways and Strategies

July 26th, 2021



Vermont Climate Council

Non-Energy Task

Cross-Sector Mitigation Subcommittee

Task Lead: Peter Walke

Global Warmings Solutions Act

Vermont Climate Action Plan Requirements

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

Global Warmings Solutions Act

Clear Sequence of Work

1. Five Subcommittees Defined in Statute to Develop the Work
 - Rural Resilience and Adaptation, Agriculture and Ecosystems, Cross Sector Mitigation, Just Transitions and Science and Data
2. Each Subcommittee following Clear Sequence of Work
 - Inventory existing programs to meet GWSA requirements
 - Identify, analyze and evaluate new strategies/programs needed to meet GHG requirements
 - Develop financing strategies for actions ready to implement
3. Develop monitoring strategy for assessing
4. Identify rules to be adopted (by ANR) by 2022
5. Adopt the Vermont Climate Action Plan by Dec 1, 2021 and update the Plan every four years thereafter.

Framework for Climate Action Plan

Pathways → Strategies → Actions

Cross-Sector Mitigation, Agriculture and Ecosystems and Rural Resilience and Adaptation

- A **pathway** is a high-level means of achieving GHG emissions reductions or adaptation, resilience, and sequestration goals. While written broadly, pathways should be stated specifically enough so that it is possible to assess whether progress has been made in achieving them.
- A **strategy** is a statement of measurable activity, a benchmark, to be reached in pursuit of the pathway. Strategies should be measurable and are a more specific subset of pathways.
- **Actions** are the “operational” tasks that the state will undertake to meet the pathways and strategies. Actions may be written around existing, or propose new, policies, programs, projects, initiatives, plans, etc. *These will be further developed in the coming months, informed by public engagement and technical analyses.*

Leading with Equity as a Core Component

The term “Just Transitions” is a way of framing for government and business action on climate change. Its work encompasses both public policies and business action to deal with the impacts of industry transition away from greenhouse gas emissions for jobs and livelihoods (the transition “out”) and aims to generate the low or zero greenhouse gas emission jobs and livelihoods of a sustainable society (the transition “in”). [Guiding Principles for a Just Transition, June 2021](#)

Guiding Principles for a Just Transition

Inclusive, Transparent & Innovative Engagement

Accountable & Restorative

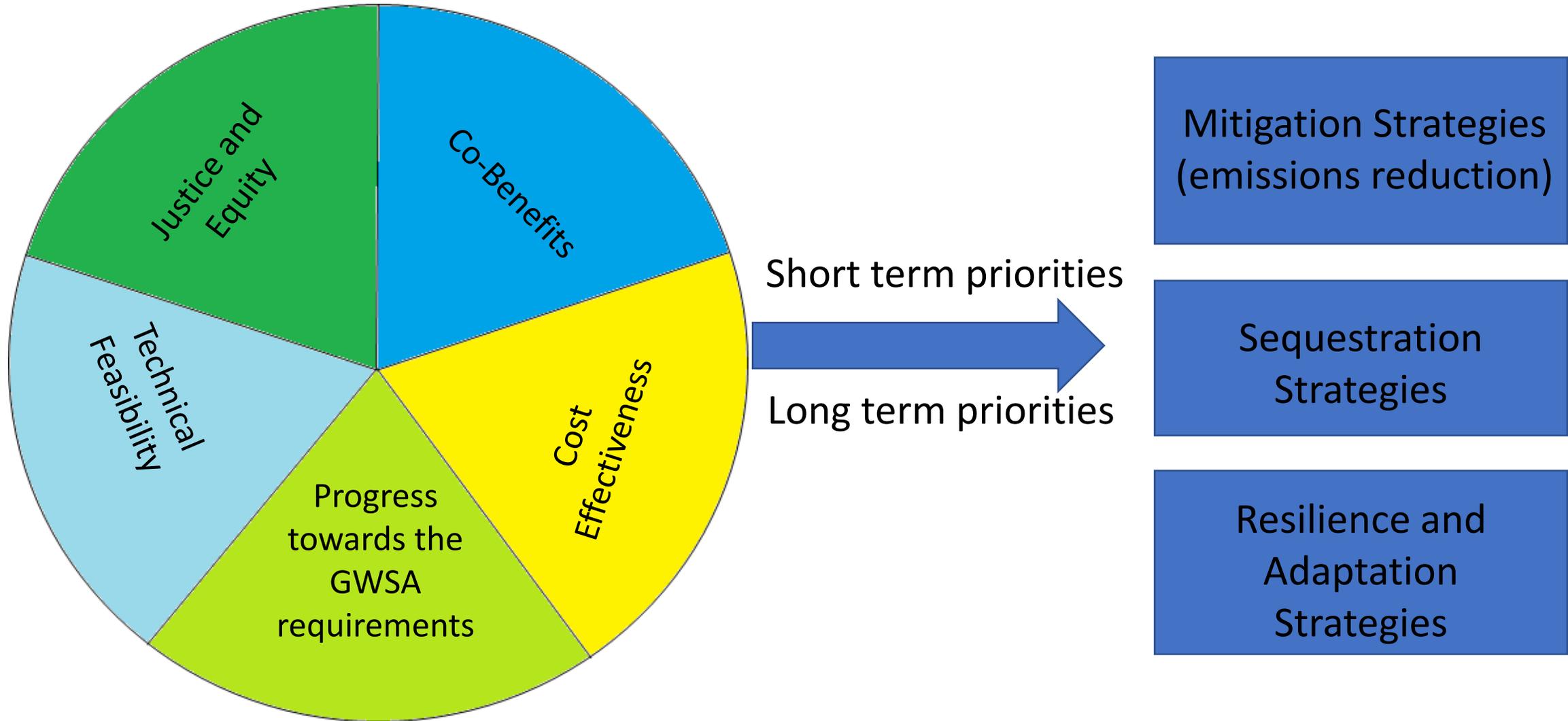
Moving at the Speed of Trust

Solidarity

The Most Impacted First

Supports Workers, Families & Communities

Climate Action Plan



Process to Date

1. Scope of Work Refined for Subcommittees
2. Subcommittee membership developed - technical expertise and diversity considered
3. Initial Ideas Explored by Task Leads
4. Presentation and Discussion
5. Pathways Presented



Non-Energy Task Leads

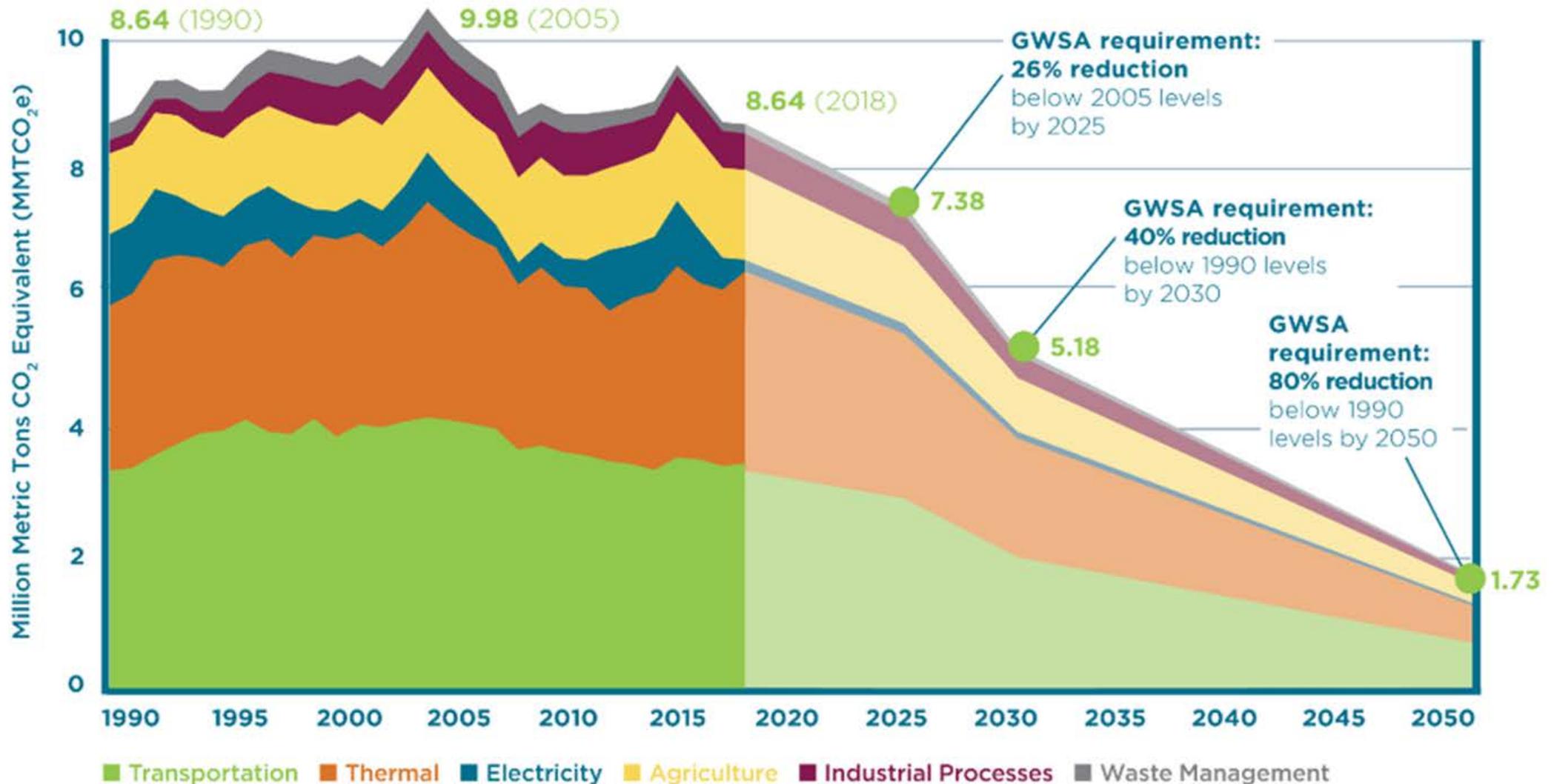
- Peter Walke

Developed with input
from:

- DEC Wastewater, Solid Waste, and Air Quality and Climate staff
- AAFM Staff
- Lauren Oates
- Agriculture and Ecosystem Subcommittee
- United States Climate Alliance
- Global Foundries
- Other states



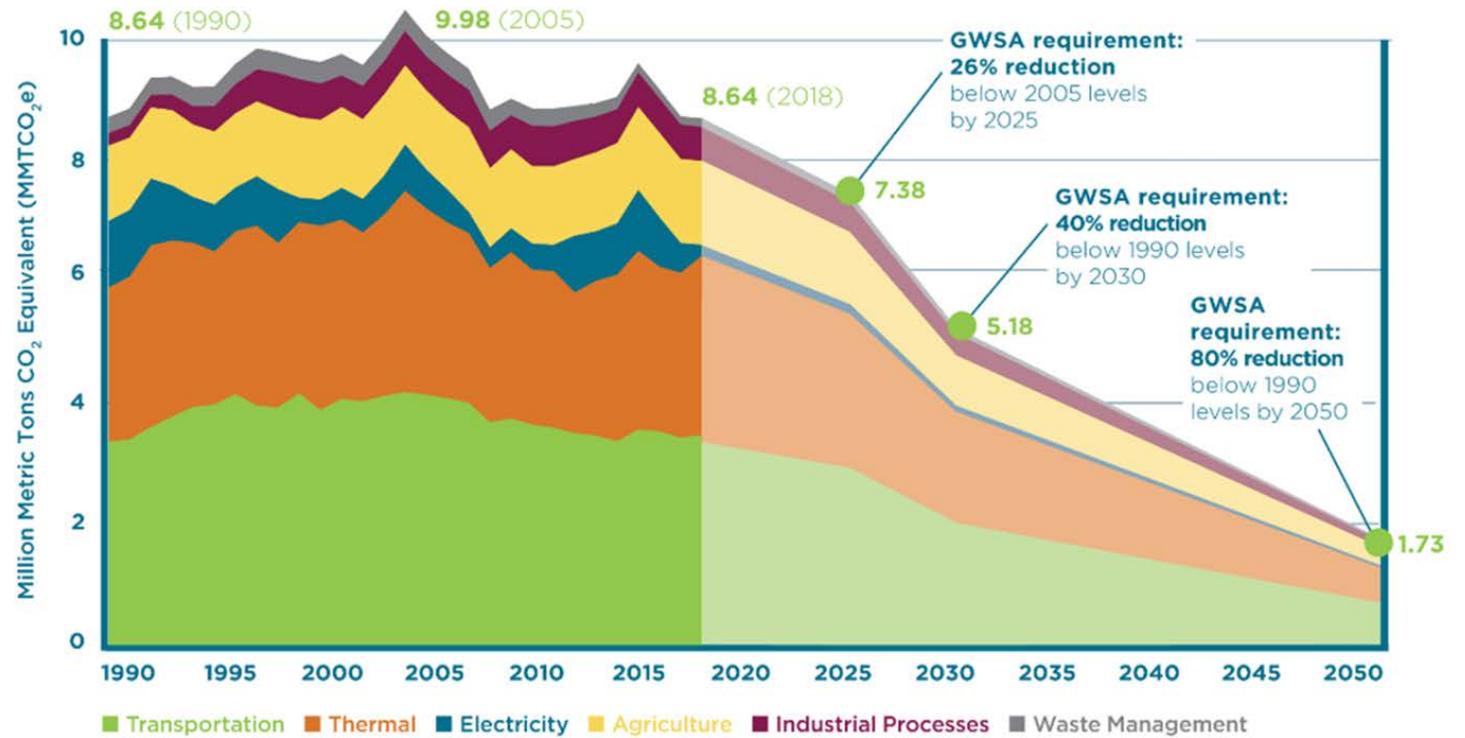
GWSA Emission Reduction Requirements



Non-Energy Task Focus

- *Agricultural emissions and how they are calculated – how on-farm practices impact emissions – and whether net Agricultural emissions reductions will be prioritized*
- *Microchip manufacture now accounts for a significant portion of industrial emissions – but used different process in 1990*
- *How to account for Waste sector emissions*
 - *Solid Waste emission reductions covered emission requirements for whole sector through 2030, but we also sought additional Wastewater sector emissions reductions*
- *Building on work of other states and jurisdictions to understand refrigeration-related emissions*
- *Buildings Task accounted for fossil fuel industry emissions*

The gray, red, and yellow bands are what we are addressing with these proposals



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



Modeling/Data Timeline and Needs

- *Evaluation of the Greenhouse Gas Emissions Inventory protocols will be critical in determining policy recommendations*
 - *Especially important in terms of Agriculture Sector emissions*
- *Determining cost-effectiveness and equity considerations will be essential to prioritizing strategies and limited resources*
- *The Climate Council will need to determine how to evaluate industrial emissions from the microchip manufacture sector as measured emissions did not begin until after 1990*
- *The Climate Council will need to determine whether both carbon sequestration and emissions reductions will be appropriate strategies to meet the GWSA requirements*

Climate Action Plan recommended pathways



List out pathways here:

1. Reduce Associated Emissions from Wastewater Treatment Facilities
2. Reduce Wastewater Treatment Facilities Energy Use
3. Reduce Ozone Depleting Substance Substitute Emissions
4. Reduce Semiconductor Manufacturing Process Emissions
5. Leverage, expand, and adapt **existing State of Vermont programs** that support agriculture GHG emission reduction and agricultural soil carbon sequestration (e.g. FAP, BMP, RAPs);
6. Develop and implement a **Payment for Ecosystem Services (PES)** program for healthy soils and soil carbon sequestration;
7. Invest in **farmland conservation** that protects natural and working lands from development;
8. Invest in Climate Smart Agriculture **education**, outreach, research, and technical assistance programs; and
9. Foster **partnerships** at all levels, which is essential to recognize, capacitate, and build strategies for farmers to address climate change.



Pathway #1 – Reduce Associated Emissions from Wastewater Treatment Facilities

- Reduce fugitive methane emissions from Wastewater Treatment Facilities
 - Require consistently operated flare to ensure methane combustion or reuse of generated biogas
 - Evaluate biogas capture potential at wastewater treatment facilities to identify the feasibility of beneficial uses before flaring excess
 - Convert aerobic holding tanks to anaerobic digestion of sludge for energy generation
- Reduce transportation emissions from Wastewater Treatment Facility Residuals:
 - Build additional digesters for sludge processing around the state to reduce transportation distances and overall miles traveled
 - Improve dewatering capacity

“Wastewater treatment plants provide a promising complementary opportunity to help divert a portion of organic wastes from landfills and create useful byproducts such as electricity, biofuels, fertilizers, and soil amendments.”

CARB Short-Lived Climate Pollutant Reduction Strategy, 2017



Pathway #2 – Reduce Wastewater Treatment Facility Electricity Use

- Optimization of sizing and operations of pumps and blowers at wastewater treatment facilities to reduce overall energy consumption

“Saving energy through energy efficiency improvements can cost less than generating, transmitting, and distributing energy from power plants, and provides multiple economic and environmental benefits.”

U.S. EPA, Energy Efficiency in Water and Wastewater Facilities - A Guide to Developing and Implementing Greenhouse Gas Reduction Programs, 2013



Pathway #3 – Reduce Ozone Depleting Substance Substitutes Emissions

- Program for reporting and monitoring of refrigerant (HFC) usage in large systems to ensure systems are maintained and leaks are fixed (Refrigerant Management Plan or RMP)
 - *Installation of permanent leak detection systems in facilities with large refrigeration systems to actively monitor systems and to help avoid catastrophic refrigerant releases*
- HFC end of life program to ensure equipment is properly disposed of and HFCs are not released to the atmosphere
- HFC change-out incentives to encourage the switch from HFCs in existing equipment

“The science unequivocally underscores the need to immediately reduce emissions of short-lived climate pollutants (SLCPs), which include black carbon (soot), methane (CH₄), and fluorinated gases (F-gases, including hydrofluorocarbons, or HFCs). They are powerful climate forcers and harmful air pollutants that have an outsized impact on climate change in the near term, compared to longer-lived GHGs, such as carbon dioxide (CO₂).”

CARB Short-Lived Climate Pollutant Reduction Strategy, 2017



Pathway #4 – Reduce Semiconductor Manufacturing Process Emissions

- Continue to explore efficiencies and alternatives to high GWP fluorinated gases in the semiconductor manufacturing process
- Work with Global Foundries to better understand the challenges, opportunities, and potential to reduce fluorinated gas emissions in the semiconductor manufacturing process
- Possible interaction with Global Foundries request to be regulated as an electric utility



Pathway #5: Leverage, expand, and adapt existing State programs that support agricultural GHG emissions reduction and agricultural soil carbon sequestration

- Utilize existing regulatory and programmatic framework for agricultural environmental management – 6 V.S.A. Ch. 215 – to leverage climate co-benefits of existing agricultural environmental efforts:
 - Implement **agronomic and grazing practices** on farms such as no-till, cover crop, and rotational grazing;
 - Development of a climate **feed management** program;
 - Expansion of programming for **agroforestry** and **silvopastoral** systems; and
 - **Natural resource restoration** practices that support climate mitigation and resilience, including river corridor easements, wetland restoration, and afforestation practices
- Partner on **methane capture** and energy generation on farms

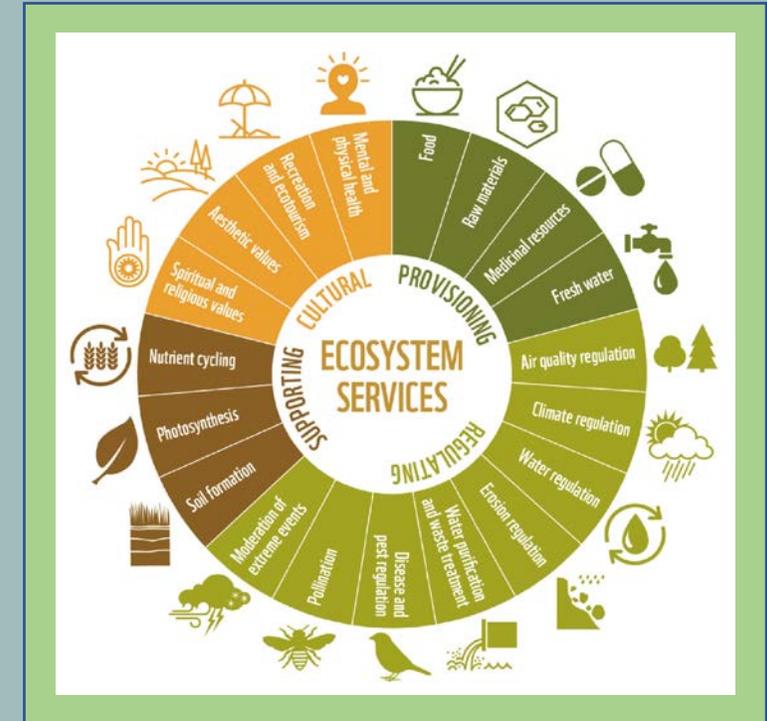
“A 0.1% increase in soil organic matter per year on corn and hay fields can help Vermont meet its climate change goals in the agricultural sector by sequestering an equivalent of one million metric tons of CO₂ on an annual basis. That’s more than the required 2050 reduction target for agriculture.”

Dr. Alissa White, UVM Gund Institute for the Environment



Pathway #6: Develop and implement a Payment for Ecosystem Services (PES) program for healthy soils and soil carbon sequestration

- Develop and implement a State of Vermont PES Program that supports the development of:
 - **healthy soils**
 - **agricultural GHG emission reduction**
 - **carbon sequestration in soils**
- Partner with the *Vermont Payment for Ecosystem Services and Soil Health Working Group* on forming recommendations for the legislature due January 2023.





Pathway #7: Invest in farmland conservation that protects natural and working lands from development

- Investment in **farmland conservation** – and associated natural and working lands – provides Vermont with the following co-benefits:
 - Promotes smart growth
 - Supports a healthy ag economy and food security
 - Provide vital protections against the impacts of increased intensity and frequency of flooding
 - Support a vital means of capturing and holding carbon in Vermont’s soils
- Investment in **farm viability** planning and technical assistance.

“Protecting critical agricultural lands from conversion to urban or rural residential development promotes smart growth within existing jurisdictions, ensures open space remains available, and supports a healthy agricultural economy and resulting food security. A healthy and resilient agricultural sector is becoming increasingly important in meeting the challenges occurring and anticipated as a result of climate change.”

California State SALC Program, April
2021



Pathway #8: Invest in Climate Smart Agriculture education, outreach, research, and technical assistance programs

- Enhance education, outreach, and technical assistance programming to support farmer learning and adoption of climate smart agricultural practices.
- By investing in helping Vermont's farmers, including recruiting and training the next generation of farmers, we can tap into Vermont's human capital and the enormous potential of our community to innovate and thrive in the midst of a harsh and changing climate.
- Fund and learn from local university and applied research.

"65% of Vermont farmers do not believe they have the knowledge and technical skills to address the impacts of climate change on their farm."

UVM New England Adaptation
Survey



Pathway #9: Foster partnerships at all levels, which is essential to recognize, capacitate, and build strategies for farmers to address climate change

- Advance an intentional and structured collaboration between interested stakeholders that will enable farmers to best access impactful programs and resources to incorporate climate change mitigation, resilience and adaptation strategies on their farms.
- Maintain Ag & Ecosystems Subcommittee through development and implementation of GWSA and CAP to cultivate, build and reinforce state, federal, nonprofit, and private sector collaborations.

“There are currently more than 20 unique State and Federal programs available in Vermont to support farmer implementation of practices that reduce green house gas emissions and support carbon sequestration in soils.”

VAAFM Inventory of Existing GHG
Emission Reduction Programs,
2021