

THE CLIMATE CONNECTION

THE VERMONT AGENCY OF NATURAL RESOURCES - CLIMATE CHANGE TEAM NEWSLETTER

Backed by Deb Markowitz, ANR Secretary, the climate change team is working to facilitate enhancements to existing programs in order to promote sustainability, reduce greenhouse gas emissions, improve waste reduction, implement adaption and mitigation methods, provide education and outreach and advance related economic opportunities.

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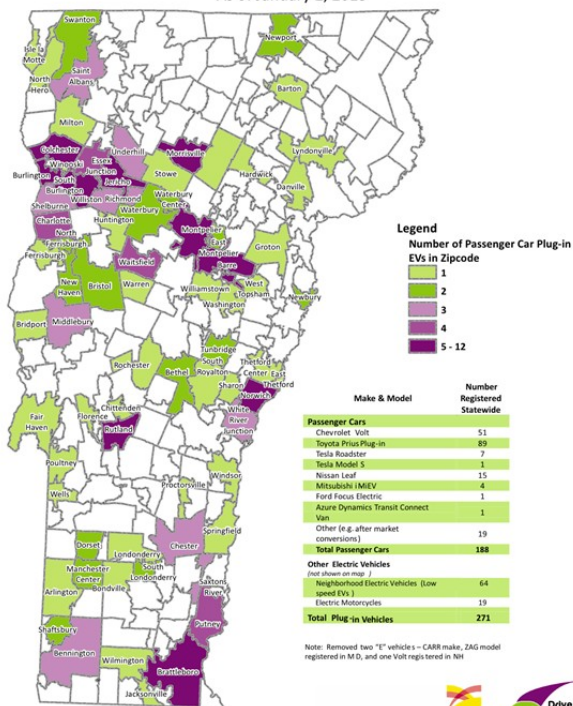
Vermont-Quebec Electric Vehicle Charging Corridor Sees Progress —Jacob Ebersole

Efforts to construct a corridor of electric vehicle charging stations between Vermont and Montreal have been gaining momentum recently. First discussed last summer, commitment to the project was reaffirmed in February at a meeting between Governor Shumlin and the new Quebec Premier, Pauline Marois.

Vermont has identified sites for charging stations in seven different communities along the I-89 corridor: St. Albans, Burlington, South Burlington, Waterbury, Montpelier, Sharon, and Norwich. Stations are in place in Sharon, Montpelier, South Burlington and the newest location in Waterbury. The rest of the charging stations remain in various stages of development.

Electric Vehicles Registered in Vermont

As of January 2, 2013



The stations along the corridor will provide “level two” charging capacity. This translates to approximately 10-20 miles of added driving range for each hour of charge. This is a significant improvement over standard “level one” charging stations, which provide only 2-5 miles of added range per hour of charging (<http://www.afdc.energy.gov/pdfs/51227.pdf>). The project aims for the sites to be easily upgradeable to even faster charging infrastructure as demand for the service continues to grow. The much more expensive “level three” chargers can provide 60-80 miles of range in just 20 minutes of charging.

As of April 1 there were a total of 308 plug-in electric vehicles registered in Vermont. 235 of these were passenger cars. The map on the left, provided by Drive Electric Vermont, identifies the communities where these vehicles are located. While this may seem like a small number of vehicles to justify the expansion of charging infrastructure, EVs are expected to see rapid growth in upcoming decades.

The State of Vermont has significant interest in encouraging rapid growth of electric vehicle ownership. Vermont has set goals to obtain 90% of its energy from renewable sources by 2050, and to reduce greenhouse gas emissions to 50% below 1990

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levels by 2028. Gasoline and diesel consumption in the vehicle transportation sector accounts for approximately 34% of Vermont's energy use and 47% of Vermont's greenhouse gas emissions. If Vermont is serious about meeting the aforementioned goals, accelerated adoption of electric vehicles will be essential. The Vermont Energy Investment Corporation estimates that Vermont will need over 500,000 EVs statewide by 2050 to meet the goals outlined in the state's Comprehensive Energy Plan.

It is true that the greatest barrier to widespread EV adoption is price. Even with a federal income tax credit of up to \$7,500, electric vehicles generally remain more expensive than comparable petroleum-powered vehicles. Ultimately, it will require continued technological advances to bring the price of EVs down to a competitive level. Although such advances are largely out of Vermont's control, the Vermont-Quebec charging corridor is a great way for Vermont to encourage EV adoption at the state level.

After price, one of the most frequently noted barriers to EV adoption is "range anxiety," or the fear that the limited battery capacity of electric vehicles will leave drivers stranded between travel destinations. The state can help alleviate these concerns by ensuring charging stations are readily available in convenient locations. The Vermont-Quebec corridor is a great first step in this direction. Interstate 89 is one of the most traveled roads in the state, and the highest densities of EV ownership are already concentrated along the I-89 corridor. In addition, the state is looking to facilitate siting of additional charging stations at locations that will provide EV owners with access to varied activities while they wait for their vehicles to charge.



Waterbury EV Charging Station
Photo: Brian Woods

The Vermont-Quebec EV corridor will reward early adopters of EVs, and demonstrate to private companies and the region that Vermont is serious about promoting electric vehicles and achieving its renewable energy goals.

National Climate Assessment Report Released

In collaboration with NOAA, the National Climate Assessment and Development Advisory Committee (NCADAC) has released the first draft of the 2012 climate assessment report.

The NCADAC is responsible for overseeing the production of a periodic report compiling scientific knowledge on climate change in the United States. The most recent report focuses on seven selected sectors: human health, water, energy, transportation, agriculture, forests, and ecosystems biodiversity. It analyzes the impact of climate change on each of these sectors in depth, and discusses the interactions between many of these sectors at a broader level. The report also reviews more localized concerns regarding climate change in eight regions of the United States.

For the northeast, the report warns that "heat waves, coastal flooding due to sea level rise, and river flooding due to more extreme precipitation events will pose a growing challenge to the region's environmental, social, and economic systems." The report also notes that infrastructure, agriculture, and ecosystems in the region are particularly vulnerable to the impacts of climate change.

The report concludes by reviewing current mitigation and adaptation efforts across the United States. There are many policies in place in both the public and private sector aimed at reducing greenhouse gas emissions, and reducing vulnerabilities to the expected impacts of a changing climate. While these efforts are encouraging, the report notes that present initiatives must be intensified in order to avoid the serious social, economic, and environmental consequences of climate change.

The NCADAC will be taking comments on the draft report between January 14th and April 12th. Please visit the [NCADAC website](http://www.ncadac.gov) to read the draft at length and to leave a comment.



Want to know more about the power of wind?

This fun interactive map will show you how wind power is being used across the nation and in Vermont! Click on the different states to learn more!

www.windpoweringamerica.gov/windmaps/community_scale.asp

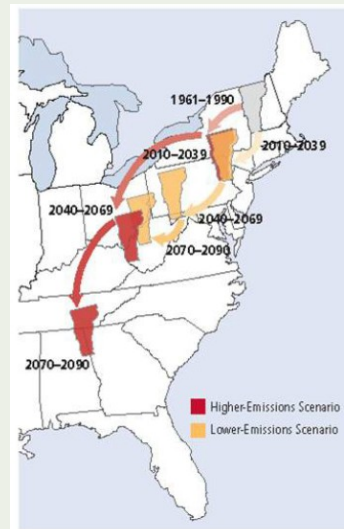
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Warmer Climate Leads to Change in Seasons for Vermont Landscapes – Molly Moran, Jacob Ebersole

In recent years, the devastating impacts of extreme weather events have alerted many Vermonters to the dangers presented by climate change. While these storms made a very sudden and destructive mark on our state, climate change has been gradually recreating Vermont's landscape for decades.

Many Vermonters are beginning to notice changes in the four distinct seasons that define our state. In the past 50 years, mean winter temperatures in Vermont have risen about 4.6°F, while summer temperatures have risen approximately 2.8°F. Annual snowfall has been steadily decreasing, while spring has been arriving earlier. Continued global emissions of greenhouse gases will perpetuate these trends for decades to come. The image on the right provides a striking representation of what Vermont's climate might look like in the future. If the current high rate of global emissions continues, Vermont's climate is projected to be similar to that of northern Georgia by the end of the century. Even under a reduced emissions scenario, our climate is likely to feel similar to that of southern Ohio.



Migrating State Climate

Changes in average summer heat index—a measure of how hot it actually feels, given temperature and humidity—could strongly affect quality of life in the future for residents of Vermont. Red arrows track what summers in Vermont could feel like over the course of the century under the higher-emissions scenario. Yellow arrows track what summers in the state could feel like under the lower-emissions scenario.

[Confronting Climate Change in the U.S. Northeast—Vermont \(Union of Concerned Scientists 2007\)](#)



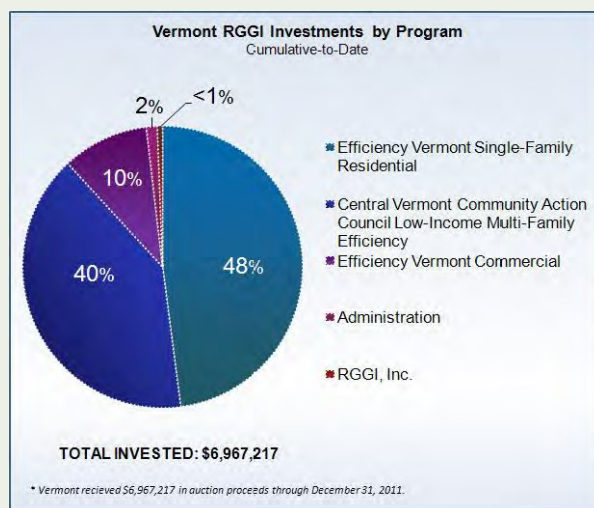
Plan a hike!

With summer just around the corner, get ready by planning a hike. Vermont State Parks offer a variety of trails throughout the state. Check out some of the popular hikes and start planning today!

<http://www.vtstateparks.com/htm/hiking.htm>

Either scenario presents a serious threat to the seasonal changes that are so central to our state's identity, ecology, and economy. The length of the maple-sugaring season in Vermont has shortened by 10% in the past 40 years. Continued warming trends would threaten the viability of the industry. Winter recreation activities including skiing, snowmobiling, and ice fishing are similarly vulnerable to a warming climate. Many ski resorts have already noticed a decline in the reliability of snow conditions in the early season. The colorful foliage that characterizes Vermont's autumn landscape will also be threatened by climate changes expected in upcoming decades. All of these vulnerabilities make it imperative that Vermont continues to investigate climate adaptation strategies and aggressively pursue reductions in state greenhouse gas emissions.

Updates to the Regional Greenhouse Gas Initiative (RGGI) – Jacob Ebersole



[RGGI 2011 Investment Report](#)

The Regional Greenhouse Gas Initiative (RGGI) is a collaborative effort between the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont to reduce greenhouse gas emissions from the electric power sector. RGGI follows a market-based cap and trade model. A set number of CO₂ allowances are granted to each state to be auctioned off to all sizeable fossil fuel-fired electric power plants. The total number of allowances available each year declines at a predetermined rate in order to ensure a net reduction in emissions over time. In Vermont, only two fossil fuel generator plants are large enough to be affected by the regulation. The process of selling CO₂ allowances generates substantial income for participating states. Vermont has received over \$8 million in proceeds from RGGI auctions. 98% of these funds have been invested in fossil fuel energy efficiency measures, with nearly half of those investments directly benefiting low-income families.

While RGGI saw considerable success in its fund-raising capacity, the cap quickly became ineffective at lowering CO₂ emissions. Shortly after RGGI was enacted, carbon emissions fell rapidly across the northeast as a result of efficiency investments, milder weather, the slowdown of the U.S. economy, and a marked decrease in natural gas prices. The total number of CO₂ allowances available became far larger than the total quantity of CO₂ emitted by the electric power sector. Consequently, there was no incentive for power plants to reduce their emissions. In response, the



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2012 program review resulted in updates to the RGGI program that will significantly cut the total number of CO₂ allowances available across the region. In 2014, the cap on emissions will fall from 165 million tons to 91 million tons, and continue to decline by 2.5% a year until 2020. Other smaller modifications were made to refine cost control measures and the ability to offset carbon emissions through forest management.

The updated RGGI program is expected to have small but generally positive impacts on the regional economy. Investments of RGGI proceeds are predicted to produce minor boosts to gross state product, employment, and real income. Across the region, electric ratepayers are expected to see small increases in their electric bills. These increases are expected to be even less significant in Vermont than the rest of the region since the state receives a large portion of its electricity from sources that do not rely on fossil fuels.

To read about the updates to the RGGI model rule in full, please visit www.rggi.org/design/program_review

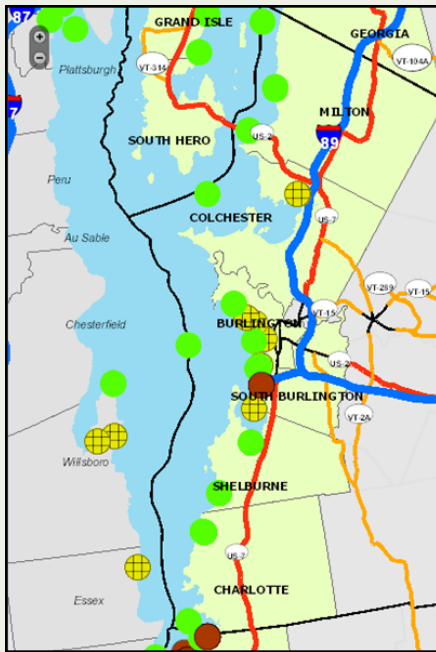
Have any questions about what to expect from climate change?

Check out this recently released database of climate information specific to the northeastern United States:

neclimateus.org

'Tracking' the Health Impacts of Climate Change

Vermont's new environmental health tool - David Grass, Vermont Dept. of Health



Blue Green Algae Tracker
www.webmail.vdh.state.vt.us/vttracking/

Environmental Public Health Tracking (Tracking) is an ongoing national effort to better understand how environmental hazards can contribute to certain illnesses. Vermont is one of 23 states funded by the U.S. Centers for Disease Control and Prevention (CDC) to provide a state and national tracking network of environmental and health data.

Vermont Tracking is being implemented jointly by the state's Departments of Health and Environmental Conservation. The goal is to improve and protect public health by allowing public health officials, researchers, policy makers, and the public access to environmental and public health data in one place. Topics such as air quality, drinking water, asthma, cancer, childhood lead poisoning, and reproductive health outcomes are featured on the state (www.healthvermont.gov/tracking) and national tracking portals (www.ephracking.cdc.gov) with data presented on maps, tables, and charts.

The newest topic to be added to the Vermont Tracking Portal is climate change. Climate-related topics include health stress and blue-green algae. Heat stress data are displayed at the county-level for emergency room visits and at the state-level for hospital admissions. From May through September in 2005, there were 106 emergency room visits due to heat stress.

During the summer months, blue green algae conditions are monitored by scientists at the Department of Environmental Conservation and volunteers for the Lake Champlain Committee. Results are reported weekly at the Health Department's Blue Green Algae Tracker (www.webmail.vdh.state.vt.us/vttracking/bluegreenalgaeftp/).

Next up will be a 'crowd-sourced' Tick Tracker application to allow Vermonters to reports tick sightings and avoid 'hot spots' when ticks are active. Vermont's climate change-related offerings will continue to expand as the Health Department kicks off its Climate Change Program, a new initiative to quantify climate-related health impacts and develop an adaptation plan to reduce these risks.

Vermont Tracking Portal
(www.healthvermont.gov/tracking).

Tick Tracker (pre-Beta)



New Report

Location (Street address, town, park name or trail name):

Date ticks found:

e-mail:

Number of Ticks found:

Ticks found:

If other describe here:

Tick Tracker (in development) - VDH

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Senator Sanders Holds Climate Change Conference in Montpelier

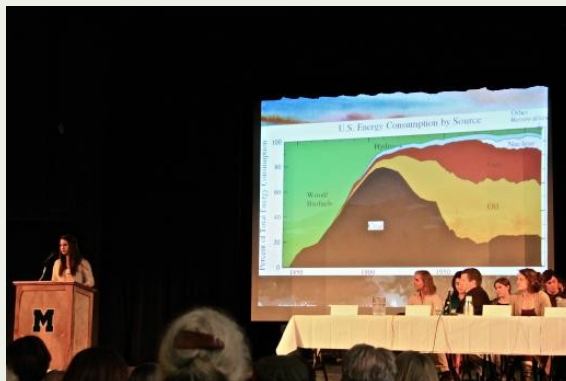
Sen. Sanders drew a crowd of over 500 Vermonters to Montpelier High School on March 16th — Jacob Ebersole

The senator kicked off the conference by emphasizing the dire need for immediate action on climate change. Sanders warned that “global warming is not only real, it is terribly real...it is the planetary crisis of our time. If we don’t get our act together, this planet will only get worse.” The senator reflected on how this crisis might manifest itself across the globe: rising sea levels could put major U.S. cities underwater; drought could lead to food shortages and political upheaval; and more frequent extreme storm events could pose massively expensive threats to human health and infrastructure.

Following the senator’s remarks, students from the UVM Rubenstein School of Environment & Natural Resources delved further into what climate change would mean for Vermont in particular. The students explained that winter snow and ice cover have already been declining in recent decades, the length of the maple-sugaring season has been shrinking, and Lyme disease has been increasing in prevalence as ticks begin to withstand the milder winters. These trends and others are only expected to accelerate in upcoming decades, posing significant threats to Vermont’s ecology, economy, and way of life. A panel of local experts built off of the background provided by the students of the Rubenstein School to examine specific threats in greater detail. Mike Winslow of the Lake Champlain Committee discussed the challenges facing water resources within the state. The Vermont Secretary of Agriculture, Chuck Ross, reviewed expected impacts of climate change on Vermont’s agriculture and forestry industries. Deputy Secretary of Transportation Sue Minter discussed the vulnerabilities of Vermont’s transportation infrastructure, focusing on lessons learned from tropical storm Irene. UVM Professor Jon Erickson concluded the panel presentations by providing an overview of ongoing debates regarding the economics of climate change.



Photo: Brian Woods



*UVM student presentation
Photo: P.F. Erickson*

In the afternoon, prominent environmental author and activist Bill McKibben delivered the conference’s keynote speech. As previous speakers had already outlined the critical threat that climate change presents, McKibben quickly jumped into the work of his grassroots organization, 350.org. He discussed the overwhelmingly positive response his organization has received across the globe. Citizens of Ethiopia, the Dominican Republic, and even the oil rich United Arab Emirates have shown enthusiastic support for the 350.org movement. McKibben noted that there was also optimism to be seen in current environmental efforts within the United States. He described the ongoing campaign to divest college endowments from fossil fuels as the largest student activism movement in decades. McKibben also lauded Vermont for becoming the first state to ban fracking,

and encouraged a continued fight against approval of the Keystone XL Pipeline.

Following all of these presentations, attendees broke off into three workgroups to discuss climate change policy options available at the local, state, and federal levels. The three workgroups focused on three different areas for action: clean energy solutions, adaptation for natural resources, and infrastructure resiliency. These sessions saw very active participation, producing numerous policy suggestions. A few common themes across all three groups included the importance of monetary incentives for climate action, planning for the future, and a focus on improving resilience at the community level.

Senator Sanders declared the event a resounding success which will encourage him to return to Washington with renewed energy. He reaffirmed that the United States is already fully capable of curbing our greenhouse gas emissions to a manageable level from a technological standpoint. The challenge that remains is to instigate policy action at the state and federal level. The senator asserted that he firmly believes in Vermont’s ability to provide leadership on this critical issue.

To read more about the event, check out this detailed blog post from Green Energy Times:

www.greenenergytimes.net/2013/03/16/live-ish-blog-bernie-sanders-bill-mckibben/

To learn about the climate legislation Senator Sanders recently introduced to congress, please visit:

www.sanders.senate.gov/newsroom/news/?id=2a869a44-1597-42a8-b625-1a88db3febbc

 **Participate in the Vermont Home Energy Challenge!**

Contribute to your town’s effort by pledging to improve the energy efficiency of your home!

www.encyefficiencyvermont.com/
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[energy-challenge-pledge.aspx](#)

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A Special Thanks...

...to Molly Moran (St. Michael's College) and Jacob Ebersole (Dartmouth College), recent interns with the Climate Change Team. Your contributions to the last two editions of the newsletter, conference presentations, the inventory of climate change research, the adaptation white paper series and many other functions of the team were invaluable and very much appreciated. We wish you the best of luck on your future endeavors.

Sincerely,

Brian and Alex



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