Vermont Climate Action Commission
Friday March 23, 2018
1:00pm – 4:00pm

Agency of Transportation Boardroom
National Life Davis Building 5th Floor
Montpelier, Vt

Commissioners Present: Riley Allen (for June Tierney), Marie Audet, Michele Boomhower, Harrison Bushnell, Kristin Carlson, Paul Costello, Matt Cota, Tom Donahue, Bethany Fleishman, Ken Jones (for Michael Schirling), Linda McGinnis, Johanna Miller, Jennifer Wallace-Brodeur (for Mary Sprayregen), Bob Stevens, Robert Turner, Peter Walke

Agenda Items

Welcome
Co-Chair Walke determined there was a quorum.

Co-Chair Walke recognized birthdays of Commissioners Boomhower and Costello.

Introduction
Co-Chair Walke reported that the budget proposed by the House includes funding for wood stove change outs, a carbon reduction study ($120K) and increased weatherization. VW settlement funds will be devoted to transportation electrification, with 15% dedicated to electric vehicle (EV) charging infrastructure. The EV charging regulatory construct is making progress, including addressing EV contribution to transportation infrastructure.

Co-Chair Costello recognized Commissioner Carlson's WDEV appearance regarding energy storage. In addition, he reported the Climate Economy Action Team has sent a letter to governor encouraging him to think more about weatherization funding, an EV incentive and the importance of a carbon market study.

Commissioner McGinnis announced a 4/11 visit by a delegation from Quebec to present to legislature on the Western Climate Initiative and energy transformation. A more technical presentation is also planned the same day. Details to follow.

Co-Chair Walke provided a brief progress report on the regional Transportation Climate Initiative (TCI). The next activity is a regional facilitated conversation on transportation transformation. He plans to share information from the VCAC listening sessions of last year with the TCI participants.

February Meeting Minutes

Approved unanimously

Working Group Work Plan Presentations (see attached work plan outlines)

Vehicle Electrification (J. Wallace-Brodeur)

Focus areas

- Education & Outreach
- Lower electric vehicle (EV) Prices (upfront cost)
- Rate Design (for electricity)
- Utility engagement in electric vehicle service equipment (charging stations)
- Policy Support for use of VW settlement funds

Challenges – Upfront vehicle cost, charging infrastructure, unrecognized benefits of EVs

Potential partners - Auto dealers, lending institutions, truck & bus associations

Concepts - tax holiday for new EV purchased to replace a vehicle failing inspection, opportunities in the used/off-lease EV market

After discussion, the work plan was approved, and the group was renamed "Transportation" to include the full range of possible actions in this sector, including the role of public transit.

Building Energy Use (R. Allen)

Focus areas

- Building Electrification
- Advanced wood heat
- Low income weatherization
- Internalizing an energy service company (ESCO) model
- Energy Codes/High performance buildings

Challenge - Improving energy efficiency of the existing building stock, which also represents the greatest opportunity.

Commissioners suggested including both efficiency and conversion to renewables in the work plan, and to consider opportunities in the commercial building sector (residential and other leased space).

The work plan was approved.

Smart Growth (P. Walke)

Focus area – expanding implementation of plans already developed by existing planning structures and groups, followed by tracking of progress. Ultimate goal: make compact communities cost-effective to develop and attractive to residents and businesses. Vision is compact development surrounded by working landscape.

Activities

- Identify and review existing case studies. There are many to choose from.
- Identify the key levers that the administration is likely to support.

Challenges

- How to create demand for downtown/compact development, both residential and commercial.
- Identify why economic benefits of compact development are not being realized.

The work plan was approved.

Carbon Sequestration – Forests (R. Turner)

Goals:

- Maintain forests as forests.
- Monetize the value of forest carbon sequestration to support maintenance of forest/avoid conversion.

Activities

- Catalog current efforts to advance forest offset trading (note the Vermont Land Trust is planning to publish a study on carbon market opportunities in Vermont in the near future).
- Identify opportunities for landowners in the 5-10 year time frame.
- Identify current constraints.
- Identify other programs that may benefit from additional forest carbon sequestration (e.g. smart growth).
- Refine estimates of current statewide annual forest carbon sequestration.

Barriers: Economy of scale, interest of landowners.

The work plan approval was tabled for discussion after the Carbon Sequestration in Agricultural Soils work plan presentation and discussion.

Carbon Sequestration – Agricultural Soil (R. Turner)

Focus areas

- Soil science and agronomy
- Financial Information - Carbon emission reduction benefits (and co-benefits)
- Motivating behavior
- Positioning farmers for selling offsets

Activity – Revisit 2010 Vermont plan for carbon mitigation from agriculture [ANR Adaptation White Paper: Potential Impacts of Climate Change on Agriculture in Vermont], with a focus on climate change adaptation policies.

The discussion noted that there is a need to build resiliency to climate change in the agricultural sector; and that soil carbon sequestration is complementary to solutions to other important issues such as phosphorus management, composting, and on-farm methane management.

The work plan was approved, and this group was merged with the Carbon Sequestration – Forests group and renamed "Sequestration".

Climate Economy (K. Jones)

Goal – Attract, retain and increase the activity of Climate Economy businesses in the state.

Activities

- Catalog unique attributes in Vermont that can be leveraged (the "Vermont Advantage").
- Identify sectors or subsectors that could benefit from those attributes.
- Identify support programs and mechanisms that are already in place.

The work plan already includes many examples of attributes, sectors and programs. The group plans a series of meetings to augment these lists. In addition, the group plans to examine in detail a select group of business sectors and identify the specific support programs (including partnerships, financing tools, incentives) that might advance sector growth.

The work plan was approved.

Commission Discussion of Work Plans

The commission discussed the topic of electricity generation, which hasn't been explicitly addressed by the commission to date. After discussion, the commission agreed that the status

and progress of efforts in the electricity generation sector could be addressed in a report introduction. Co-Chair Walke proposed that identification and discussion of other topic areas that were not the subject of work plans but that need to be acknowledged in the final report as an agenda item for the next meeting. There was general agreement that the commission as a whole is open to all ideas, even if not covered by a subcommittee, and that there will be time in future full meetings to consider any creative ideas that are contributed as potential elements of the commission's recommendations.

The Co-Chairs noted that additional guidance from the administration regarding the content and format of the July report and plans for implementation beyond July was being sought. The commission can make suggestions regarding both. It was noted that the high level of effort of the current process is not sustainable, and that a transition plan is needed as the process moves from work plan development to implementation.

Upcoming Schedule

- No April Meeting
- Between now and May 10, each work group will create bulletized recommendations
- May 10 – group review of this work
- Between May and June, work groups draft their respective sections of reports, w/recommendations
- June meeting - review of work group product
- Between June and July – report preparation
- July meeting – discussion and approval of final report

July 31 – final report delivered to governor

In response to a question regarding engagement of other stakeholders and/or experts, the Chair noted that the work groups have authority to engage such entities as necessary.

Public Comment

No members of the public were in attendance

Adjourn

Vermont Climate Action Commission
Vehicle Electrification Workgroup

Preliminary Work Plan
March 12, 2018

Five Buckets of Actions to be Implemented Holistically:

1. Education and Outreach (E&O)

a. Leverage and enhance Drive Electric Vermont (DEV) to maximize the impact of education and outreach campaigns and stakeholder engagement to build awareness and encourage purchase consideration for EVs.
b. Explore other E&O possibilities (e.g., utility interactive EV websites, utility-bill flyers, NESCAUM (Northeast States for Coordinated Air Use Management) campaigns, DMV waiting-room monitors).
c. Provide EV educational materials to dealers.
    i. Work though NESCAUM to develop materials for dealer education.
    ii. Modify an existing New Jersey dealer-education packet.
    iii. Continue DEV education of dealers and focus materials on helping dealers talk about EVs (to make the sale).
d. Amplify E&O through Vermont Climate Action Commission Commissioners.
e. Consider EV marketing over the radio, if funding is available.
f. Conduct pilot projects in less populated areas to increase consumer knowledge of EVs.
    i. EV ride and drive events in partnership with local energy committees.
    ii. DEV events.

2. Creative Ways to Lower EV Prices

a. In the absence of new revenue, explore creative workarounds to provide EV purchase incentives. Should new revenue become available, it should be dedicated to point of sale purchase incentives.
b. Work with dealers and DEV to gather and publicize special EV pricing purchase and lease deals; maintain and update this information on a regular basis on DEV website.
c. Research ride hailing leasing pilots to discount EVs for drivers; offer EV purchase incentives to customers who agree to use their EVs for ride share in rural areas (to help make EVs available to low-income Vermonters and to address the absence of mass transit in rural areas).
d. Explore ways in which EV incentives under Tier III of the State's Renewable Energy Standard can be equalized through state or utility investments to provide a more equitable benefit to all Vermonters.
e. Create a better used-EV market by working with dealers, manufacturers, and financiers on ways to keep used EVs in the State.

f. Explore tariff on-bill financing (PAYS) and other finance strategies to help overcome the high upfront costs of electric buses; leverage PAYS with Tier III or VW settlement funds if PAYS cannot yet function on its own in the heavy-duty EV market.

3. Rate Design Policy Support to Utilities and the PUC to Lower EV Charing Costs While Not Driving Up Costs for Utility Customers

a. Consider changes to demand charges for charging stations.
b. Combine rate design and planning.
c. Incorporate locational value into rate design.
    i. Account for areas that may need additional load.
    ii. Target areas that need additional load for heavy-duty EV pilot projects (e.g., school buses).
d. Use rate design to help build a business model for publicly available charging stations.
e. Use rate design to benefit both utility customers and the grid.
f. Feed Commission recommendations into the PUC process relating to rate design.
g. Use interactive rate design to help dealers explain the economic opportunities in EVs to potential EV purchasers.
h. Collaborate with utilities on the Commission's rate-design work.

4. Utility Engagement in Building Out Publicly Available EV Charging Infrastructure

a. Engage utilities around public DCFC buildout, while leveraging private funds/private industry to the extent possible.
b. Engage utilities as potential applicants for VW Appendix D settlement funds to install and operate DCFCs at identified gap sites.
c. Seek utility input on the Tier 3 value of DCFC.
d. Reach out to OEMs (possibly through utilities) for charging infrastructure buildout.
    i. Charging stations near dealers could attract EV purchasers.
    ii. A broader charging network could leverage EV purchase incentives.

5. Policy Support for the State's Administration of VW Settlement Appendix D Funds

a. Provide policy recommendations without participating in funding decisions.
b. Recommend siting priorities for charging stations (EVSE).
c. Offer input on potential pilot projects for heavy-duty electric vehicles.

Working Group Topic: Building Energy Use

Commission Members:

Bob Stevens, Tom Donahue, Linda McGinnis, Jenn Wallace-Brodeur, Matt Cota, Paul Costello, and Kristin Carlson

State Agency Staff:

Dan Edson, Josh Kelly, Kelly Launder, and Jared Ulmer

Public Members:

Existing Condition and Trajectory:

- Approximately 250,000 residential year-round occupied units
- Approximately 54,000 commercial accounts
- Roughly 20% of the state's energy used for buildings and processes is from renewables (CEP)
- 30% of the building stock was built before 1940 (CEP)
- About 25% of Vermont's energy bill is for heating and process requirements (CEP, 5)
- The residential sector accounts for 60% of Vermont's thermal fuel consumption, commercial 29%, and industrial 11%. (CEP, 88)
- Weatherization Assistance Program waiting lists can be years long
- Typically deep retrofits achieve 15-30% energy savings through weatherization.
- The current pace of weatherization 2000 homes/year while we need to be doing 12,000/year (Building Energy Panel)
    - Through 2016 we have 23,297 of the 80,000 target
    - 10,900 of the 23,297 are low income households through 2016 (Vt PSD report)

Goals:

High level goals

- 90% renewables by 2050 (CEP at 2)
- 80-95% carbon free by 2050 (Title 10)
- Renewable Energy Standard (Act 56 of 2015)
    - Tier I – 55% in 2017 increasing by 4% every 3 years achieving 75% in 2032
    - Tier II – 1% of annual sales in 2017 increasing by 3/5ths of a percent until 10% in 2032
    - Tier III – Fossil fuel savings of 2% in 2017 from market transformation projects increasing by 2/3rds of a percent per year until 12% achieved in 2032
- 25% renewables by 2025 (10 VSA § 580(a))
- 40% renewables by 2035 (CEP at 2)
- 15% reduction in total energy consumption per capita by 2025 and 1/3rd by 2050 (CEP at 2)

Building energy goals

- Goal is to realize 30% of energy use in buildings from renewables by 2025 (CEP at 2)
- 80,000 residences weatherized by 2020 (Act 92 of 2008)
- All new buildings are "net zero" by 2030 (CEP at 8)
- 35,000 cold climate heat pumps by 2025 would begin the transformation of other buildings (CEP)

Other Entities Exploring Topic:

[What state (Vermont or others) or federal entities are exploring this topic? Where is there overlap? Does the Commission have a sufficient role to play? Is it worth a dedication of our resources?]

- Clean Energy Finance Collaborative is looking at overcoming barriers to financing clean energy investments.
- Vermont utilities and Tier 3 pathways related to buildings (mostly cold climate heat pumps)
- Experience in other states
    - Washington and Oregon on increasing energy efficiency investments in state buildings
    - Net zero building costs in California
- Building and General Services (state buildings)
- Weatherization
- Neighborworks of Vermont
- Efficiency Vermont
- Thermal Energy Task Force
- Vermont Housing and Conservation Board (VHCB)
- Various Vermont consulting outfits (e.g., VEIC and EFG)
- State Wood Energy Team (SWET)
- Biomass Energy Research Center (BERC) of VEIC (Adam Sherman)

PSD Comprehensive Energy Plan
Local biomass summary from the Vermont Independent

Proposed Commission Focus:

1. **Building Electrification**

    a. Revisit potential policy pathways, technologies, and business models for furthering building electrification;
    b. Extend the reach of existing building electrification through expansion of utility incentives and service offerings;
    c. Extending the role of storage systems, metering technology, and measurement devices;
    d. Explore pathways for extending the reach of building electrification to models for third party delivery models and aggregation of customer loads;
        i. Options for monetization of value streams;
        ii. Framework for cooperation and working with distribution utilities and ISO-NE;
        iii. Dynamic and time-varying pricing.

2. **Advanced wood heat**
    a. Resurface ambitions, targets and pathways for further consideration;
    b. Some potential pathways to address barriers to market adoption;
        i. Reducing barriers to capital for advanced wood heating systems;
        ii. Options for funding and providing support incentives (current legislative bill);
        iii. Strategies for overcoming barriers to public perception;
            1. System performance and reliability;

2. Emissions;
3. Forest sustainability; and
4. How wood heat solutions compare against other heating options.

c. Regulatory Framework;
    i. Consider clear, and consistent regulations can help expand market adoption and stimulate private investments in the wood heat sector.
d. Role for EVT;
e. Role for Clean Energy Development Fund;
f. Role of Utilities in relation to Tier III;

3. Low-income Weatherization

a. Revisit eligibility criteria for low-income weatherization;
b. Develop or resurface information on status, progress, risks associated with existing funding of low-income weatherization;
c. Options and opportunities for funding low-income weatherization programs;
d. Recommendations for extending the depth of low-income weatherization retrofits;
e. Expanding or scaling up demonstrated programs like the Heat Saver Loan Program;
f. Use of bonding authority in connection with pre-existing revenue streams to increase investment in low-income weatherization (e.g., H. 831)

4. Internalizing the ESCO model to extend self-sustaining investment for MUSH institutions (extending the BGS model)

a. Investigate pre-existing pathways to develop this model in Colorado, Washington, and Maryland
b. Identify the energy profile or budgets for municipal buildings, primary and secondary educational institutions, universities, and hospitals in Vermont;
c. Options and opportunities for the establishment or expansion of a revolving loan funds to support the framework;
d. Explore the potential pathways and permutations for leveraging the following institutions to build on the success of the BGS model:
    i. BGS role;
    ii. Role of ESCOs and Commons Energy;
    iii. Role of EVT;
    iv. Role of new hire or virtual program manager
e. Identify likely frameworks for models to adapting the BGS model to reach other MUSH institutions and sectors.

5. Revision and Increasing Efficiency of Building Energy Codes/High Performance Buildings

a. Resurface the state of our understanding of building energy codes, including cost and compliance;

b. Mapping out the development of building energy codes to reach CEP objectives for all new construction to meet net zero design by 2030;
c. Extend pathways for increasing the code compliance and enforcement efficiency;
d. Building energy code options and opportunities for mandating a storage for peak shaving;
e. Building energy code options for building energy management and renewable energy;
f. Electrification and Building Codes:
    i. Level 1 and 2 EV integration for multi-unit threshold requirements;
    ii. Explore pathways to encourage building electrification as a component requirement in building codes.

Expand educational outreach for high performance building labels like LEAD, Energy Star, and Home Energy Ratings.

Metrics:

[How will we define success? What are the GHG implications? How will be monitor that progress?]

- 80,000 Vermont residences with deep retrofits (target)
- Energy use by public buildings (metrics)
- Percent improvement in energy efficiency of public buildings (target)
- 100% of new buildings "net zero design"
- Commercial buildings metrics and targets
- Percentage of high performance residential and commercial energy efficient buildings
- Percentage improvement in energy efficiency, renewables, and reduction in energy expense for for municipal, university, schools and hospitals financing and implementation
- Targets and metrics for advanced wood heating systems
- District heating projects

Information Needs:

- Baseline information on all targets and policy pathways
    - Up-to-date progress report regarding deep retrofits on residences (PSD reports 23,397 residences and 10,900 low income HH through 2016)
    - Municipal and school energy profiles
    - State buildings energy profile
    - Commercial building energy profile

Potential Expertise:

- Efficiency Vermont
- CAP Agencies
- Weatherization
- Vermont Public Service Department
- Vermont Housing and Conservation Board

- Clean Energy Finance Collaborative
- Local consultants
    - Energy Futures Group (EFG)
    - Vermont Energy Investment Corporation (VEIC)
    - Biomass Energy Resource Center (BERC – part of VEIC)

Full Commission Discussion Items:

Working Group Topic: Smart Growth

Commission Members: Peter Walke, Johanna Miller, Liz Gamache, Bob Stevens, Bethany Fleishman, Michele Boomhower, and Jennifer Wallace-Brodeur
State Agency Staff: John Austin (ANR), Tom Rogers (ANR), Carey Hengstenberg (ANR), Tami Wuestenberg (ANR), Dan Dutcher (VTrans), Billy Coster (ANR), Jen Mojo (ANR), Jared Ulmer (VDH), Chris Cochran (ACCD), Gary Holloway (ACCD), Jacob Hemmerick (ACCD), Donna Casey (NRB), Jens Hilke (ANR), and Greg Boulbol (NRB)
Public Members: Jamey Fidel (Vermont Natural Resources Council), Kevin Geiger (Two Rivers-Ottauquechee Regional Commission), and Charlie Baker (Chittenden County Regional Planning Commission)

Existing Condition and Trajectory:

Smart growth is a development approach that results in vital, attractive city, town and village centers surrounded by working farms, forests and open space. This development pattern is more energy-efficient, environmentally sustainable, and economically responsible than the sprawling, auto-oriented patters. Smart growth provides a strong foundation to prepare and adapt Vermont's landscape for climate change.

Energy Efficient. Smart growth is energy efficient because it creates more housing choices close to jobs, stores, services and schools which encourages more walking and biking and makes public transit work better. Supporting this type of development means fewer vehicle miles traveled. That reduces greenhouse gas emissions, creates cleaner water and air, saves energy and money, and helps us meet the efficiency goals in the state's Comprehensive Energy Plan

Environmentally Sustainable. Focusing growth in city, town and village centers reduces development pressures to fragment scenic and working lands, which erodes their functions and productivity. Farms and forests provide Vermonters with enormous benefits and a range of economic and environmental services. Forest benefits include water supply and water quality protection, flood control and protection, wildlife habitat and biodiversity, clean air, carbon sequestration, outdoor recreation, and scenic beauty.[1] Smart growth maintains large blocks of productive agricultural soils and connected forest lands to adapt to and mitigate climate change.

Economically Responsible. Not only does smart growth reduce our carbon footprint, it also saves taxpayers dollars by reducing long-term costs to provide and maintain public infrastructure and municipal services (i.e. water, wastewater treatment, public transportation, schools) through efficient economies of scale. In fact, development in compact centers generates more public wealth and costs less to service than the sprawl alternative on a per acre basis.[2] While "smart growth" may be a term new to many, it's a concept that has a long history in Vermont:

[1] Act 171 Draft Guidance. Agency of Natural Resources. 2017. http://anr.vermont.gov/Planning/Forest_Blocks_And_Habitat_Connectors
[2] Badger, Emily. The Simple Math That Can Save Cities From Bankruptcy. City Lab. March 30, 2012. https://www.citylab.com/life/2012/03/simple-math-can-save-cities-bankruptcy/1629/

> Away from settled areas, police and fire protection becomes more difficult. This problem is aggravated by increased costs for busing school children and for snow removal as secondary roads are settled. Often, inefficient utilization of land results from development strung along road networks. These are the problems of strip development. The magnitude of the problem is readily apparent from Land Use Maps.
>
> Act 250 Vermont Interim Land Capability Plan, Adopted 1973

Demographic change, greenhouse gas emissions, severe weather, and financial challenges prompt a fresh look at smart growth strategies and land use governance as means to address climate change. Smart growth works when development goals, investments, and regulatory structures align to make Vermont's centers attractive places to live, work and play, while ensuring the viability of Vermont's farm and forest landscapes, and natural systems functions outside of centers.

Land use in Vermont is principally governed by Title 24 Chapter 117 of Vermont Statutes Annotated. The Act establishes:

- Structures and processes for governance, comprehensive land use planning and administration of land use
- Fourteen (14) statewide planning and development goals (including specific smart growth goals)
- Eleven (11) required elements (and many sub-elements) for regional plans
- Twelve (12) required elements (and many sub-elements) for local plans
- A regional and local option for enhanced energy plan certification (to obtain deference for coordinated energy and land use planning before the Public Utilities Commission).
- Regulatory plan implementation tools (e.g. bylaws) and non-regulatory plan implementation tools (e.g. capital budget and program).

Local control, fragmented responsibility, and overlapping jurisdiction makes Vermont's land use a patchwork of subsidiarity historically resistant to statewide interests. Authority is substantially vested in municipal governing bodies (executive function), planning commissions (legislative function), and development review boards (quasi-judicial function) -- although the Act enables some variation. Vermont municipalities have the choice to plan. Communities that plan are enabled to implement the plan using regulations and other tools. In 2013, 78% of Vermont's municipalities had confirmed plans, and 53% had zoning or subdivision regulations.[3] Local plans can be confirmed by the regional planning commission for consistency with statewide goals, the regional plan, and the adjoining municipal plans. While certain larger scale development is subject to state and federal review (Act 250, NEPA), Vermont's land use regulation is significantly influenced by local zoning and subdivision bylaws and the capacity of local infrastructure like roads and sewers.
Volunteer and staff capacity varies widely among Vermont municipalities and moving from planning to implementation is difficult for many communities, especially when new legislative requirements divert focus away from implementation (local and regional planning requirements have shifted or expanded nine of the past ten years while municipal and regional planning resources have shrunk).

[3] Act 59 Report to General Assembly. Dept. of Housing and Community Development. December 2013.

Statewide influence over land use principally comes through financial incentives like tax credits and grants that drive interest from municipalities and decision-makers. The state designations process established by 24 VSA 76A is a proven framework to coordinate inter-agency investments in ways that support smart growth outcomes at the local level. The Department of Housing and Community Development manages the state designation programs: Downtowns, Village Centers, New Town Centers, Growth Centers and Neighborhood Development Areas. These programs provide incentives, align state policies and funding, and give communities the technical assistance needed to overcome local obstacles for smart growth development in Vermont's compact, designated areas.
Outside centers, support for working farms, forest and open space come through efforts of state agencies, non-profits, and advocacy groups. A widely utilized program is the Agency of Agriculture's and the Department of Forest, Parks and Recreation's Vermont's current use value appraisal program which lowers property tax burdens for working lands. This program provides financial incentives to encourage land owners to keep land in farming or forestry. The Department of Forest, Parks and Recreation also provides land owner and technical assistance, conserves and manages forest land, and promotes forest economy enterprises all with the goal of enhancing and sustaining forest's benefits as mentioned above.

VHCB's farm and forest viability program also provides technical assistance, business planning, succession planning and implementation grants to farm and forestry enterprises across the state, enhancing the economic viability of businesses that are critical for maintaining an undeveloped, working rural landscape. Continued support for VHCB is another key strategy to affect land use in support of climate resilience.

From hazard mitigation and energy, to natural resource planning, Vermont's land use and development stakeholders are advancing climate change preparedness commensurate with the capacity available. While we focus considerable effort incorporating smart growth principles into our planning goals and requirements, we consistently underperform in the implementation of those practices and tracking our overall progress.

Municipalities grow weary from state mandates and the lack of resources that bring them to the table, and many Vermonters' value life on large rural lots, even if they don't farm or actively manage a forest. Compact planning and development can seem undesirable to the lived experience of some land-use decision makers – and threatening to those who plan to subdivide their land for economic reasons.

A concerning finding raised DHCD's in Act 59's report to the legislature is that developing in rural Vermont is faster, cheaper, and less constrained than developing in Vermont's compact centers due to: land costs, coordinating infrastructure and shared facilities (water/wastewater/stormwater), staging construction in tight locations, greater need for creative design solutions, and meeting the concerns of a larger number of neighboring landowners.[4] An affirming trend found in the Act 171 Guidance is that Vermont is currently *losing* forest cover after a century of forest regeneration. While some of this loss comes from conversion of forests to agriculture and commercial uses, the main cause is scattered residential development.[5] If Vermont's per capita vehicle mile traveled or single occupancy vehicle trips are any indicators, we're not headed in the right direction.[6] Scattered research like this indicates that

[4] Act 59 Report to General Assembly. Dept. of Housing and Community Development. December 2013. P

[5] Act 171 Draft Guidance. Agency of Natural Resources. 2017. http://anr.vermont.gov/Planning/Forest_Blocks_And_Habitat_Connectors

Vermont's decades-long focus on smart growth planning inputs is not leading statewide smart growth outcomes.

If we want active and vital community centers, we must take steps to overcome the barriers that discourage development in areas designated for growth. Increased investment in planning for smart growth implementation and infrastructure can achieve a host of state and local smart growth goals related to climate change, such as: increasing housing and employment in our downtowns and village centers, preparing for severe weather, managing storm water, promoting energy efficiency, maintaining natural systems and their services, and revitalizing local and working lands economies.

Goals:

A key challenge is balancing the long-term priority of preparing for climate change with competing short-term issues and resource constraints. The Climate Action Commission has the opportunity to lend its weight in support of **implementing and tracking** Vermont's smart growth policies and planning elements as a means to mitigate the effects of and adapt to a changing climate.

- Make existing settlements and centers the most attractive places to locate.
- Support and maintain farms, working forests, important natural resources, and a connected, resilient and functioning landscape

Other Entities Exploring Topic:

Many other entities play a role in promoting smart growth principles in Vermont, including state agencies, regional planning commissions, municipalities, the Natural Resources Board, district environmental commissions, the Vermont Natural Resources Council, the Council on Rural Development, the Vermont Housing and Conservation Board, Efficiency Vermont, the Preservation Trust of Vermont, the Vermont Land Trust, and many others.

One critical process underway currently is the Act 47 or "Act 250 at 50" Commission. The Act 47 Commission is charged with modernizing Vermont's primary land use law. Act 47 directs the Commission to investigate how Act 250 should address and consider a project's impact on climate change. Because that review is ongoing, the Smart Growth Working Group suggests the full Climate Action Commission provide support in terms of overarching principles rather than duplicating the efforts of the Act 47 Commission.

Proposed Commission Focus:

The Smart Growth Working Group proposes to focus on the barriers to and opportunities for expanding the implementation of smart growth principles around Vermont. While there are many ideas to improve the state's planning framework, the greatest opportunity lies in helping communities transition from planning to implementing their smart growth strategies, including evaluating the financial and human resource needs of communities and the tools they have at their disposal.

In addition to expanding the actual implementation of planned strategies, the working group proposes to focus on ways that Vermont can better track land use trends and our success in meeting smart growth goals. Currently, there is no ability to track in one central location the number of subdivisions

and single-family home across the state. The Commission proposes to develop recommendations for tracking land use trends, both spatially and quantitatively, across the state.

Metrics:

Supporting smart growth as part of a comprehensive climate change strategy will have significant benefits for meeting Vermont's climate goals both in terms of reducing our current emissions but also in avoiding the creation of structures and systems that lead to greenhouse gas emissions. However, some of the benefits are indirect, so we will consider if the following metrics help us better understand the state's progress:

- The number of vehicle miles travelled originating from or terminating in a designated center
- The number of rehabilitation and weatherization projects of downtown and village center buildings
- The number of rural towns that have implemented water and waste water solutions
- Implementation of statewide parcel data and creation of relevant GIS data layers to track land use trends over time, e.g. housing starts inside and outside state designated centers.
- The share of bicycle and pedestrian commute trips
- The public transit ridership rate
- The quantity and distribution of electric vehicle supply equipment installations in multi-modal designated centers
- The number of towns that have implemented town plan elements and local bylaws that address forest fragmentation and habitat connectivity, per Act 171.
- The rate forestland conversion and fragmentation
- The number of acres of highest priority forest block or connecting habitat, as defined in Vermont Conservation Design, conserved or otherwise protected from development.

Information Needs:

A focus group of experts including local and regional planners, developers, environmentalists, etc. could help the Commission identify the top barriers that can limit effective implementation of local smart growth strategies. Articulating the challenges would help the Commission identify possible solutions to overcome them.

Potential Expertise:

The Working Group proposes to engage a small focus group once it has developed a set of proposals. The focus group would "ground truth" the proposals and offer additional suggestions to improve them.

Full Commission Discussion Items:

The Working Group recommends focusing on a few achievable changes or enhancements to the state's existing smart growth framework. The aim of these recommendations would be to strengthen the foundation for current emission reductions and avoid future emissions by promoting smart growth principles.

Working Group Topic: Carbon sequestration in Forests

Commission Members: Marie Audet, Paul Costello, Robert Turner
State Agency Staff: Alex DePillis
Public Members:

Existing Condition and Trajectory:

Forest are a major carbon sink that cover roughly 78% of the land area of state. Estimates suggest more than half our annual CO_2 emissions are being absorb by these forests. Managing forests for carbon sequestration is completely compatible with all other forms of responsible forest management. Programs exist that allow for forest landowners to monetize forest growth as carbon offsets, but the short-term financial feasibility of these programs for the small landowners of the state is constrained by cost and complexity. Only one forest carbon project has been initiated in Vermont to date. Still, there is growing interest in any program that can add to the income stream of forest landowners, particularly when current wood markets are weak.

From a larger perspective, programs such as carbon credit trading may generate substantial additional sequestration, but may well play a role in keeping the major carbon sink that is our forests intact. Trading of carbon offsets from forests is likely to continue to generate interests, both on the part of policy makers and landowners. Various fledgling efforts are underway in the private sector to explore the potential further. Nationally and internationally, most experts expect to see considerable growth of these programs in the next 10-20 years.

Goals:

The CEP recognizes the importance of intact forests (Land Use chapter) and discusses the role of wood fuel for heat and energy. RGGI is a possible market for carbon offsets, but in the CEP RGGI s discussed mainly in the context of CO_2 *emission reductions* and generating funds for state energy efficiency programs. The goal of the subcommittee is to determine what actions the legislature and administration might undertake to support and encourage additional sequestration in forests by landowners. It will also identify steps, if any, to be taken to support improved access for landowners to existing programs that generate carbon credit revenues.

Other Entities Exploring Topic:

Maintaining and increasing carbon sequestration in forests is a major topic of discussion worldwide. Carbon trading, both through voluntary and regulatory mechanisms (for example, Cap and Trade) is a component of RGGI and California's AB32 (Cap and Trade bill). It is being considered by a majority of Canadian Provinces as an alternative to a federally mandated carbon tax. A number of states (NY, MA, others) exploring whether to expand the scope of entities covered by RGGI in supplemental state legislation. Many large, national companies and some in Vermont are active in the voluntary purchase of offsets. It seems nearly inevitable that interest and participation in these programs will grow. The Commission's role is to identify how best to position the state to take advantage of any opportunity that these developments present, both for its own emission reduction goals and for the benefit of landowners.

Proposed Commission Focus:
The subcommittee will…

1. Catalogue the current efforts by various independent groups to move the prospects of forest carbon offset trading forward. These include the Department of Forest, Parks and Recreation, Middlebury College, the Vermont Land Trust, UVM School of Natural Resources, and Sustainable Woodstock. Identify any innovative efforts nationwide that might be a model for Vermont.
2. Identify the potential for forest landowners in the 5-10-year time frame. Are there trends that we should be watching?
3. Identify current constraints? Are there areas where local capacity building could facilitate forward movement, possibly creating jobs? Does it make sense to support other private efforts with state resources?
4. Identify opportunities where other programs (Smart Growth, Current Use, VT Coverts) may benefit from the promotion of additional forest carbon sequestration.
5. In more general terms, explore and refine the estimates of the proportion of annual State emissions currently being sequestered by forest growth. With forests playing such a large role in capturing emissions through annual sequestration, we should account for this benefit accurately and reliably in our assessment of the State's progress towards carbon neutrality.

Metrics:

1. The Commission will develop brief reports on current initiatives impacting or involving this topic. Through this, we will identify actions that may be taken by state agencies or legislators that may lead to increased adoption of forest carbon credit participation by Vermont forest landowners. In a sense, the Commission may become a source of information for an array of parties interested in more information on this topic.
2. With support from DFPR, the Commission will attempt to quantify the opportunity for additional sequestration through an analysis of the current and expected growth and composition of our forests.

Information Needs:

See questions above.

Potential Expertise:

Various individuals with expertise either with project development, regulatory policy, or other pertinent experience.

Full Commission Discussion Items:

RGGI has but a single project generating offset credits. By expanding the entities covered by RGGI, it is likely the demand for credits and allowances would grow—with upward pressure on prices. A more robust RGGI trading of allowances and offsets might expand the opportunities for landowners to sell credits into this market. A few of the states in the region are examining expanding RGGI. Increasing the scope of this program would not only benefit landowners selling credits, but expanded sales of allowances would also generate additional revenue for state emission reduction, alternative energy, and efficiency programs.

Working Group Topic: Sequestration in agricultural soils

Commission Members: Marie Audet, Paul Costello, Robert Turner
State Agency Staff: Alex DePillis, Karen Bates, Marli Rupe, Ken Jones
Public Members:

Existing Condition and trajectory:
Conservation practices that increase soil health, reduce pollution and soil loss, and store carbon are already being adopted by progressive farmers. Current practices include no-till/low-till, cover cropping, and nutrient management plans. On the GHG side, these practices both increase carbon stored in the soil and decrease carbon emissions. They provide additional benefits to farmers by reducing fossil fuel use, enhancing productivity, and reducing fertilizer costs. Other co-benefits include reductions in nitrogen and phosphorous emissions and better soil resilience under drought. Many farms have adopted these practices voluntarily. Some experts believe conservation practices in agriculture have the potential for capturing all our annual CO_2 emissions, both locally and globally. There are current initiatives in the legislature that promote regenerative agricultural practices. Markets and payments for soil-based carbon offsets are nascent, but clearly gaining momentum across North America.

Goal:
The goals stated in the CEP include reducing GHGs within the state and from outside the state's boundaries caused energy use within the state by 50% by 2028 and 75% by 2050. Sequestration is an important and somewhat overlooked strategy to reduce atmospheric carbon dioxide. The CEP mentions carbon sequestration mainly in the context of forests. Agriculture plays a small role in the CEP, focused mainly on the potential for energy generation (and emission reductions) from anaerobic digestion. This subcommittee will examine the potential for substantial additional sequestration in agricultural soils. We will articulate goals for the reduction of GHG emissions and the sequestration of carbon resulting from improved management of agricultural soils. Our investigations will allow the Commission to identify key leverage points and policy actions needed to systematically advance this goal.

Other Entities Exploring Topic:
Within Vermont, NRCS, UVM extension, VT Dept of Agriculture, the VT Legislature, and others are working on aspects of improving agricultural soil management. These organizations bring a wealth of data and experience working with framers. This committee's efforts will leverage the work of these groups, with what we feel is an opportunity to elevate the importance of this work—but with an important shift in emphasis: good soils management doesn't just benefit our farmers and waters, it benefits our climate. Our final recommendations will incorporate information on the science of carbon sequestration in ag soils; the history of soil carbon additions and the potential for additional sequestration; and the relevance of this to the State's GHG goals. Vermont is not alone in these efforts. Other states, Canadian provinces, agricultural non-profit organizations, and the UN Framework Convention on Climate Change COP21[7] are among the organizations promoting similar goals.

Proposed Commission Focus:
1. Soil Science and agronomy
   Ample information exists about the rates of sequestration and emission reductions under various soil practices. We have begun to compile relevant reports and data sources containing estimates of

[7] http://newsroom.unfccc.int/lpaa/agriculture/join-the-41000-initiative-soils-for-food-security-and-climate/

the potential per-acre benefits and can extrapolate this to an estimate of additional sequestration for Vermont. The subcommittee will organize and interpret this information in the context of the goal stated above.

2. Financial information
   Information on the financial costs and returns available to farmers that influence carbon-friendly practices appears less readily available. We need to understand whether research has been done supporting a range of costs and cost reductions associated with the adoption of these practices. Having this information will be important to identifying key interventions.
3. Motivating behavior
   We've begun to collect information on what motivates a farmer to change practices. Clearly, financial incentives through practice-enabling grants are strong motivators, but we also need to explore whether new businesses that may offer contract planting or cropping may play a role, especially as a wider swath of farmers begin to consider this option. We know that different forms of incentive have been applied in states in the northeast. We expect to investigate the range of other programs that may offer tactics for Vermont.
4. Positioning our farmers for selling offsets
   Sales of carbon offsets are being examined as a market mechanism to encourage adoption of these practices. Even if a program mechanism existed, current prices are too low to warrant the effort involved in offset sales. However, markets change and the trajectory of interest in these mechanisms is increasing. We propose to investigate any existing programs and protocols to examine how Vermont farmers might position themselves for the sale of offset credits.

Metrics:

We will have engaged multiple experts across different sectors in the gathering and organizing of information. Maintaining this engagement across partners will add to the strength of the final recommendations.

We will have met our objective if we can articulate the following:

a. The amount of carbon sequestered over the last ten (or fewer) years since farmers started employing conservation tillage practices
b. The best opportunities for the greatest additional sequestration. This may include certain soils (more C potential) or regions where farmers are more receptive.
c. Tons of carbon that can reasonably be sequestered in a ten-year time frame.
d. Specific programs and incentives that are likely to be effective motivators.
e. The estimated cost of these programs, and the likely impact they will have on rates of sequestration.
f. The kinds of information systems or technologies needed to measure and report on the status of acres under conservation cropping.

Information Needs:

Most of the information we need exists. We need to gather it together, assess its adequacy, and identify gaps.

Potential Expertise:

Josh Falkner (UVM)
Jeff Carter (UVM Extension)
Daniella Malin Climate Smart
Carbon farming (Toensmeier)
Alex DePillis (Vermont Agency of Agriculture)
Jenifer Wightman (Cornell University)

Full Commission Discussion Items:

[What else does the full commission need to consider?]

Climate Economy Work Group

Work Plan

During the next three months, the work group will convene four times to identify sectors or subsectors that have a unique "Vermont advantage" and recommend actions that can accelerate these sectors. We will focus the meetings around sector identification, the "Vermont advantage" around these sectors, and an analysis of effective economic development tools (both financial and non-financial incentives).

The attached material provides lists of factors that the work group will integrate to arrive at recommendations for improving Climate Economy businesses in Vermont. The goal is to identify specific actions that will move one or more business activities forward. These specific actions will include:

- introducing partnerships that enhance marketing or improve processes or supply chains for a sector
- refining finance tools
- focusing current incentive programs
- other actions that the Commission can play a role in facilitating

During future work group meetings, in addition to adding to the attached lists, we will explore a few of the business sectors (Part Two) to determine if particular Vermont attributes (Part Three) provide unique business advantages and from that determine the partnership (Part One), financing and incentives that might move the sector forward. The exercise may identify specific business sectors that will benefit from a workplan leading to the growth of that sector. In addition, by carrying out the exercise for a few of the business sectors, we may identify a consistent set of activities that are clearly beneficial for many of the clean energy businesses therefore leading to a recommendation regarding incentives and business supports that will be valuable for the full set of clean energy businesses.

Proposed Meeting Schedule:

Friday, April 6, 2018 – 1 p.m. – @ ACCD – Sector Discussion
Friday, April 27, 2018 – 1 p.m. – @ ACCD - The Vermont Advantage
Friday, May 18, 2018 – 1 p.m. – @ ACCD – Acceleration / Incentive Tools
Friday, June 22, 2018 – 1 p.m. – @ ACCD - Draft Recommendations

Part One –Support that is available for current and future climate economy businesses

- The organizations that provide support to businesses
    - Vermont Department of Economic Development
    - Small Business Development Center https://www.vtsbdc.org/
    - Regional Development Corporations http://accd.vermont.gov/economic-development/resources/rdc
    - Vermont Chamber of Commerce and regional Chambers http://www.vtchamber.com/
    - International Trade Administration
    - Vermont Sustainable jobs fund http://www.vsjf.org/
    - Vermont Center for Emerging Technologies http://vermonttechnologies.com/
    - Burlington Ignite
    - Trade associations
    - Universities and colleges
    - Others

- The programs that are examples of support to businesses
    - VEGI – cash payments based on increasing payroll and capital investment
    - Vermont Training program – cash support for businesses providing training to employees or to training providers offering service to multiple companies
    - Department of Labor – training and placement programs
    - Grant programs
        - Northern Border Regional Commission
        - Windham County Development Program
        - USDA Rural Development
        - Community Development Block Grants
        - Others
    - Small Business Innovation Research program – multiple levels of grants moving technology ideas from the laboratory to the market
    - capital gains treatment within the Vermont State Income Tax
    - Networking activities – ranging from general get-to-know you, to content specific workshops
    - Brownfields program – grant money to rehabilitate contaminated sites
    - R&D tax credit
    - Financing programs
        - VEDA
        - Other public sector financing
        - Flexible Capital Fund
        - Milk Money
        - Small Business Offering Exemption
        - Links to other private sector financing

- Others

- The marketing support that is available to businesses
  - Specific events such as the Big E, trade shows
  - Think Vermont, etc.
  - International markets
  - Support of pitch events

Part Two - Business sectors that can be a focus for Vermont

- Renewables
  - Solar – electric generation
  - Solar – thermal services
  - Wind – electric generation
  - Biomass – electric generation
  - Biomass – thermal services
  - Waste to energy
  - Liquid biofuels
  - Hydroelectric generation including pump storage
- Efficiency
  - Building thermal efficiency (new and existing buildings)
  - Industrial process efficiency (unique to each manufacturing process)
    - Largest industrial sectors in Vermont (by NAICS 3-digit employment)
      - Food manufacturing
      - Computer and electronic products
      - Machinery manufacture
  - Electricity use efficiency (currently the emphasis of Efficiency Vermont)
    - Lighting
    - Air handling (V of HVAC)
    - Heat pumps for thermal or domestic hot water
    - Other
  - Generally, using new technology to reduce energy use
    - Telecommuting
    - Retail
    - Robotics
    - Artificial Intelligence
    - Other
  - Other

- Transportation

    - Electrification of fleet (focus of the EV working group)
    - Improve efficiency of transit (e.g. use of smart phone technology for dynamic routes)
    - Improve efficiency of goods transportation
    - Autonomous vehicles to better utilize vehicle fleet
    - Other

- Delivery of electric services
    - Smart grid integration of distributed generation
    - Storage
    - Time of use to match use patterns with generation patterns for expanding businesses

- Energy using businesses that match well to Vermont energy providers
    - Cogeneration
        - Wood processing
        - Food processing
        - Other
    - Large electric demand that is not easily located in regions with low electricity costs
        - Ski areas
        - Education establishments
        - Health care establishments
        - Hospitality establishments

Part Three –Unique attributes in Vermont that can be leveraged

- Vermont's small scale
    - Easier to network
    - Access to officials
    - Access to customers developing public support
- Vermont's electric utilities
    - Vertically integrated (unlike adjoining states that underwent dereg in the 00s)
    - Clean generation portfolio
    - VELCO (utility owned transmission unique to Vermont?)
    - Efficiency Vermont (first in the nation, relatively large revenue stream)
    - Neighbor to Hydro Quebec (very large source of renewable electricity)
- Vermont workforce
    - High proportion of college education
    - Lower wage due to isolation from large urban centers
    - May have different motivations (due to lower wage)

- Vermont's physical capital
    - Water
    - Clean air
    - Forest resources
    - Farm land
    - Aesthetic
- Business sectors with high Location quotients (meaning Vermont has more activity on a per capita basis)
    - Dairy
    - Craft beer
    - Maple
    - Lodging
    - Craft
    - Arts
- Non profit sector
    - Advocacy (potentially useful for marketing)
    - Research (including Regulatory Assistance Project, although that is not a non-profit)
    - Community support (e.g. VECAN, Vital Communities, CAP agencies)
    - Business support (VBSR)
- Public education – low student:teacher ratios
- Higher education – highest proportion of out-of-state students of all states
- Second homes – large proportion – some in ski towns, some on lakeshores
- Strengths of higher education institutions
    - UVM
    - St. Mike's
    - Champlain
    - Norwich
    - Middlebury
    - Vermont Technical College
    - Other
- Vermont Quality of Life
    - Low traffic
    - Low crime
    - Small towns with town centers
- Health outcomes
    - Lower obesity rates
    - Others
- Vermont political environment
    - LGBTQ

- Minimum wage
- Progressive Income Tax
- Progressive Washington delegation
- Women in positions of power (legislature, justice and administration)