E. Jobs and the Economy

Vermont continues to lead the nation in modeling best practices in responding to growing greenhouse gas emissions and reducing human-caused carbon emissions. The Climate Action Commission believes the state is primed to marry these efforts with private, entrepreneurial efforts to create and grow a new *climate economy*.

The *climate economy* is largely defined by the economic responses aimed at reducing carbon emissions and accommodating to the realities of a climate-changed world. It is a large, growing portion of the economy. However, the Commission chose to focus primarily on *the economic activities that are related to carbon emissions* when considering how best to grow jobs related to the climate economy. While there are legitimate arguments that expand the climate economy definition to topics such as waste reduction, localized agriculture, and advanced manufacturing, the Commission focused on what it believed to be the largest and most immediate opportunity to grow jobs in Vermont.

The Climate Economy Baseline

Vermonters spend more than $2 billion dollars on energy services that include the purchase of:

- 310 million gallons of gasoline
- 70 million gallons of diesel fuel for transportation
- 130 million gallons of heating oil for residential, commercial and industrial purposes
- 100 million gallons of propane for residential, commercial and industrial purposes
- 12.2 trillion BTU of natural gas for residential, commercial and industrial purposes
- 4.5 billion kWh of electricity – some generated locally, some imported from other states and Quebec
- 7.5 trillion BTU of wood for process and building heat

During the last period of higher fossil fuel prices (2014), Vermonters spent close to $3 billion on energy. The subsequent reduction in the price of oil due to global market conditions has resulted in savings to Vermont businesses and homeowners of several hundred million dollars each year. The possibility of a return to higher petroleum prices is a factor not to be dismissed lightly in that those hundreds of millions of dollars currently available for other purchases could be lost again.

As noted in other portions of this report, there are many areas where Vermonters and Vermont entrepreneurs are participating in the climate economy, including:

Homes and Workplaces

- Weatherization to reduce the need for heating fuels
- Electrification of heating through heat pumps
- Installation of advanced wood heating systems
- The production of renewable fuels from our forestry and wood products industry

Getting Around

- The increased use of energy efficient transit services
- The emphasis on land use decisions to reduce the need for vehicle use

- The shift to electric vehicles
- The construction of electric vehicle charging stations

Communities and Landscape / Sequestering Carbon on Vermont's Farms and in Its Forests

- Utilizing Vermont's millions of acres of forest for carbon storage and sequestration
- Utilizing Vermont's forests for renewable energy fuels
- The choice of home and business location as an important factor in directing the future delivery and use of energy
- The emphasis on land use decisions to reduce the need for vehicle use

The Business of Clean Energy

Many of the recommendations in this report have the potential to spur economic opportunities for entrepreneurs and for Vermonters. However, most of the recommendations focus on consumer-facing, demand creation – with an eye on creating a market with the assumption that jobs and private economic investment will occur. Incentives and policies increase the demand for weatherization, heat pumps, electric vehicles, solar panels, and transit. Businesses providing those goods and services receive a benefit by the increase in demand. Perhaps the most recent example of a successful demand-driven incentive has been the expansion of solar in Vermont.

To complement the many demand-side enhancements in this report, the Commission's Climate Economy work group focused on the support of bold supply-focused recommendations that will create an ecosystem that supports the creation and growth of climate economy businesses.

Fostering additional job growth requires a focus on matching the familiar challenges of climate economy businesses with the competitive advantages Vermont's energy sector and business ecosystem either already possesses or could possess with deliberate action. The Commission recognizes that while we must do everything we can to create an environment where climate economy entrepreneurs from across the globe would consider Vermont, our highest success will come from helping Vermont-based businesses grow. Vermont ideas turn into Vermont start-ups, and Vermont start-ups turn into Vermont scale-ups.

As such the Commission focused on two parts of the Climate Economy that are well established and primed for expansion:

1) Clean Grid Modernization
2) Expansion of Advanced Wood Heat Production Facilities

Defining Clean Grid Modernization Businesses

Clean grid modernization businesses can be defined as businesses that relate to the creation and utilization of a smart grid – a more communicative and responsive grid that allows for more efficient generation, storage, transmission, and use of electricity. Vermont, with its near ubiquitous installation of smart meters and distributed energy generation assets, offers clean grid modernization businesses an ideal place to do research, apply their technology, and grow their business. The state currently has nationally recognized leaders in clean grid modernization, including our utilities, newly-established energy storage companies, start-up smart-grid utilization companies, and dozens of renewable energy companies.

Distributed renewable generation production businesses benefit from an improved grid infrastructure. Since the early introduction of distributed generation, many economic benefits related to electricity demand peaks and reducing high price spot purchases have been captured, and to meet the State's renewable generation goals, there is the need for expanded renewable generation. Furthermore, distributed generation provides job-creating opportunities and reduces the flow of money out of state to pay for remote generation resources.

Clean grid modernization works in tandem with distributed generation. New generation supplies require a modern grid with demand controls and storage capacity to best utilize the new generation. The use of storage batteries in grid modernization benefits from more distributed generation to provide supply during periods of recharge.

Supply constraints and grid weaknesses in certain regions are an additional feature addressed by clean grid modernization. Strategically siting new distributed generation resources will benefit the grid.

To achieve this new energy future, businesses should continue to grow in a way that does not drive up costs for utility customers and provides value so we can continue to see benefits.

Expanding Advanced Wood Heat Production Facilities

The working group recognized that renewable energy production has created thousands of jobs in Vermont – especially in connection with a national expansion of solar installation, sales and servicing jobs. However, the working group felt that the state should be focusing additional efforts into the expansion of an often-overlooked renewable sector – advanced wood heat. The harvesting, processing and use of Vermont's forests as wood pellets in homes and businesses across the region has the potential to reduce our state's greenhouse gas emissions, increase forestry jobs, and provide landowners with income to support good management practices. There is an obvious nexus between Vermont's existing natural assets, this growing sector, and the climate economy.

Supporting Clean Grid Modernization Businesses

The Commission proposes implementing systems that meet the following clean grid modernization goals:

- With better managed electricity, enabled by grid modernization, the overall costs of delivery of electricity have the potential to be reduced 5 percent (about $35 million per year) compared to a Business as Usual scenario.
- The Clean Grid modernization businesses will have 200 employees (in addition to the jobs associated with the Distributed Generation businesses). Total salaries at $15 million (expansion of services into other states will be above and beyond this amount)
- 10 percent of current electricity sales increase in distributed energy generation in next five years (reducing out of state purchases by that same 10 percent - some portion of that from non-renewable sources)
- Capital investment at $100 million for grid modernization with a significant portion of the costs for battery storage plus additional investment in distributed generation
- Ratepayer savings approximately $10 million per year

The Commission recommends making several structural changes that will incentivize and accelerate clean grid modernization entrepreneurial growth.

Expanding Advanced Wood Heat Production Facilities

The Climate Economy work group supports the efforts of the Buildings Work Group to provide incentives to building owners to install modern wood heat infrastructure. This approach will incentivize growth in the sector by generating demand. The following recommendations reduce the barriers to the creation and expansion of advanced wood heating fuel facilities on the supply side.

The Climate Commission proposes to meet the following benchmarks over the next five years:

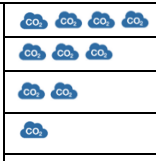
- 100,000 tons annual production within Vermont – wholesale value $20 million (retail $25-30 million)
- 200,000 tons pulp wood purchase from Vermont loggers – value $5 million
- The wood pellet businesses will have 200 employees (plus 50 jobs associated with logging). Total salaries at $10 million.
- Capital investment at $60 million
- Reduced out of state fuel purchases of $25 - $40 million annually depending on price of fuel oil (if all replacement fuel oil – reduced fuel oil use of 12 million gallons)

Current wood pellet production faces significant competitive pressures from parts of the US and Canada that have lower costs for production. To reduce costs for Vermont producers, the Commission recommends a series of strategies:

Climate Economy Recommendations:

The Jobs and Economy working group identified two specific business activities that show great promise for both addressing greenhouse gas emissions and supporting Vermont business activities. The Clean Grid Modernization sector can result in the reduction of 100,000 metric tons per year of carbon dioxide equivalents when the utilities and their customers shift demand and increase renewable generation.

The expansion of Advanced Wood Heat production facilities (wood pellets) has an uncertain impact on greenhouse gas emissions depending on the role of that new production in encouraging new Vermont customers to use advanced wood heat and how much displaces the purchase of out-of-state pellets.

Key			
GHG Impact	The total amount of reductions in greenhouse gas emissions		High = > 484 MTCO2e Med = 242 – 484 MTCO2e Low = 121-242 MTCO2e Lowest = < 121 MTCO2e
		U	Unmeasurable
		NYM	Not yet measured
		P	Preventative
Savings Impact	Annual savings achieved if recommendation is implemented		High = > $10 million/yr Med = $2 - $10 million/yr Low = < $2 million/yr
Investment Needed	The investment required to deliver the GHG reductions, financial savings, and social benefits for Vermonters		High = > $5 million Med = $500K - $5 million Low = < $500K
Ease	Considering administrative, financial, and political feasibility.		High Med Low
	This icon conveys that this action is necessary to unlock potential for additional GHG impact and cost savings		

Recommendation 43 Create an electric regulatory environment that promotes cost-effective innovation	GHG Impact 	Savings Impact 	Investment Needed 	Ease 
Action Step(s)			Designated Lead (other stakeholders)	
1. Summarize research to determine the opportunities available for rate design restructure			PSD	
2. Review current law for constraints on rate design			PSD	
3. Determine need and initiate rate design as appropriate			PSD	
Background: Clean Grid Modernization businesses, especially those using smart grid data to drive down costs for all customers, need a system in place to enable the transformation. The system can include appropriate price signals to consumers about when they should or shouldn't use electricity or also more innovative approaches to deliver savings seamlessly. Smart devices, renewable generation assets and storage companies all need a dynamic electricity pricing system to succeed.				

Recommendation 44 Provide access to smart meter data for clean grid modernization companies	GHG Impact	Savings Impact	Investment Needed	Ease
Action Step(s)			Designated Lead (other stakeholders)	
1. Convene grid modernization companies to define their data needs			PSD and ACCD	
2. Work with the utilities to determine what data is available for the grid modernization companies and identify proprietary or sensitive customer data that cannot be shared			PSD	
3. Determine policy changes (through PUC) or statutory changes (via legislation) to allow for data to be made available			PSD	

Background:

The state's success at becoming one of the first nearly ubiquitous smart grids is a unique Vermont asset. The Commission heard from several businesses that participated in the Vermont Sustainable Jobs Fund Accel-VT climate economy accelerator that their access to the utilities and the grid was especially attractive and a potential determining factor to doing business in Vermont. Enabling clean grid modernization businesses access to the entire state's smart grid data could create a new incentive to doing business in Vermont and be cost-effective for ratepayers.

Recommendation 45 Determine value of grid modernization	GHG Impact	Savings Impact	Investment Needed	Ease
Action Step(s)			Designated Lead (other stakeholders)	
1. Conduct an analysis to assign value to grid modernization in Vermont			Interagency	
2. Seek additional expertise, possibly through an RFP to refine the analysis and determine a value for Vermont			PSD	

Background:

Grid modernization is not as attractive for investors as recent investments in renewable energy generation, yet the sector offers great promise to consumers, businesses and utilities. Understanding its economic value will enable the State and Stakeholders to identify innovations for future use of the grid that in turn will facilitate the realization of beneficial greenhouse gas reduction policies.

Recommendation 46 Establish a $1 million innovation fund	GHG Impact	Savings Impact	Investment Needed	Ease
Action Step(s)			Designated Lead (other stakeholders)	
1. Develop legislation and appropriations to create fund			Legislature and Governor	

Background:

Create a new fund that provides equity investments for target climate economy businesses to encourage the growth of the sector. The fund should be modeled on the Working Lands Enterprise Initiative, which provides small grants to private entrepreneurs and non-profit groups to create jobs in the agriculture sector. Eligible expenses should include product development, start-up costs, equipment purchases, and talent acquisition in distributed energy, grid modernization, and energy storage start-ups. Many start-up climate economy businesses are attracted to larger cities where equity capital is more available, and this grant program would provide a unique Vermont advantage at a Vermont scale. The Commission recommends that initial capitalization of this fund equals $1 million.

Recommendation 47 Create a Small Business Innovation Research (SBIR) grant matching program	GHG Impact	Savings Impact	Investment Needed	Ease
Action Step(s)			Designated Lead (other stakeholders)	
1. Interview past stablished Program to Stimulate Competitive Research (EPSCoR) and SBIR recipients for their experiences			ACCD	
2. Design SBIR Matching program (including any legislative actions necessary)			ACCD	
3. Draft and promote legislative changes for programs			ACCD	

Background:

Incentivize target businesses to do research and technology commercialization in Vermont by providing a State match to the existing federal Small Business Innovation Research grant program. Eleven federal agencies, including the Department of Energy, are required to dedicate 3.2 percent of their research and development budget to small businesses. Companies can apply for as much as $1 million to conduct research in partnership with the federal agency. In the past 35 years, Vermont companies have received approximately $130 million in federal SBIR awards. The State could encourage Vermont businesses to utilize the program by providing a small match to any SBIR award made to conduct distributed generation, energy storage, and grid modernization work. In addition, non-Vermont businesses may choose to do their research here in Vermont, resulting in more start-ups being located here in Vermont. The Commission recommends a $100,000 annual investment

Recommendation 48 Enhance the Vermont Employment Growth Incentive (VEGI) for distributed energy, grid modernization, and energy storage businesses	GHG Impact 	Savings Impact 	Investment Needed 	Ease 

Action Step(s)	Designated Lead (other stakeholders)
1. Draft legislative language to adapt the VEGI statute to support the unique characteristics of these businesses (see changes below)	ACCD
2. Develop impact analysis to show how the two changes affect future tax expenditures	ACCD
3. Pass legislation and enact into law	Legislature and Governor

Background:

The current VEGI program provides a cash incentive one to nine years after a specified employment and capital investment target is met. For businesses in this sector, our proposal is to front load the payments at the time of employment and investment (with real-time monitoring to ensure that the positions are maintained). Another aspect of VEGI is that the incentive value is decreased based on an assumption of background growth – growth presumed to take place in the absence of any incentive payment. Start-up businesses and high growth businesses struggle to overcome background growth requirements. If a company of one person hires one person, the 100 percent growth often disqualifies a company from the program. Mid-size, faster growing companies, like those in the tech industry, often need to exceed unattainable growth figures to qualify. To enhance the VEGI program for target climate economy businesses, we propose to assign a zero rate of background growth to calculate incentive payments. The Commission recommends a $200,000 annual investment in this enhancement.

Recommendation 49 Create a fully refundable research and development tax credit	GHG Impact	Savings Impact	Investment Needed	Ease
Action Step(s)			Designated Lead (other stakeholders)	
1. Review other state R&D programs			ACCD	
2. Draft legislative language for Vermont's R&D tax credit			ACCD, Tax	
3. Develop impact analysis to show how the two changes affect future tax expenditures			ACCD, Tax	
4. Promote legislative changes for program			ACCD	

Background:

The existing Vermont credit provides tax benefit for conducting research in Vermont, but that credit is only available to companies that meet federal requirements and have an existing Vermont income tax liability (corporate or personal for pass-through businesses). Many start-up companies wait years to be profitable. By making the tax credit fully refundable for distributed energy, grid modernization, and energy storage businesses, Vermont could become the preferred destination to conduct research and development in the sector. The Commission estimates that this would cost $100,000 annually.

Recommendation 50 Create a new student loan repayment program	GHG Impact	Savings Impact	Investment Needed	Ease
Action Step(s)			Designated Lead (other stakeholders)	
1. Convene representative businesses in the clean grid modernization sector to scope program qualifications			ACCD (DOL and PSD)	
2. Design the debt forgiveness package and draft legislative language			ACCD (VSAC)	
4. Promote legislative changes for program			ACCD	

Background:

Create a student loan forgiveness program for entrepreneurs and workers in the clean grid modernization sector. Graduates of Vermont colleges and universities that work with Vermont businesses in this sector will receive a partial loan forgiveness for each year that they hold the job. In addition, students that pursue an academic field of study that prepares them for work in the clean grid modernization field will also be eligible for debt forgiveness. The Commission estimates that this would cost $100,000 annually

Recommendation 51 Support for free legal services to new climate economy entrepreneurs	GHG Impact	Savings Impact	Investment Needed	Ease
Action Step(s)			Designated Lead (other stakeholders)	
1. Convene representatives from distributed generation, grid modernization, and energy storage businesses to meet with representatives from Vermont Law School Entrepreneurship and Legal Laboratory (VLSell)			VLS (ACCD, and PSD)	
2. Develop marketing materials for VLSell to be used in the clean energy business space			VLS and ACCD	
3. Provide an appropriation to support VLSell			Legislature and Governor	

Background:

One critical area of support for new and emerging clean energy businesses, including clean tech and grid modernization businesses, is intellectual property and corporate legal services. Legal services for new businesses to support formation of the appropriate legal entities, structure outside investment, and even file for an Employee Identification Number can range from $6,000 to $20,000, placing a significant burden on new and emerging businesses at the time when they can least afford such capital outlays. Further, for clean technology companies or others developing new products, intellectual property legal services such as applying for a patent can be as high as $20,000. In September 2018, Vermont Law School will launch a new Entrepreneurship and Legal Laboratory (VLSell). This program will eliminate barriers to growth for early-stage companies in Vermont by providing low-cost or pro bono legal services. Legal services will be rendered by students, supervised by experienced legal practitioners. This program meets a need that all new and expanding businesses share, particularly businesses in the new climate economy sector who face complex legal challenges. The Commission recommends $50,000 in funding support for the VLSell to provide low-cost and pro bono legal services to start-up businesses in the clean technology, energy, and grid modernization sectors. This funding will allow VLSell to specifically assist businesses in these sectors, addressing one of the critical barriers to growth that they face.

Recommendation 52 Reduce electric costs for wood pellet manufacturers	GHG Impact 	Savings Impact 	Investment Needed 	Ease 
Action Step(s)			Designated Lead (other stakeholders)	
1. Review the current incentive rates to determine if there are enhancements that are appropriate for wood pellet mills that would otherwise not be operating in Vermont			PSD (utilities)	
Background: Vermont's relatively high-cost of electricity is a deterrent to attracting new high-energy using manufacturers. Though the State has a process enabling businesses to apply for a reduced economic-development rate to encourage load expansion and job creation, the program is rarely used. The Commission recommends creating a new, enhanced rate reduction for wood pellet manufacturers recognizing the benefits of reduced greenhouse gas emissions provided by advanced wood heat and the potential to grow the green economy.				

Recommendation 53 Streamline the permitting for wood pellet production plants	GHG Impact	Savings Impact	Investment Needed	Ease
Action Step(s)			Designated Lead (other stakeholders)	
1. Review Act 194 of 2018 to determine additions that will be beneficial for wood pellet mills			ACCD (ANR, NRB, RDCs, land use stakeholders)	
2. Make a legislative recommendation for a clean energy industrial park designation program			ACCD (ANR)	

Background:

The State's permitting process can be costly and time consuming, often resulting in hundreds of thousands of dollars and many months of delay. The Commission recommends creating a new designation program that would encourage clean energy, climate economy, and wood pellet production facilities to locate in areas the state, municipality, economic development experts, and land use planners agree is the best place for growth. In return for locating in a designated area, permitting costs and hurdles would be reduced, if not eliminated, allowing for a more cost effective citing process and a more predictable process.