



CENTRAL VERMONT REGIONAL ENERGY COMMITTEE

March 30, 2017

4:00pm

Central Vermont Medical Center – Board Room

AGENDA

1. **CALL TO ORDER & WELCOME**

The Chair will call the meeting to order.

2. **CHANGES OR AMENDMENTS TO THE AGENDA**

The Committee should consider any changes or amendments to the agenda.

3. **PUBLIC COMMENTS**

Members of the public are encouraged to provide comments related to items not on the agenda.

4. **APPROVAL OF MINUTES**

The Committee should review and consider approval of the draft minutes from the February 23, 2017 Regional Energy Committee meeting.

5. **MUNICIPAL INPUT SURVEY & PUBLIC PARTICIPATION UPDATE**

Staff will provide an overview of the results from the municipal input survey that was distributed to municipal elected officials, planning commissions, conservation committees, and energy committees. Additionally, staff will provide an update on future public participation efforts being planned.

6. **REGIONAL & MUNICIPAL TARGETS FOR RENEWABLE ENERGY**

Since the last Regional Energy Committee meeting, staff has received updated information regarding regional targets for renewable energy generation. Instead of a megawatt target, a megawatt hour target has been provided including options for generation. Staff will provide an overview of this information including a municipal breakdown. An overview of this information is *included* with the agenda.

7. **REVIEW OF ENERGY PLANNING STANDARDS & ENERGY PLANNING CONSISTENCY**

Staff has been working to develop information for a regional energy planning effort that will be consistent with the standards outlined in Act 174 of 2016. To this end, staff will provide the Committee with an overview of where the energy planning efforts currently stand focusing primarily on the “pathways” portion of the standards and how these pathways are addressed in the 2016 Central Vermont Regional Plan. The Committee should review the information and provide feedback to staff as appropriate. Portions of the 2016 Central Vermont Regional Plan and an outline of the standards are *included* with the agenda.

8. **OTHER BUSINESS**

The next meeting of the Regional Energy Committee will be on Thursday, April 27, 2017.

9. **ADJOURN**

**CENTRAL VERMONT REGIONAL PLANNING COMMISSION
REGIONAL ENERGY COMMITTEE**

**February 23, 2017
MEETING NOTES**

The regular meeting of the Central Vermont Regional Planning Commission's Regional Energy Committee was held on Thursday, February 23, 2017 at 4:00PM in the Board Room of the Central Vermont Medical Center.

Committee Members Present:

Jamie Stewart – Central Vermont Economic Development Corporation
Brian Fitzgerald – RPC Representative - Town of Duxbury
Bram Towbin – Town of Plainfield Selectboard
Don LaHaye – RPC Representative - Town of Waitsfield
Alex Bravakis – Novus Energy Development
Ron Krauth – RPC Representative - Town of Middlesex
Steve Fitzhugh – Town of Northfield Planning Commission
Karin McNeill – Agency of Natural Resources
Dan Potter – Vermont Public Service Department
Jackie Cassino – Agency of Transportation
Julie Potter – RPC Representative - Town of East Montpelier
Janet Shatney – RPC Representative - Barre City

Committee Members Not Present:

Patty Richards – Washington Electric Coop
Robert Dostis – Green Mountain Power
Mark Sousa – Green Mountain Transit
Barbara Conrey – City of Montpelier Energy Committee
Paul Zabriskie – Capstone Community Action
Karen Horn – Vermont League of Cities & Towns

Others Present:

Eric Vorwald – CVRPC Senior Planner
Marian Wolz – CVRPC Assistant Planner
Laura Hill-Eubanks – Town of Northfield
Stephanie Kaplan – Town of Calais
Harrison Snapp – Town of Waitsfield

CALL TO ORDER & WELCOME:

The meeting was called to order by Mr. Fitzhugh at 4:02PM. Since several members of the public were in attendance, Mr. Fitzhugh asked for a round of introductions.

CHANGES OR AMENDMENTS TO THE AGENDA:

No changes to the agenda were recommended.

PUBLIC COMMENTS:

No members of the public presented comments.

APPROVAL OF MINUTES:

Jamie Stewart moved to approve the January 23, 2016 minutes as presented; Ron Krauth seconded. Motion carried by a vote of 7-0 with two members abstaining.

REGIONAL & MUNICIPAL TARGETS FOR RENEWABLE ENERGY:

Mr. Vorwald provided an overview of the proposed methodology for determining renewable energy generation targets at the municipal level. He outlined that similar methodology will be used for energy efficiency and conservation targets as well. He noted that municipalities will not be held to these targets, rather these targets will act as guidance for the region to ensure it can meet the State's goal of 90% renewable energy by the year 2050.

Ms. Wolz continued the discussion of targets by showing some possible municipal breakout of targets for number of homes to be weatherized by 2025 and electric vehicles per municipality by the years 2025, 2035 and 2050. Ms. Wolz noted that these targets utilize a basic methodology of allocating by municipalities share of regional total (for example, share of light duty vehicles or share of homes) and that again, municipalities will not be held to these targets, rather they will be used to benchmark the region's progress towards its regional goal of 90% renewable energy by 2050.

Mr. Krauth noted his concern of the accuracy of tracking weatherization and the savings in energy due to weatherization. The Committee discussed levels of home weatherization and how it would be tracked in the plan update. Ms. Wolz noted that for weatherization program, there are tracking mechanisms through Efficiency Vermont while for weatherization not done through a program, there is the possibility to self-report and track via the Community Energy Dashboard. Ms. Potter noted that thorough all types of planning, there are always issues with accuracy of data. She added that while there may be discrepancies in accuracy and tracking of data, those will not change the need to focus on clear pathways and policies in the energy plan that work to achieve the region's energy goals.

Mr. Vorwald brought the conversation back to the methodology in question. Ms. Wolz noted that this methodology is being used by other RPC's, some with slight variations. She noted that one variation on the methodology would be to factor in municipal electricity use into the allocation percentage. The Committee discussed whether it would be worthwhile to include current or future electricity projections in the target allocation equation.

Mr. Krauth asked about the LEAP methodology and where the values for passenger rail and electrification came from. Ms. Wolz noted she would follow-up with VEIC on those numbers.

Mr. Vorwald asked if any representatives from the business sector, transportation or renewable development sector would add any additional factors to the methodology equation. Mr. Stewart noted that for many larger businesses, much of the low hanging

fruit of energy efficiency upgrades have already been done, and that going forward it will be a challenge to find ways to greatly improve efficiency in the business sector.

Mr. Bravakis noted that battery storage for energy is going to be the “holy grail” moving forward and that that should play a part in the discussion of renewable energy generation. Ms. Cassino noted that she would like to see electricity use factored into the target methodology for comparison, but otherwise felt the methodology suggested was a fair distribution across the municipalities.

Ms. Potter asked that before electricity usage was factored in, that staff check with Efficiency Vermont on whether the data is reported at place of use or address listed. She noted this would make a significant difference if it is reported based on listed address.

MUNICIPAL INPUT SURVEY:

Ms. Wolz provided an update on the municipal energy survey and the feedback that has been received thus far. She noted that survey responses will be used to look for energy siting issues and opportunities at a regional level. If trends appear across responses from municipalities, those will be elevated to be included in the Regional Energy Plan. She also noted that another intent of this survey is to have municipalities begin the discussion on energy use and siting opportunities in their community.

Ms. Kaplan asked about the policy of restricting all types of development and where that came from. Mr. Vorwald responded that it comes from Act 174 and is intended to ensure that municipalities treat energy development on the same level of other types of development. He added that municipalities could address energy developed based on scale, meaning they could restrict development based on compatibility with other types of development that are allowed for in that area. Mr. Potter added that while zoning is important in the discussion, energy development review does not take zoning into account, so town planning is even more important when it comes to the discussion of scale of renewable development.

Mr. Bravakis referenced the new net metering rules, which he outlined give municipalities even more say for identifying locations for renewable energy development. He added that if a municipality writes a letter to the developer or notes a preferred location in the town plan, which will give the developers a green light for siting a project at the location. He added that conversely, noting preferred locations will provide more protection for areas that municipalities wish to see not sited for renewable projects.

OTHER BUSINESS:

Mr. Fitzhugh noted that the next meeting will be on Thursday, March 30th 2017.

ADJOURN:

With no additional business to discuss Mr. Krauth moved to adjourn the meeting which was seconded by Mr. LaHaye. The Committee voted unanimously to adjourn the meeting at 6:00pm.

New Megawatt Hours (MWh) targets for the Central Vermont Region

Region	Share of Overall In-State Generation Output Target			
	Share of Population	Target Total MWh	Existing MWh	Target New MWh
Addison	5.8%	318,517	145,538	172,978
Bennington	5.6%	308,967	15,785	293,182
Central Vermont	10.3%	567,165	148,635	418,530
Chittenden	25.5%	1,401,859	556,623	845,236
Lamoille	4.0%	219,674	33,746	185,927
Northeastern	10.3%	564,962	546,282	18,680
Northwest	8.8%	486,009	225,570	260,438
Rutland	9.6%	526,131	86,854	439,276
Southern Windsor	4.0%	219,332	24,720	194,612
Two Rivers	8.8%	485,219	88,588	396,631
Windham	7.3%	402,166	304,450	97,716
Statewide	100%	5,500,000	2,176,792	3,323,208

Town Name	Share of Overall In-Region Generation Output Target		
	Population	Regional Share of Population	Target New MWh
Barre City	9,052	13.9%	58,255
Barre Town	7,924	12.2%	50,995
Berlin	2,887	4.4%	18,579
Cabot	1,433	2.2%	9,222
Calais	1,607	2.5%	10,342
Duxbury	1,337	2.1%	8,604
East Montpelier	2,576	4.0%	16,578
Fayston	1,353	2.1%	8,707
Marshfield	1,588	2.4%	10,220
Middlesex	1,731	2.7%	11,140
Montpelier	7,855	12.1%	50,551
Moretown	1,658	2.5%	10,670
Northfield	6,207	9.5%	39,946
Orange	1,072	1.6%	6,899
Plainfield	1,243	1.9%	7,999
Roxbury	691	1.1%	4,447
Waitsfield	1,719	2.6%	11,063
Warren	1,705	2.6%	10,973
Washington	1,039	1.6%	6,687
Waterbury	5,064	7.8%	32,590
Williamstown	3,389	5.2%	21,810
Woodbury	906	1.4%	5,831
Worcester	998	1.5%	6,423
Total	65,034	100%	418,530

Renewable Energy Generation Technology Capacity

Technology	Capacity Factor	Annual MWh Output per MW of Installed Capacity	Acres per 1 MW of Installed Capacity
Solar	14%-16%	1,300	8
Small Wind	20%-25%	2,000	4
Utility Scale Wind	25%-35%	2,600	4
Methane	60%-90%	6,600	Site specific
Biomass	60%-80%	6,100	0.07*
Small Hydro	40%-60%	4,400	Site specific

*The District Heat Plant in Montpelier has an installed capacity of 16 million BTUs (~5 MW) and is roughly 15,000 sq ft (~1/3 acre).



MEMORANDUM

TO: Central Vermont Regional Energy Committee

FROM: Eric Vorwald, AICP
Senior Planner

RE: **Regional Energy Plan Development and Pathways**

DATE: March 31, 2017

The purpose of this memo is to provide the Central Vermont Regional Energy Committee with information regarding development of the Regional Energy Plan and how the standards outlined in Act 174 of 2016 can be met through existing planning efforts.

Vermont State Statute requires all regional plans to contain an energy element as noted in 24 V.S.A. §4248a(a)(3). As such, the 2016 Central Vermont Regional Plan includes information related to the analysis, needs, scarcities, costs, and problems with energy across all sectors including electric, thermal, and transportation. Also included with this section of the regional plan are goals and policies to address the issues related to energy. Additionally, other chapters of the regional plan including transportation; land use; and utilities, facilities, & services include information, goals, and policies related to energy in one form or another.

Based on the above mentioned material, staff is proposing that the standards outlined in Act 174 of 2016 can be reasonably met through existing sections of the 2016 Central Vermont Regional Plan. To this end, staff is providing relevant sections of the regional plan for review by the Committee including an outline of the standards identified in Act 174. A comparison of this information should reveal the extent to which planning for the energy future of the region has been done and note any areas that may need to be expanded or included to meet the requirements of Act 174.

Action Requested:

The Regional Energy Committee should review the sections of the 2016 Central Vermont Regional Plan and provide feedback to staff regarding the consistency by which the standards identified in Act 174 of 2016 are being addressed, focusing specifically on the *Pathways/Implementation Actions* section for consistency with the 2016 Central Vermont Regional Plan.

**CENTRAL VERMONT REGIONAL PLANNING COMMISSION
REGIONAL ENERGY PLAN OUTLINE**

03.30.2017

ANALYSIS & TARGETS

Information in this section will primarily be provided by the Public Service Department including data collected by the Vermont Energy Investment Corporation (VEIC). Strategies in bullet 5 and information noted in bullet 7 will be established by the CVRPC and the Regional Energy Committee.

Analysis of resources, needs, scarcities, costs, and problems

- Estimate of current energy use for transportation, heating (thermal), and electric
- 2025, 2035, 2050 targets for thermal and electric efficiency improvements
- 2025, 2035, 2050 targets for use of renewable energy for transportation, heating, and electricity
- Evaluate the amount of thermal-sector conservation, efficiency, and conversion to alternative heating fuels needed to achieve the targets
- Evaluate the transportation system changes and land use strategies needed to achieve targets
- Evaluate the electric sector conservation and efficiency needed to achieve targets
- Include municipal breakdown of targets by sector

PATHWAYS/IMPLEMENTATION ACTIONS

The 2016 Central Vermont Regional Plan includes a section related to energy which addresses the majority of the items noted below. Additional discussion in the 2016 Central Vermont Regional Plan is included in the Land Use, Transportation, and Utilities, Facilities, & Services sections.

The following outline includes references to the relevant sections of the Energy Chapter that may address the standards listed below.

Policy on the conservation and efficient use of energy

- Encourage conservation by individuals and organizations
Included throughout the Energy Chapter
- Promote efficient buildings
Page 3-15, paragraph 2 and Goal 1 including specific policies.
- Promote decrease in fossil fuels for heating
Page 3-11 under the summary of trends; page 3-15 paragraph 3; and Goal 2 including specific policies.

Policy on reducing transportation energy demand, single-occupancy vehicle use, and encouraging renewable or lower-emission energy sources for transportation

In addition to the citations below, the Transportation chapter of the regional plan discusses all of these items and provides specific goals and policies.

- Encourage increased use of transit
Page 3-13, paragraph 5 related to transportation (continuing onto page 3-14); and Goal 3 including specific policies.
- Promote shifts away from single-occupancy vehicle trips
Page 3-14, paragraph 2 related to transportation; and Goal 3 including specific policies. Additionally, Goal 4 in the Transportation chapter supports this pathway.
- Promote shift away from gas/diesel vehicles to electric or non-fossil fuel transportation options
Page 3-14, paragraph 4 related to transportation; and Goal 5 including specific policies.
- Facilitate the development of walking and biking infrastructure
Page 3-14, paragraph 5 related to transportation; and multiple goals in the energy, land use, and transportation chapters.

Policy on patterns and densities of land use likely to result in conservation of energy

- Include land use policies that demonstrate a commitment to reducing sprawl and minimizing low-density development
Multiple references to land use and development patterns are noted throughout the various plan chapters including Energy, Land Use, Transportation, and Utilities, Facilities, & Services.
- Strongly prioritize development in compact, mixed-use centers when feasible and appropriate or ways to make compact development more feasible
Multiple references to land use and development patterns are noted throughout the various plan chapters including Energy, Land Use, Transportation, and Utilities, Facilities, & Services.

Policy on the development and siting of renewable energy resources

In addition to references in the Utilities, Facilities, & Services Chapter, the majority of this information will be established through the development of the resource and constraint maps, which is noted in the guidance provided by the Department of Public Service.

- Evaluate generation from existing renewable sources by municipality
- Analyze generation potential on suitable locations by municipality
- Identify adequate land or locations for the siting of renewable sources to meet the 2050 targets established for the region
- Ensure identified constraints do not prohibit the development of sufficient renewable energy sites to meet identified targets

- Include statements of policy with the maps related to preferred, potential, and unsuitable sites for renewable energy generation
- Maximize the potential for renewable energy generation on preferred locations

MAPPING STANDARDS

Mapping information will be developed by staff and reviewed by the Regional Energy Committee. The information represented by the maps has been provided by the State of Vermont. Additional map information will be provided through discussions with the Regional Energy Committee and the municipalities.

Maps of existing electric generation sources (if only 15kW and above are used, a statement regarding 15kW and smaller will be included elsewhere in the plan)

Potential areas for development and siting of renewable energy generation

- Include data showing raw potential for wind and solar using the best available data
- Include known constraints as indicated in the standards
- Include possible constraints as indicated in the standards
- Include transmission and transportation infrastructure such as 3 phase power
- Include preferred locations for siting by size, type, or source

Potential areas that are unsuitable for siting based on resource, size, or other factors

- Include information regarding why specific sites are unsuitable for a given resource based on factors such as size, availability, or land use policy
- Include supporting information (such as studies or specific data) for the identification of additional constraints beyond those listed above
- Include siting locations for all types of generation technologies
- Include mapping at the municipal level

Energy Element

The 2003 Central Vermont Regional Plan Energy Element began with the following Statement:

“The environmental and economic implications of energy use have become critical factors in nearly all public policy decisions and in many private actions as well. Energy costs are a major line item in government, business, and personal budgets.”

Just five years later, this reads as a gross understatement. The situation now seems far more critical than we could have imagined then. Consider that:

- Energy costs have sky-rocketed. (Oil was \$25 per barrel when the previous Plan was adopted. It is now, as of June 2008, approaching \$150 per barrel and it appears that price increase will continue.) Consumer fuel costs have more than doubled since 2003)
- War, terrorism, and political uncertainty plague the Middle East
- Global climate change is now universally accepted as a scientific fact and major threat to our environment and economy
- Global oil production has probably either peaked, or is close to peaking, but global demand (particularly in developing countries) grows exponentially
- The Nation’s trade deficit has grown exponentially, primarily due to increasing oil imports at ever higher prices
- Vermont’s biggest energy contracts are five years closer to expiration
- Inadequacies in the State’s electrical transmission and distribution systems are becoming ever more apparent as they approach capacity.

Although the energy picture often appears abstract and beyond the influence of communities, the times call for decisive action and bold policies and programs that look well beyond the five year time frame of this Plan. Sound Regional and local planning can play a positive and effective role in guiding energy decisions. In fact, by promoting appropriate land use patterns, participating in energy development decisions, facilitating alternative transportation options, and encouraging energy conservation strategies, Vermont communities can lead the Nation toward a position of sustainable energy use which will not only maintain a healthy environment, but will also build a foundation for economic health and stability.

24 VSA, Chapter 117, Section 4347 requires that the Regional Plan contain an energy element ".which may include an analysis of energy resources, needs, scarcities, costs and problems within the Region, a statement of policy on the conservation of energy and the development of renewable energy resources, and a statement of policy on patterns and densities of land use and control devices likely to result in conservation of energy." Chapter 117 further requires that the Regional Plan "promote an efficient and economic utilization of drainage, energy, sanitary and other facilities and resources; promote the conservation of the supply of food, water, energy and minerals;" and "promote the production of food and fiber re- sources and the reasonable use of mineral, water and renewable energy resources."¹

The Energy Element of the Regional Plan seeks, in part, to satisfy these mandates. Title 30 VSA, Section 248 empowers CVRPC to appear before the Public Service Board to aid the Board in making determinations in Certificate of Public Good hearings. Title 10 VSA, Section 6068(a) empowers CVRPC

¹ State of Vermont. [Title24 VermontStatutesChapter177:VermontMunicipalandRegionalPlanningandDevelopmentAct. 1967](#)

to testify before the District Environmental Commission and Environmental Board (Act 250) regarding conformance of subdivisions and developments with criteria concerning energy conservation, private utility services, and public utility services and more generally with the Regional Plan.

Thus, the Energy Element of the Central Vermont Regional Plan is designed to assist in the decision making processes of state and local government, and to enhance the economic and environmental health of the Region.

DISCUSSION: TRENDS

Our society uses energy to heat homes and offices, to power an industrial economy and to transport people, goods and services from place to place. About 40% of the world’s energy consumption occurs in the United States. Vermont is one of the nation's least energy intensive states; yet the average resident of Vermont consumes approximately 8.1 KW of energy each year, nearly two times more than the average Japanese or German citizen.

In Vermont, the primary sources of energy are fossil fuels (oil, gas, coal and liquid petroleum gas), nuclear generated electricity, local and imported hydro-electricity, and biomass (fuel wood). Renewable energy sources such as solar and wind currently account for only a negligible proportion of total energy use. Fossil fuels are used primarily for transportation and heating, while nuclear power (supplied from the Vermont Yankee Facility in Vernon, Vermont) and out of state hydro-power (supplied by facilities in New York state and Quebec) provide for the lion’s share of our electricity demand.

Statewide Energy Demand- All Sectors, by Fuel (KW/year)

Year	Fossil Fuels	Electric	Biomass	Solar
1980	2,112	427	344	.3
Percent	73.2%	14.8%	12.0%	0.0%
1990	2,406	567	263	.2
Percent	74.3%	17.5%	8.1%	0.1%
2010	3,623	817	292	.7
Estimated Percent	76.5%	17.3%	6.1%	0.1%

Statewide Energy Demand- All Fuels, by Sector (KW/year)

Year	Residential	Commercial	Industrial	Transportation
1980	1,000	364	387	1,134
Percent	35%	13%	13%	39%
1990	962	393	440	1,444
Percent	29.7%	12.1%	14%	44.6%
2010	1,339	568	601	2,229
Estimated Percent	28.3%	12.0%	12.7%	47.0%

SOURCE: Vermont. Public Service Department. Vermont Comprehensive Energy Plan, 1998

Although analyses of energy demand by fuel and by sector are not available for Central Vermont specifically, data generated for the State as a whole can be interpolated for planning at the Regional level.

Transportation stands as the sector where energy use has grown substantially during the past 30 years. During that time energy consumption in the transportation sector grew 97% primarily due to increased commercial and industrial uses. The transportation sector now accounts for over 45% of all energy, and approximately 60% of all fossil fuels, consumed in Vermont.²

Residential use, while decreasing as a percentage of total energy demand, is projected to have increased by over 334 KW/year (34%) between 1980 and 2010, presumably due to the significant increase in the State's total number of housing units and the trend towards larger homes with more gadgets. While fossil fuel use in the commercial and industrial sectors has been less pronounced, the total projected increase between 1980 and 2010 is projected to add up to over 334 KW/yr. (*See map: Energy & Communications and for more discussion: Utilities, Facilities & Services Element.*)

Fossil Fuels

As shown in the above tables, fossil fuels account for over 3/4's of all energy consumed in Vermont. Approximately 65% of the oil consumed in the U.S. is imported, up from only 10% in 1960³. In fact, oil imports account for approximately 50% of the total U.S. trade deficit and the cost of U.S. oil imports has increased over 300% in this decade to a level of about \$340 billion in 2007.

Our economic system is so tied to the availability of fossil fuels that even modest increases in price can lead to high inflation, lagging economic growth and monetary instability. Dependence on fossil fuels inflates an already record high national deficit. It is estimated that as much as 90% of every household energy dollar permanently leaves the community⁴. The remainder stays in the local economy to pay the overhead costs associated with the distribution system and to pay for locally produced forms of energy. As fossil fuel costs rise, a greater proportion of our income will leave the Region.

This situation can only become more critical as we approach peak oil production (Some experts believe we have already passed or reached it). The U.S. Department of Energy's 2005 report "Peaking of World Oil Production: Impacts, Mitigation and Risk Management" states that:

"The peaking of world oil production presents the U.S. and the world with an unprecedented risk management problem. As peaking is approached, liquid fuel prices and price volatility will increase dramatically, and, without timely mitigation, the economic, social and political costs will be unprecedented. Viable mitigation options exist on both the supply and demand side, but to have substantial impact, they must be initiated more than a decade in advance of peaking."

The economic and social consequences of intensive fossil fuel use are only part of the story. The combustion of fossil fuels is by far the largest contributor of atmospheric "greenhouse gases" (primarily carbon dioxide). There is strong consensus in the scientific community that continued accumulation of "greenhouse gases" within the earth's atmosphere is creating a warming of the atmosphere, or "greenhouse effect." Such warming could cause severe coastal flooding and unpredictable climate shifts, threatening the viability of the earth's most significant urban and agricultural centers. In Vermont, significant warming could cause irreparable harm to the State's largest industry, tourism. Reduced snowfall and a die-off of sugar maples could spell disaster for ski areas, syrup producers, and our fall foliage season.

² Union of Concerned Scientists. *Energy and National Security*. December, 1990.

³ Union of Concerned Scientists. *The Global Warming Debate: Answer to Controversial Questions*. March 1990.

⁴ Kinsley, Michael J., *Economic Renewal Program: An Introduction*. (7). Rocky Mountain Institute. 1989.

Further, fossil fuel combustion is also directly linked to the acidification of rivers, lakes and soil, and human health hazards resulting from declining air quality. For reasons highlighted above, and because fossil fuels are an exhaustible natural resource, we must begin now to drastically reduce the magnitude of fossil fuel consumption in our society.

Nuclear

Over one hundred commercial nuclear reactors across the country supply about 20% of our nation's electric power. The Vermont Yankee Nuclear Power Plant in Vernon provides about 35% or one third of the current electrical power in Vermont. However, it is only licensed to operate until 2012⁵ and its future beyond that is un- certain.

The generation of electricity via nuclear fission is one of the more controversial energy issues in the U.S. Some view nuclear power as a clean and renewable, choice, while others regard it a threat to the public health, safety and welfare. Although recent polling shows that most Vermonter's hold the latter view, it is gaining traction at the national (and international) level as an alternative to fossil fuels.

While there were no plants ordered in the U.S. between 1979 and 2005, there are currently several sites under consideration, nationwide, for new or expanded plants Chief among opponents' concerns is the issue of spent fuel. Nuclear generated electricity produces various long-lived radio nucleotide wastes which are highly toxic and require extraordinary precautions for safe storage. Existing technology does not guarantee safe disposal. Further, the industry has not yet resolved safety issues regarding fuel storage and the decommissioning of commercial nuclear power plants. These problems are in evidence at The Vermont Yankee Nuclear Power Plant in Vernon, as stated on its own web site:

“U.S. nuclear plants were designed under the assumption that the federal government would remove the used fuel in a timely manner throughout operation. The government however, has not yet begun removing the fuel. Not unexpectedly, a growing number of plants – including Vermont Yankee- have fuel pools that are nearing their storage capacity. In order to continue operating, these plants need to supplement their fuel pools.”

Yankee has requested, and received, approval from the Vermont Legislature to construct a dry cask fuel storage facility scheduled to be in place in 2008. The Facility will need the Legislature's help once again if it is to continue operating into the future. The plant, scheduled to be decommissioned in 2012, has applied to the Nuclear Regulatory Commission for a 20 year license extension, and will likely receive a decision this year. However, in accordance with Vermont Act 160 (2006), the plant may not operate after its current termination date unless the State's General Assembly finds that its continued operation will “promote the general welfare.”

Hydro-power

Currently, Vermont gets about half of its energy from hydro-power (about 10% from small, in-state sources; or about 50 private and utility owned sites) and the remainder from Hydro-Quebec and New York Power Authority⁶. The Hydro Quebec contract is scheduled to expire in 2015.

⁵ Vermont. Department of Public Service. ElectricPlan. 2005.

⁶ Vermont. Department of Public Service. Biennial Report. July, 2000- June, 2004.

It is estimated that Vermont has at least 174,000 KW of undeveloped hydroelectric potential. This represents about 22% of current use. Most of the sites constituting this additional capacity are classified a “mini-hydro” (under 1000 kW) developable at existing, but unused, dam sites.

Hydroelectric development will require a balancing of priorities. While the benefits of generating electricity from local, renewable resources are evident, they are not without associate costs. The power output captured from a given stream must be moderated by environmental considerations. A minimum stream flow, adequate to support aquatic life forms, must be maintained and impoundments must be designed with water quality and land use/recreation considerations in mind

Hydropower potential lies not only within naturally flowing streams and rivers, but to some extent in potable water systems, as well. In fact, the City of Barre has recently contracted with a consultant to conduct a feasibility study for the development of “small scale, low impact hydroelectric systems to provide a source of local, renewable power that would reduce the cost of electricity for the City” within its water system. The first phases of this study have identified three sites (the Nolan Street PRV Regulation Vault, the Dix Reservoir and the Orange Dam) as having “no technical barriers” and being “worthy of more intensive study”. The City is continuing to pursue these possibilities.

Wood Biomass

Forest land covers approximately 77% of Vermont's total land area. Total forest inventory amounts to approximately 475.5 million tons of living biomass and an estimated additional 80 million tons of salvageable dead wood. Estimated annual growth of forest biomass is approximately 12 million tons. In 1989 about 2.8 million tons were harvested from Vermont forests. While ownership patterns, ecological and physical constraints, public sentiment and market pressures will likely drive future forest harvests, consideration should be given to expanding the use of biomass to generate electricity and provide direct heat.

Unfortunately, biomass electricity has been decreasing as a percentage of Vermont’s power mix (from 10% in 1980 to about 6% currently), and fewer homes are being heated with wood. However, the generation of electricity from biomass is a phenomenon that continues to hold the potential to benefit both the economy and natural environment of Vermont. Under proper management and replacing fossil fuel combustion, the generation of electricity from biomass could reduce green- house emissions. Importantly, this would also stimulate local economies.

According to the Northeast Foresters Association, “The biomass market provides an important outlet for low grade wood, a material neither suitable nor economical to process as lumber or paper. Revenues from the sales of biomass chips in 2005 in Vermont totaled nearly 5 million dollars.” The organization also estimates that annual cord- wood sales (about 270,000 cords) net landowners about \$1.4 million in stumpage. These sales are good for the economy as estimates show that approximately 80% of each dollar spent on wood remains in the State while only 20% of each dollar spent on nonrenewable energy sources remains in the State⁷.

Intensive biomass extraction does carry ecological risks such as air pollution and depletion of soil nutrients. Before the expansion of biomass electricity occurs, careful analysis of the long term impact of large scale and sustained harvest should take place.

⁷ Vermont. Department of Public Service. [ComprehensiveEnergyPlan](#).

Currently, less than one-third of Vermont homeowners use fuel wood as a heat source. Increased use of fuel wood for heating would stimulate local economies and, if harvest and burning is executed in an environmentally sound manner, would decrease the environmental impacts of existing patterns of energy consumption. New technology is expanding the potential for implementing high-efficiency wood burning in buildings as a primary heat source. While wood burning does contribute a large proportion of atmospheric particulate pollution - pollution directly associated with respiratory damage - new wood burning technology and stricter EPA emissions standards are resulting in increased efficiency and reduced particulate emission.

Vermont also has two large scale wood-fired generators (Ryegate and Burlington) which produce about 244 GWh, or 4% to 6% of Vermont's electrical energy, one of which is capable of using natural gas as an alternative fuel. Between them, they use nearly one million tons of wood chips annually. Vermont also leads the nation in small-scale applications of biomass energy. The State of Vermont operates wood chip heating systems at the State Capitol complex and the Waterbury office complex. Such systems have also been installed in at least twenty-six educational settings, including U-32 High School and the Green Acres Housing project in Barre⁸.

Vegetable Biofuels

Biofuels are renewable, agriculturally derived liquid fuels that can be used to run vehicles and heat buildings. They include biodiesel, ethanol, and even straight vegetable oils. A variety of plants with high oil or cellulose content can be employed to produce these products. Some, including corn, sunflower, canola, soy and hemp, could be grown and processed in Vermont. Doing so could help keep money circulating in the community, creating jobs and sustaining local agriculture, while helping to avoid the external costs associated with fossil fuels. However, it may also take farmland out of food production.

Biodiesel, in particular, appears to be catching on in Vermont (and elsewhere), as it can be used in many existing vehicles and furnaces with minimal equipment modification. Furthermore, it is blended with petroleum fuels. As of January 2007, bio-diesel fuel was available at about two dozen locations throughout Vermont.

Methane Production

The decaying organic materials of landfills, manure pits, and waste water treatment systems produce significant amounts of methane; a greenhouse gas 20 times more potent than carbon dioxide and a potential energy source. It has been estimated that methane from U.S. landfills alone accounts for as much as 2% of global greenhouse gas build-up. Capture technologies have experienced tremendous growth in recent years rendering methane a valuable energy source.

Nationally, 415 Landfill Gas to Energy (LFTGE) projects are in operation, according to the EPA. However, Vermont currently has only two such systems, and a cow manure methane generating system, on line. A third landfill system proposed for the Moretown Landfill, has received CVRPC's tentative endorsement. This project would use captured methane to produce electricity in two generator sets with a combined capacity of 3.2 MW and would connect to GMP's nearby 35 KV line.

⁸ Vermont. Department of Public Service. Utility Facts.

In the past several years, the Department of Public Service and the Department of Agriculture received a \$695,000 Federal appropriation to promote the use of methane recovery technology on Vermont dairy farms.

Wind-power

Essentially a form of solar power created by pressure and temperature differences across our planet, wind-power is one of the oldest and most environmentally benign sources of energy. In recent years it has experienced resurgence in its application, which is certain to continue. In fact, it is the fastest growing energy source in the world and a major contributor to the power portfolios of several European nations. Wind turbines are among the most economical of contemporary renewable energy technologies, and have become cost competitive with most conventional electricity sources (especially when indirect, avoided costs are factored in).

Although Vermont has potential for wind power, it is estimated that only 10 to 15% of Vermont's electrical power could be generated by wind because of its intermittent nature. Viable sites for wind turbines exist primarily between 2,500 and 3,500 feet in elevation. Some such locations, particularly those without existing development, may be aesthetically or ecologically sensitive.

The modern industrial wind turbine is not an insignificant piece of machinery. Mounted on towers ranging from 150 to 260 feet tall, with blades that can extend an additional 150 feet, they can be imposing structures. Consequently, wind generation proposals in Vermont have faced some opposition on aesthetic grounds. Other concerns raised have included noise, habitat issues, collateral bird and bat kill, and “ice throws” from the blades. Still, it is important to note that a recent poll conducted by the Vermont Public Service Board revealed that a majority of Vermont survey respondents say they would support the technology, even if turbines were visible from their homes.



Wind farm, Searsburg, Southern Vermont.
Photo courtesy of Dan Emery.

Currently, Vermont produces only 6 MW of power (enough for about 2000 homes) by way of commercial wind power at an 11 turbine “farm” in Searsburg. However, over a dozen proposals which could supply as much as 500 MW have been approved or proposed throughout the State. While none of these sites are in the Central Vermont Region, this does not suggest that we do not possess viable sites.

Finally, it should be noted that advances in small scale wind turbine technology figure to make them an increasingly viable option for private individuals or groups of individuals. State law restricts the regulation through zoning of turbines with blades less than 20-feet in diameter. Furthermore, any small scale turbine that returns energy to the power grid is exempt from local bylaws and is instead reviewed by the Public Service Board under Act 248.

Solar-power

Solar energy has tremendous potential for providing clean, reliable and safe energy, even in Vermont's climate. The application of both active (systems which collect, store and distribute solar energy within a building) and passive (systems which utilize a building's structure to trap sunlight and store it as heat) solar technologies have demonstrated their cost effectiveness in Vermont.

Solar-tempered buildings are buildings that have their long axis oriented within 30 degrees of true south and have an unobstructed net south facing window area equal to at least 7% of the total floor area. Solar-tempering coupled with proper insulating can offset heat costs in a building by 40%. Although solar-tempering at initial construction generally requires no additional investment, experts suggest that a majority of new buildings in Vermont do not incorporate such design principles.

Contemporary solar technologies have proven their value in Vermont, particularly in rural areas. As the technologies improve and costs decrease, solar thermal collectors and photovoltaics (technologies which can convert sunlight to electricity) will become more competitive in the marketplace even in less remote areas. As the power source of solar technologies is inexhaustible, and solar energy neither contributes pollutants to the atmosphere nor to our reliance on foreign energy suppliers, strategies should be developed to encourage its use.

Natural Gas

At present, there are no natural gas transmission lines in Central Vermont. However, natural gas use in Vermont is increasing at about 4-5% a year. Natural gas is the least carbon intensive of all the fossil fuels and therefore releases relatively small amounts of carbon dioxide upon combustion. Moreover, the combustion of natural gas produces no SO₂ and low NOX. Both are acid rain precursors. Natural gas could be most appropriately applied in residential and commercial water heating, cooking and space heating, in various industrial processes, and in a small amount of electrical generation. Enabling the use of natural gas in Central Vermont will mean increasing and extending load capacity and is encouraged, where technically feasible and economically and environmentally appropriate, in the transition to clean fuels.

Demand Side Management

In 1990 the Public Service Board required the state's regulated utilities to carry out Least Cost Integrated Planning and implement Demand Side Management programs. In Central Vermont those utilities are investor owned municipal and cooperative electric utilities. Least Cost Integrated Planning requires that each utility ".meet the needs of its customers at the lowest total long term cost and.do so by giving equal consideration to all generation, transmission and energy efficiency options." Demand Side Management programs promote the conservation of energy as an energy source available for future demand. Through their Demand Side Management programs, the Region's utilities will likely provide various incentives including financing and partial payment of certain efficiency improvements, energy audits and design services.

As the creation of excess generating capacity can be used to meet future electrical needs for Vermont, conservation must continue to be viewed as a source of electricity. Conservation is our least expensive and most environmentally benign source of electricity.

SUMMARY OF TRENDS

Despite the compelling need to change both the pattern and magnitude of energy consumption, the Vermont Department of Public Service predicts that energy consumption in Vermont will increase and that fossil fuel consumption will continue to grow as a proportion of total energy consumption. It is projected that the bulk of the increase in energy consumption will be for space and water heating and for transportation.

Fossil fuels must be replaced by renewable energy resources. As long as present patterns of energy consumption are continued, prices will rise, the nation's trade deficit will increase, pollution will continue and the potential for severe atmospheric changes will grow. Sustained economic health and avoidance of continued environmental degradation will require a dramatic shift to renewable energy resources and improved energy efficiency. This shift will require not only strong market pressure, but also creative policy initiatives.

Besides the predicted increase in energy consumption, Vermont must plan ahead for expected energy source loss, as Vermont Yankee's license expires in 2012 and our contract with Hydro-Quebec ends in 2015. It is important that Vermont, and especially Central Vermont, begins to look for energy options before these events occur.

Because the external costs (i.e. the hidden social and environmental costs) of energy are not reflected in the current market, renewable technologies are forced to compete at a disadvantage. In effect, energy consumption is subsidized by the public (i.e. health insurance costs and environmental degradation). These circumstances must be altered in order to facilitate the emergence of a renewable energy economy.

IMPLICATIONS FOR LOCAL/REGIONAL PLANNING

Planning ordinances

Through the planning process, Vermont's municipalities are able to influence patterns of land development, guide capital investments, and impact the use of natural resources. A planning effort sensitive to energy issues will promote settlement patterns that minimize transportation requirements, encourage land use that conserves energy, and develop a policy which encourages the efficient use of energy resources.

The Vermont Planning and Development Act (V.S.A. 24, Chapter 117) enables Vermont's municipalities to adopt regulatory bylaws for implementing their town plan. Zoning bylaws and subdivision regulations are the most commonly used bylaws in Central Vermont. Each affords the opportunity to promote energy efficient development at the local level.

Zoning bylaws control the type and density of development. Encouraging high density and diverse uses in and around existing built-up areas will lead to more compact settlement patterns, thereby minimizing travel requirements. At the same time, zoning bylaws must be flexible enough to recognize and allow for the emergence of technological advancements which encourage decreased energy consumption, such as increased use of solar and wind-power and telecommunications technology.

Through setback and height requirements, zoning also controls the size and relative location of new structures. Chapter 117 permits communities to exempt moderately sized wind and solar energy devices from these restrictions. A zoning bylaw may allow for the consideration of solar access (exposure to sun)

in reviewing projects at the local level.

Local zoning bylaws may also permit the creation of planned unit or planned residential developments (PUD/PRD). These are a grouping of mixed use or residential structures, pre-planned and developed on a single parcel of land. The setback, frontage and density requirements of the zoning district may be varied, in consultation with the town planning commission, to allow creative and energy efficient design (i.e. east-west orientation of roads to encourage southern exposure of structures, solar access protection, use of land forms or vegetation for windbreaks, and attached structures).

Subdivision regulations govern the creation of new building lots, as well as the provision of access and other services and facilities to those lots. Subdivision regulations, like the PUD/PRD, involve the town planning commission in the design process. As with the PUD/PRD, the planning commission should use the opportunity to ensure that the conservation of energy is considered in subdivision development. Except through the Act 250 process, there is no regulation of energy efficiency in new construction in the Central Vermont Region (about 1/3 of new residential and 3/4 of new non-residential construction go through Act 250.) Act 250 requires that "best available technology" for energy efficiency and recovery be used in construction.

In its review of development proposals, Act 250 applies a life cycle cost test to determine the "appropriate level" of energy efficiency. The "appropriate level" requires the developer to invest in energy efficiency up to the economic breakeven point for a particular structure, occupant and usage pattern. This standard allows for flexibility in design without sacrificing the energy efficiency of specific measures.

Transportation

According to the Vermont Comprehensive Energy Plan, the transportation sector accounts for over 45% of total energy demand and approximately two-thirds of all fossil fuels used in Vermont. As discussed in previous pages this situation imposes a tremendous economic and ecological detriment. Environmental degradation resulting from heavy petroleum use is well documented, as is the fact that the lion's share of money spent on fuel and automobiles leaves the state, thus undermining the local economy.

The rural character and decentralized settlement patterns of Central Vermont, the very qualities which render Central Vermont an extraordinary living environment, create difficult circumstances in which to minimize the consumption of traditional fuels in the transportation sector. Nevertheless, there are strategies which can be employed at the local, Regional and state levels which will bear influence within this context.

Because any gains in energy efficiency will be at least partially offset by increases in population, it is important that the Region and member municipalities plan for and promote alternative and public transportation options. Improved access to, and increased use of, alternative and public transportation options such as rail, bus, van-pooling, ride-sharing and bicycling, will not only decrease energy consumption, but will also reduce the infrastructure expenditures that are associated with the "car culture."

Another strategy by which the demand for transportation can be reduced is through encouraging settlement patterns which require less physical travel. The concentration of employment opportunities, housing and social services, the expansion of telecommunications potential, and the increased use of local resources may help achieve this objective.

Other important strategies, for reducing energy demand in the transportation sector include: promoting research and development of alternative fuels, incentives for the retirement of less efficient vehicles, and promoting increased efficiency standards for new automobiles. In the future, bio fuels are likely to be important sources of energy in the transportation sector, a phenomenon which could have a beneficial impact upon Vermont's economy.

For our part, CVRPC participates in and promotes the Way to Go! Commuter Challenge, an annual one week promotional event designed to encourage alternatives to the solo commute. We also work with our municipalities in identifying and implementing projects for VTrans' Safe Routes to School Program whereby pedestrian infrastructure improvements are promoted and funded.

Buildings and Structures

According to the Vermont Comprehensive Energy Plan, approximately 30% of the total amount of energy consumed in Vermont is used for residential purposes. The Plan shows that growth in energy demand in the residential sector will be driven by increases in population and housing, and a corresponding increase in demand for space and water heating. This demand, when considered with the energy demand associated with the space and water heating requirements of commercial and industrial buildings, represents tremendous potential energy savings.

Investments in energy efficiency improvements in new and existing buildings and appropriate site design in new development will result in the realization of this savings, and will demonstrate a significant impact on total energy demand. Ultimately, such investments will reduce the percent of income residents spend on energy, per capita energy consumption and environmental degradation.

Although investments in energy efficient technology often require a significant commitment of resources, initial expenditure generally more than pays for itself over the life-time of the technology. In almost all cases, it is cheaper for the homeowner to invest in energy efficient designs, materials, and weatherization projects than pay inflated operating expenses over the life of the mortgage. Nevertheless, current building practices, both new construction and renovation, do not include substantial investment in energy efficiency and conservation measures. Such investment, coupled with the increased use of renewables such as biomass, solar and wind-power, will stimulate local economies and will afford a measure of environmental protection.

Creative financing and investment schemes (both private and public) might provide builders and homeowners the incentive necessary to capitalize on energy efficiency and conservation technologies. Because increasing the energy efficiency of buildings is most effectively accomplished during initial construction or major renovation, local review procedures are a useful mechanism in promoting energy conservation.

Often rental occupants lack the incentive and/or financing necessary to reduce energy consumption for space heating. In many instances rental occupants are paying their energy costs directly, or their rents are adjusted to cover these expenses. Thus, the owners of the apartment buildings also have little incentive to retrofit their buildings for energy conservation. In fact, disincentives such as the ability of a landlord to deduct fuel costs as operating expense on federal tax returns and the possibility of increased municipal tax assessments if retrofit improvements are made may encourage the status quo in buildings that are energy gluttons.

Energy Programs and Resources

A variety of organizations and programs exist to provide assistance to citizens and local government in the realm of energy conservation and development. A partial list of Vermont based resources follows:

- The Alliance for Climate Action/10% Challenge – Community energy organizing and programs. www.10percentchallenge.org
- Apollo Alliance Vermont – Coalition of labor, business and community groups dedication to energy independence. www.apolloalliance.org/state
- Biomass Energy Resource Center – Consults on biomass and cogeneration projects. 802-223-7779
- Efficiency Vermont – Financial and technical assistance for energy savings. EnergySmart home energy analysis. www.encyvermont.org
- Renewable Energy Vermont – Trade association for renewable energy dealers. www.REVermont.org
- School Energy Management Program – Provides free energy assessments for schools. www.vtvs.org
- Sustainable Energy Resource Group - Consults with communities on energy planning/programs. www.SERG-info.org
- Vermont Biodiesel Project – Collaboration designed to help accelerate emergence of industry in Vermont. www.vtbiodeiselproject.org
- Vermont Green Building Network – Promotes green building in Vermont. www.vgbn.org
- Vermont Energy Education Program. – Provides in school energy curriculum. www.veep.org
- Vermont Energy Investment Corp – Promotes energy efficiency and renewable technologies. www.veic.org
- Vermont Energy Star Homes – Technical assistance to build energy efficient homes. www.vtenergystarhomes.com
- Vermont Peak Oil Network – Network of groups and individuals working on energy sustainability. www.vtpeakoil.net
- Vermont Rideshare - Promotes commuter carpooling. www.VermontRideShare.org
- Vermont Energy and Climate Action Network- Collaborative of organizations involved in energy and climate issues.

- Vermont Fuel Dealers Association – Trade association of fuel marketers. www.vermontfuel.com
- Vermont Biofuel Partnership – Resource for producers, wholesalers, retailers and users of bio-heat and biodiesel fuel. www.vtbio.org

ENERGY GOALS AND POLICIES

Goal 1:

The efficiency with which energy is used should be increased. Policies:

1. Before the construction, expansion or upgrading of new or existing public generation or transmission utilities and/or facilities, utilities shall demonstrate having employed reasonable measures to improve efficiency and promote energy conservation for consumers, as stated in Docket 5270.
2. Municipalities are encouraged to form a Town Energy or Climate Action Committee.
3. Municipalities and/or groups of municipalities are encouraged to consider the establishment of local, publically owned and operated bulk storage fuel facilities, as authorized under 24 VSA, Chapter 107, Section 3701, as a means of containing fuel costs for Central Vermont residents.
4. The conservation of energy should be integrated into local planning efforts. CVRPC will continue to provide technical assistance to municipalities and will encourage that municipal bylaws promote energy conservation and the development of renewable energy resources.
5. CVRPC will promote the conservation of energy, use of renewable energy resources and energy efficient design through participation in the Act 250 process.
6. Municipalities are encouraged to establish local energy codes requiring or promoting energy efficient design and renewable fuel use in new construction while promoting technological innovation and efficiency; thus increasing energy conservation in non-Act 250 projects.
7. CVRPC recommends that practical energy conservation measures be taken during the citing, design, construction or renovation, and maintenance of buildings. Building designs which incorporate the use of solar energy and other renewable energy technologies are encouraged.
8. Individuals are encouraged to consider the impact of their lifestyle choices on energy use and conservation. Factors such as the size and location of one's home can have a profound impact on energy use. Smaller homes, closer to jobs, resources and infrastructure use less energy and have less of an environmental impact than larger more remote ones.

9. Towns and school districts should include energy efficiency and conservation in their plans and daily operations.
10. Supports efforts to create a fund to provide low interest capital to home owners, landlords, institutions, and businesses to assist in making cost effective investments in energy efficiency and renewable energy.
11. CVRPC encourages Regional lending institutions to adopt energy efficiency standards for new construction as well as for existing housing coming on the market.
12. CVRPC supports efforts to expand the Home Weatherization Program for low income Vermonters.
13. Municipalities are encouraged to review the Town Energy and Climate Guide (Vermont Energy and Climate Action Network, 2006) for ideas and suggestions on energy conservation and development.

Goal 2:

The use of non-renewable energy resources should be decreased, while the use of renewable energy resources, particularly those of local origin, should be increased.

Policies:

1. The Commission supports implementation of Least Cost Integrated Planning (as called for by Vermont's Twenty Year Electric Plan, PSB Final Order in Docket 5270, and the Vermont Comprehensive Energy Plan) and recommends that thorough consideration of the benefits of utilizing local energy resources be applied to all future LCIP analyses.
2. CVRPC will promote the development and use of renewable sources of energy, particularly those of local origin, through public education efforts and participation in Act 250 and Section 248 hearings.
3. CVRPC encourages State and federal funding targeting research and development of renewable energy and energy efficiency technologies.
4. CVRPC encourages efforts to determine the potential for sustainable large scale biomass/biofuel production in Vermont and Central Vermont in particular, and encourages concurrent efforts to evaluate the ecological impacts associated with long term, large scale biomass production and harvest.
5. Large scale wood using projects, such as power generators and wood pellet production, proposed for Central Vermont and adjacent Regions are encouraged. However, they must demonstrate that the project's demand for wood will not ultimately lend to Regional supply shortages. In the event that a wood energy plant is proposed within the Region, that proposal shall include a forest management plan which ensures that timber harvesting will occur in a sustainable manner.

6. CVRPC supports State funding to the Vermont Use Value Appraisal ("Current Use") Program.
7. The Agency of Natural Resources Comprehensive Rivers Program identifies river segments that should be targeted for protection. This program should be expanded to address the potential for hydro-power.
8. Expansions and efficiency improvements to existing hydro-power generators and transmission facilities are encouraged where such investments clearly benefit the residents of the Region.
9. CVRPC supports Barre City's efforts to identify and develop hydroelectric power sites for local needs and will assist in implementing the same as appropriate and possible.
10. Hydro-power development should not diminish water quality, habitat, or recreational opportunities. "Run-of-the-river" projects are preferred to projects which require impoundments with low or minimum flows. Fish ladders should be installed where appropriate and necessary.
11. CVRPC encourages the recovery of methane for use as an energy source from solid-waste, agriculture sites, or waste water treatment facilities wherever economically feasible. New landfills should be designed to enable the capture of gases during decomposition.
12. CVRPC encourages the development of biofuels to reduce gasoline consumption, which can be produced from local renewable resources. Local regulations should encourage alternative fuel businesses in local land use regulations.
13. CVRPC supports the use of biofuels and/or electric power in government and public transit vehicles.
14. In evaluating any commercial wind power generation proposals, CVRPC will consider the economic, social, and environmental benefits (i.e. costs avoided) in addition to potential environmental/aesthetic impacts. CVRPC will help to identify those locations where wind turbines might be feasible and appropriate, as well as those sites where turbines would be considered inappropriate. For the life of this Plan, the Washington County portion of the Worcester Range and Camel's Hump are considered inappropriate locations for industrial turbines due to their inaccessibility, wilderness values, and aesthetic features. Conversely, the presence/proximity of existing development should be considered as a positive in evaluating potential wind sites.
15. CVRPC encourages the development of small scale wind, solar, or hydro power by individuals, or groups of individuals, to offset fossil fuel consumption and promote self-sufficiency. For this reason, it encourages municipalities to make provisions for the same in local plans and bylaws.

Goal 3:

Emissions of greenhouse gases, acid rain precursors, and other environmental toxins must be decreased.

Policies:

1. In considering public benefits of any construction, expansion or upgrading of existing public generation or transmission utilities and/or facilities, consideration shall be given to the external costs (economic, social and ecological) of any decision, and those external costs shall be reflected in the decision as the Public Service Board has recently recommended.
2. CVRPC supports proposals to deliver natural gas to the Region where such proposals are technically feasible, and economically, socially, and ecologically appropriate in the gradual transition to clean resources.
3. CVRPC encourages that the development of existing transportation systems incorporate design and location principles so as to:
 - complement the recommendations set forth in the Land Use and Transportation Elements of this Plan and in the Region's municipal plans;
 - encourage the concentration of social and civic services, employment and housing opportunities, and retail centers within or adjacent to planned or existing community centers; and
 - support the expansion of telecommuting, teleconferencing, and public transit.
4. CVRPC urges that land use planning and implementation programs promote planning for efficient non-motorized alternatives to the automobile by:
 - Provision of cycling and walking paths between or within population centers;
 - Creation and maintenance of sidewalks or other pedestrian modes in areas of concentrated settlement; and
 - Development of commuter parking lots, particularly on limited access highways.Accordingly, the Commission will continue our participation in the Safe Routes to School and Way to Go programs and will support the above measures whenever possible.
5. CVRPC encourages the maintenance, continued operation and expansion of the Region's railways.
6. CVRPC encourages the establishment of incentives for developers and municipalities to accommodate public transit in their plans.
7. The Commission encourages employers to support the use of public transit by their employees.

Excerpts from the 2016 Central Vermont Regional Plan

FUTURE LAND USE

State Statute directs Regional Plans to include a “land use element, which shall consist of a map and statement of present and prospective land uses.” (24 V.S.A. § 4348). The Map identifies general Planning Areas that will be used to guide land use and development in the Central Vermont Region.

The Planning Areas are not meant to be detailed representations of current conditions, nor are they intended to be distinct areas of segregated future land uses. The Planning Areas focus on the overall pattern and form of development across the rural to urban spectrum rather than on specific densities or uses, which are more properly de- fined at the local level.

Future Land Use Planning Areas

Regional Centers are the Region’s core downtowns, plus their surrounding mixed- use neighborhoods, which accommodate high density commercial, institutional, industrial and residential uses. Regional Centers in Central Vermont include portions of the City of Montpelier, Barre City and Waterbury Village, each of which contains a state- designated Downtown district and infrastructure that includes urban road networks, sidewalks, public spaces and public water and wastewater systems. These areas provide regional services and employment and are areas where efforts to reduce travel demand through ridesharing, transit and multi-modal transit options are critical.

Regional centers are not only the dominant attractors of work and personal business trips in the Region, they also attract significant numbers of trips from the outside the Region. The Region’s greatest concentrations of office space, retail space, banking services and other generators of personal business are located in downtown Montpelier and Barre City. Relative to the other downtown areas, Montpelier and Waterbury have more office space (such as the State Office Complex). Barre City also has State Offices at the McFarland House and City Place, and has more manufacturing and industrial land uses.

There is one State-designated Growth Center within the Region and its boundaries are adjacent to the City of Montpelier’s Designated Downtown. Growth Center designation in Vermont recognizes municipalities that demonstrate a capacity to plan and invest in vital, walkable, mixed-use centers and must include and support a designated Downtown, Village Center or New Town Center. A Growth Center has clearly defined boundaries that can accommodate a majority of commercial, residential, and industrial growth anticipated by the municipality or municipalities over a 20-year period.

Town Centers are less densely populated settlements and smaller than regional centers, but similarly accommodate many of the same residential, civic, commercial and light industrial uses. Typically referred to as “Villages,” factors in determining the presence and boundaries of a Town Center include: a state-designated village center, local road network and availability of public utility infrastructure, relatively dense development and smaller lot sizes (1 unit per acre or higher), a mix of land uses, and a distinct separation from surrounding rural areas.

The Region ’ s largest Town Centers that provide water and wastewater infrastructure and also serve as sub-regional retail and employment centers include Waitsfield Village/Irasville and Northfield Village. Additional Town Centers that provide water and/ or wastewater infrastructure, or both, include Warren Village, Cabot Village, Colbyville (Waterbury), Marshfield Village, Northfield Falls, Plainfield Village, Williamstown Village, Washington Village, East Barre, Worcester Village and Waterbury Center.

East Montpelier Village, East Calais, Maple Corner, Woodbury Village, Moretown Village, Duxbury Village, Middlesex Village and Roxbury Village round out the twenty existing Town Centers recognized in this Plan.

A subcategory of Town Centers in this Plan is New Town Centers. “New Town Center,” as defined by the State, means the area planned for or developing as a community’s central business district, composed of compact, pedestrian-friendly, multistory, and mixed use development that is characteristic of a traditional downtown, supported by planned or existing urban infrastructure, including curbed streets and sidewalks and on-street parking, storm water treatment, sanitary sewers, and public water supply. ” Though there are no state-designated New Town Centers within the Region, the Town of Berlin desires to encourage the expansion of the historic town area in the vicinity of Berlin Four Corners to adjacent areas to serve as a location of a mix of small-scale commercial, high density residential and civic uses in a traditional village setting.

Policies [Related to Planning Areas]:

1. In order to maintain the existing settlement patterns, higher density residential, commercial, and industrial development should be located in Regional Centers and Town Centers.
2. Small-scale shopping centers, designed to complement the historic character and support the vibrancy of community centers, are most appropriate in Town Centers or Hamlets (see Rural Areas). Community and Regional Shopping Centers, however, are less appropriate in Town Centers or Rural Areas and should be located in Regional Centers as a first priority and Mixed-Use Commercial areas as a second priority.
3. Encourage infill, redevelopment, adaptive reuse of existing buildings and reuse of “brownfield” sites in Regional and Town Centers. Encourage the revitalization and reuse of viable historic structures whenever possible.

Strategy 3a: Work with municipalities to align local capital planning and public investment strategies with infill and redevelopment goals.

Strategy 3b: Support implementation of infill and redevelopment activities identified in the 2015 Vermont Downtown Action Team reports (Barre City, Northfield, Waterbury, Waitsfield and Warren).

4. Municipalities should consider use of innovative tools such as “form- based” land use regulations. These types of regulations focus less on specific uses and more on the physical form of the built environment, utilize dimensional standards to shape how buildings relate to each other, to streets, and to other public spaces.

Strategy 4a: Explore opportunities to conduct a regional workshop focused on Implementing Form-based Land Use Regulations.

5. Continue to work with municipalities and VTrans to reduce conflicts between traffic needs and human-scale functions of Regional and Town Centers through practices like traffic-calming measures, pedestrian-safety improvements and gateway treatments. Priority for the use of public funding for the maintenance or improvement of infrastructure shall be for those that support concentrated development in Regional and Town Centers.

Strategy 5a: Support identification of corridors for new roads or road segments in and around Regional and Town Centers as part of a local planning process, and support for construction of those roads and utility infrastructure to help drive growth in a way that supports compact center development.



Figure 1: Connected Streets. The diagrams above illustrate two different traffic patterns created by new development (shown in light gray). The diagram on the left highlights several smart growth principles by integrating the new roads with the existing road and providing for a mixture of uses at a density consistent with compact development (Smart Growth Vermont).

6. Priority for the use of public funding for the development of affordable housing and assisted living facilities shall be for those located within Regional and Town Centers in order to increase access to services.
7. The placement of municipal and other government buildings should be in established Regional and Town Centers in order to maintain and enhance the vitality of these areas.
8. Encourage the development of public places and cultural events within Regional and Town Centers.
9. Support the creation of off-road bike and pedestrian paths that connect Regional and Town centers with residential areas and neighboring centers in a hub and spoke pattern.
10. Identify key areas with flood storage capacity and encourage floodplain protection measures such as land acquisition or restrictive land use regulation in areas up- stream of Regional and Town Centers.

[Land Use] Goal 3:

To encourage the historic settlement pattern of compact village and urban centers separated by rural countryside while promoting development in economically viable locations.

Policies:

1. New development should be planned so as to respect the historic settlement pattern of compact villages, neighborhoods, and urban centers separated by rural countryside. Accordingly, CVRPC:
 - Endorses the concept of creating new villages to accommodate new growth.

- Endorses “smart growth” planning principles as embodied in this Plan and supports the designation of “Growth Centers ” – be they identified in local plans or through the State process codified in Act 183. We would also support efforts to simplify the State Growth Center designation process so as to make its benefits more accessible to a broader cross-section of communities.
- Will assist municipalities in conducting the studies required to prepare applications to the Downtown Board for State Growth Center Designation.
- Supports the appropriate expansion of existing settlements, particularly where excess infrastructural capacity exists. (The existing settlements within Central Vermont are those areas currently served by public water and/or sewer systems or characterized by higher densities of development. Existing settlements include, but are not limited to, the downtowns and cities, the villages and the myriad concentrated residential neighborhoods.)
- Encourages PUD, "cluster" or "open space" design for new residential and commercial developments, particularly those outside of existing settlements or planned growth areas and discourages the development of commercial and residential sprawl.
- Encourages "in fill" development and adaptive reuse of buildings in existing settlements.
- Supports and encourages revitalization efforts directed towards strengthening and improving villages and cities.
- Recognizes that some environmental and development "trade-offs" will be necessary to achieve desired growth patterns. To this end, CVRPC believes that mandatory mitigation of any agricultural soils or habitat losses, even at a reduced ratio, within State designated Growth Centers is counterproductive to enticing development and recreating traditional land use patterns.
- Believes that land use restrictions should not unduly hinder self-employment for residents. Such opportunities may help reinforce traditional land use patterns through economic incentives.
- Believes that land use plans should not unnecessarily infringe upon the land-owner's ability to enjoy and profit from the investment and use of private property.
- Encourages municipalities and individual landowners to identify sites which may qualify for assessment and/or cleanup under the EPA’s Brownfields Grant Program.
- Encourages municipalities to undertake build-out modeling in order to better evaluate development capability and future growth potential under current zoning, as well as to examine the potential impact of employing alternative density strategies.

2. To seek ways to overcome the economic disincentives to development within existing built-up areas, including the high costs associated with the construction of, or hookup to, necessary infrastructure. CVRPC:

- Recognizes Tax Increment Financing (TIF) as a valuable tool for supporting infrastructure development in planned growth areas and supports amending current State law to make it more practical for communities to implement.
- Over the next five years CVRPC will continue to work with municipalities to prepare a regional land use map that incorporates the developing land use plans of its municipalities and displays locally and/or State designated growth centers. In conjunction with this effort,

CVRPC will provide technical assistance in growth center planning, upon request, and in conjunction with State guidelines.

- will recognize growth center designations and employ them to attempt to achieve desired growth patterns through its influence over public expenditures and development review decisions, where applicable.
- Will provide assistance to municipalities seeking such funding for brownfield assessment and remediation, upon request.

TRANSPORTATION GOALS AND POLICES

Goal 1:

To achieve a Regional transportation planning process that is comprehensive, multi-modal, and public, and is integrated with Regional and local land use planning as outlined in the Central Vermont Regional Plan.

Policies:

7. Support the planning and design of the Region's transportation system to encourage development and re-development in existing villages, cities, and designated growth centers.
8. Encourage the full integration of transportation and land use planning at the Regional and local level.

Goal 3:

Enable the transportation system to operate at its highest efficiency by managing travel demand and encouraging shifts to under-utilized and more efficient travel modes.

Policies:

2. Support the education of the Region's employers in the development of Travel Demand Management Programs (e.g. tele-commuting, flextime, compressed work weeks, ride-share matching, preferential parking, commuter fringe benefit, etc.). Facilitate the establishment of Transportation Management Associations to organize and administer TDM programs.
3. Educate the public on modal choices available.
4. Encourage preservation of existing rights-of-way for future transportation purposes. In particular, work to retain abandoned railroad rights-of-way for transportation uses such as trails and bike paths.
5. Consider new or expanded public transit services that serve intra-Regional and intercity travel needs.
7. Establish aggressive, but realistic, targets for modal shares along Regional transportation arteries.
9. Market public transit to new users.

Goal 4:

To integrate modes of travel in order to allow for their most effective use and ultimately reduce dependence on single occupant vehicles.

Policies:

1. Encourage the development of park and ride lots for car and van pools, and encourage employers to provide incentives to car and van pool users.
5. Encourage the availability of multiple options for the movement of people and goods.

Goal 5:

To establish a transportation system that minimizes consumption of resources and maximizes the protection of the environment.

Policies:

3. Support efforts to minimize energy consumption, especially nonrenewable energy resources, and explore expanded use of alternative fuels.
5. Promote public awareness of the environmental impacts resulting from use of the Region's transportation system.
6. Promote a transportation system that encourages concentrated development, allows greater access to residences, employment, and services, and facilitates carpooling, bus and rail service, and non-motorized travel.

Goal 9:

To promote a Regional public transportation system.

Policies:

1. Provide for basic mobility for transit-dependent persons.
2. Support public transit that provides access to employment.
3. Encourage congestion mitigation to preserve air quality and the sustainability of the highway network. Support public transit that advances economic development with emphasis directed toward tourist areas.

UTILITIES, FACILITIES, & SERVICES GOALS AND POLICIES

ELECTRIC POWER GOAL: Improvement, and expansion of electric power generation methods and infrastructure so as to provide adequate service, conserve energy, maximize benefits of public investment, minimize impacts on aesthetic, ecological and recreational resources, and protect public health.

Policies:

1. CVRPC supports the concepts of "demand side management" and "least cost integrated planning" as mechanisms to reduce electrical power consumption, and its attendant costs (both financial and environmental) through conservation and energy efficiency
2. CVRPC encourages the development and use of renewable energy sources to meet the region's electrical power needs, while minimizing impacts on aesthetic, ecological and recreational resources (see Energy element of this Plan).
3. CVRPC encourages diversity in the region's future power supply so as to establish flexibility and avoid reliance on any single source.
6. The Commission encourages adherence to environmentally and ecologically sound utility line maintenance practices.

Plans and designs for utility infrastructure and corridors should incorporate climate projections and be reviewed for long-term reliability, safety and economic, social and aesthetic impacts.

9. Resource areas, as identified by this Plan, shall be avoided wherever possible, in the location or routing of new substation or transmission facilities.
10. Substation facilities should be located in industrial areas or in those planned for industrial use whenever practical. In any case, such facilities should be sited as un-obtrusively as possible.