CHITTENDEN COUNTY RPC
Communities Planning Together

CCRPC Long Range Planning Energy Sub -Committee

AGENDA

*=attached to agenda in the meeting packet

DATE: **Tuesday, May 16, 2017**

TIME: **5:00 p.m. to 7:00 pm**

PLACE: **CCRPC Office, 110 West Canal Street, Suite 202, Winooski, VT.**

WIFI INFO: **Network = CCRPC-Guest; Password = ccrpc$guest**

1. **Welcome + Introductions (5 minutes)**

2. **Review April 18, 2017 Minutes* (5 Minutes)**

3. **ECOS Plan Draft Energy Element Revisions* (60 Minutes)**
   Staff will present the energy enhancements made to the ECOS Plan. This draft will be sent to the Department of Public Service at the end of May. This is a contractual deadline, and a true draft. We will continue to revise this work through the Fall. Please focus your review on the yellow highlighted sections of the ECOS Pan, the maps, and the County Data Guide. The questions related to the Plan are:
   a. Have we best described the natural gas issue in the 90X2050 LEAP scenario? (See page 3 and page 10)
   c. Do you agree with the statement saying that Strategy 3.2.2 does not include energy generation development? (see page 12)
   d. Should the ECOS Plan language use the term "shall" to prohibit renewable energy generation development on known? Is the sentence about mitigation necessary? Does encouraging solar generation on previously developed sites not consider our rural areas? (See page 15)
   e. If we use the word "shall" to prohibit generation on known constraint areas then do we have a contradiction with using the State's definition of known constraints? (See page 19)
   f. Does the Plan language on substantial regional impact for energy development seem appropriate? (See page 24)
   Please note that the Long Range Planning Committee will also be reviewing this language at their meeting on 5/11/2017. Staff will summarize their comments and changes at the meeting.

4. **Solar/Wind Targets* (10 Minutes)**
   The Committee will discuss the difference between the regional renewable energy generation targets available from the Department of Public Service. Please see the attached table
5. **Act 174 Package to Municipalities (10 minutes)**
   On April 30th each municipality in the region received a draft municipal data energy guide. Staff will provide an overview of the guide. The guide for each town can be downloaded from http://www.ccrpcvt.org/our-work/our-plans/regional-energy-plan/

6. **Next Steps** *(5 minutes)*
   Next Meeting June 20th
   Do we need a meeting?

CHITTENDEN COUNTY RPC
Communities Planning Together

CCRPC Long Range Planning Energy Sub -Committee

Draft Minutes

DATE: **Tuesday, April 18, 2017**

TIME: **5:00 p.m. to 7:00 pm**

PLACE: **CCRPC Office, 110 West Canal Street, Suite 202, Winooski, VT.**

Attendance

Keith Epstein, South Burlington
Jeff Forward, Richmond
Catherine McMains, Chair, Jericho
Sharon Murray, Bolton
Karen Purinton, Colchester
Irene Wrenner, Essex
Kate Desrochers, VEIC
Dave Roberts, VEIC
Melanie Needle, CCRPC
Emily Nosse-Leirer, CCRPC
Regina Mahony, CCRPC
Marshall Distel, CCRPC
Eleni Churchill, CCRPC
Jason Charest, CCRPC

1. **Welcome + Introductions**
   The meeting commenced at 5:06.

2. **Review March 21, 2017 Minutes***
   Sharon Murray made a motion and Karen Purinton seconded the motion to accept the minutes. The motion passed unanimously.

3. **LEAP Presentation**
   Dave Roberts and Kate Desrochers from VEIC attended the meeting to present the latest LEAP results. The LEAP model has been run again to reflect refined inputs that better reflect actual travel patterns in Chittenden County and the CCRPC Board approved population forecast for 2050.

   As a reminder, the Long-range Energy Alternative Planning (LEAP) model is an accounting framework that shows one possible scenario for how Chittenden County can meet its 90% renewable by 2050 and associated goals. It is a "self-consistent story line of how an energy system might evolve over time."

   In CCRPC's 90x2050 LEAP scenario, the state goal of getting 90% of energy from renewable sources by 2050 is met, but CCRPC only gets 78% of its energy from renewable sources. Chittenden County's LEAP model doesn't change any of the fuel use at the airport or for railroads to renewable sources. However, Jeff Forward noted that there is the possibility of biofuels being used for aviation in the future. VEIS Staff said that the assumptions in the 90X2050 scenario are consistent with past state-

led runs of the LEAP model for aviation and rail. However, the Chittenden County 90X205 scenario factors in Chittenden County's VMT being lower than the state average (and assumes that all electricity being used to power EVs is coming from renewable sources). Catherine McMains noted that she is pessimistic about lowering VMT and increasing fuel efficiency for cars because of current low gas costs and potential changes in federal policy.

VEIC has also run the LEAP model to see what would happen if Vermont Gas continues business as usual. In that case, the region would only obtain 50% of its energy from renewable sources by 2050 which does not meet the state 90X2050 goal. The Committee discusses that gas infrastructure remains a challenge for Chittenden County's 90x2050 goals. Melanie indicated that this analysis of Vermont Gas in the 90X2050 scenario is an important data point to inform the policy conversation about the implications of the renewable energy goal.

Jeff Forward raised concerns about whether renewable natural gas could ever be produced in significant enough quantities to replace the natural gas used by VG's customers. He shared that a past study showed that there is the possibility for about 30MW of production from methane from cattle and landfills, but this is only about 3% of the state's load and 30MW is an ambitious estimate. Additionally, Jeff commented that compressed natural gas (CNG) could be an energy source in the transportation sector. CNG in the transportation sector does have a positive impact on air quality and efficiency when compared to gasoline. However, it does not advance the renewable energy goal. Staff indicated that this concept of will be added to the narrative portion of the ECOS Plan.

Melanie asked why there is a significant difference between wood chips, wood pellets and cord wood as energy sources in the 90x2050 scenario. Jeff Forward said this is because wood chips are a more desirable energy source for residential uses and many school use wood chips for heating sources.

Going forward, VEIC's next steps will be to adjust the LEAP parameters to reflect the results of CCRPC's Metropolitan Transportation (MTP) modeling. This work will likely be started in the Fall.

4. <u>ECOS Plan Draft Energy Element Revisions</u>

Draft revisions to the ECOS plan were distributed before the meeting (available in the packet). The edits are intended to make the ECOS plan compatible with the energy planning standards mandated by Act 174. Emily explained that there is not much that needs to be changed in terms of the text in the plan. The committee focused its discussion of the changes on two issues: whether to say that renewable energy generation "shall" not take place in areas with known constraints and how to address the fact that natural gas infrastructure poses such a challenge to meeting the 90x2050 goal.

On the issue of "shall," committee members were divided. Some felt that very strong language would be beneficial, because it would allow CCRPC greater influence in the PSB process. By saying that development "shall" not occur in areas with known constraints, CCRPC may be able to help towns steer wind and solar development to desirable places. But other committee members felt

that “shall” was too strong a prohibition, especially given that known constraints are originally defined by the state as areas signaling “likely, though not absolute, unsuitability for development based on statewide or local regulations or designated critical resources.” The Committee also identified that list of the town local constraints could be problematic for town plan/regional plan consistency in the future if the town plans change. Staff indicated that they could add a statement saying the if there is an issue with consistency then the ECOS Plan should defer to the currently adopted municipal policies in effect. Staff will examine these issues further and draft new text. The committee will make a recommendation to the board on language at their May 16 meeting.

As discussed above, the LEAP scenario model shows a significant reduction in natural gas as an example of how we may reach the 90x2050 goal in Chittenden County. The committee agreed that this pathway will be challenging because of our current reliance on natural gas for heating in significant portions of Chittenden County’s areas planned for growth, a recent expansion of the service area (which will likely cause a switch of propane and oil customers to natural gas), and the relatively low cost of the fuel source. CCRPC has no control over the natural gas industry, or the Public Service Board’s decisions to grant Certificates of Public Good for new natural gas infrastructure. VEIC has modeled Chittenden County’s ability to reach the 90x2050 goal if natural gas usage continues at current rates. In that scenario, Chittenden County will only be able to obtain 50% of our energy from renewable sources. With this in mind, the committee suggested that the plan be clear about the challenges we are facing to meet the 90X2050 goal. However, the committee also agreed that none of the actions that CCRPC has control over would change because of this natural gas issue. CCRPC will work to the best of our ability to meet the 90x2050 goal via the strategies we have influence on. For example, CCRPC can support education on thermal efficiency improvements in buildings and equipment upgrades and electrification of the heating sector through heat pumps, electrification of the transportation sector, promoting alternative modes of transportation, and working with our communities to plan for development in our areas planned for growth. These actions may help us reach the target collectively, even if a total shift away from natural gas does not occur. Karen Purinton, added that the mapping identifies where we don’t want energy generation to be and we have yet to have a discussion on the preferred sites for energy generation. She is concerned that the prime energy areas are inviting energy development in greenfields and the State seems to be trying to encourage energy generation on previously developed areas. The committee asked staff to develop more descriptive language to describe the challenge and CCRPC’s limited control over gas infrastructure. This language will be discussed at the next committee meeting.

5. <u>Act 174 Package to Municipalities</u>

As part of our Act 174 training contract with Northwest RPC and the Department of Public Service (DPS) we are required to send municipalities maps showing prime and base energy generation areas for both wind and solar, as well as data analysis results that estimates

- Current energy use across transportation, heating, and electric sectors
- 2025, 2035, and 2050 targets for thermal and electric efficiency improvements, and the use of renewable energy for all sectors
- The amount of thermal-sector conservation, efficiency, and conversion to alternative heating fuels needed to achieve the targets
- The amount of electric-sector conservation and efficiency needed to achieve the targets.

Staff reviewed Northwest RPCs sample of these data and explained that staff will be using this as a template for what we provide to our municipalities. Also, staff is working with a Department of Public Service-provided methodology to break out the LEAP data for each municipality in our region and will review this with the Committee. The Committee asked whether DMV registration data is available to better estimate transportation energy use. VEIC cautioned that the DMV data does not align directly with town boundaries because it is based on zip codes and it does not identify the vehicle duty type. Staff said they would consider getting these data. Jeff Forward asked for the energy template to be shared with him so he can pass it along to his energy committee.

6. <u>Solar and Wind Targets</u>

At the March meeting, the Committee agreed to continue planning for wind in our region and asked staff to assign wind targets to municipalities. Staff identified that this creates an equity issue across the region because not all towns have wind potential according the data we are using.

Melanie discussed the fact that there are equity concerns about having local targets for wind, given that at least four municipalities do not have any industrial-scale wind potential at all. The committee agreed that having targets at the regional levels is enough, and CCRPC staff can discuss the wind maps and wind generation potential individually with each affected municipality to ensure that they are comfortable with what's being represented.

Additionally, the Committee discussed the differing renewable energy targets regions can choose to work with. To date, CCRPC has been working with the solar and wind targets that consider energy resource areas as well as potential. Melanie has estimated that these targets are reasonable given the energy resource area the County has according to the energy maps. Melanie indicated that the State has another set of targets that regions can use which are technology natural and are significantly higher. These targets are only based on population and are much higher than the targets that consider energy resource area. Melanie told the Committee that the DPS guidance she received is that regions should choose the methodology that is most appropriate for their region. Melanie reported that she **has** been using the targets that consider energy resource in coming up with our local targets. The committee discussed the fact that this is a confusing state policy. Charlie expressed concerns that in the future this could mean that our plan may not be energy compliant if this is the case. The committee asked Melanie to check the numbers again because there was some confusion on them.

Everyone was concerned about the fact that all regions are using different methodologies to come up with their goals. What will the consequences be when we look at whether all regions are meeting their goals if everyone is using a method chosen because it's beneficial to them?

Charlie warned that CCRPC should be prepared to be challenged by the PSB on our assertion that we are unable to meet the higher generation targets based only on population. We need to use the smaller targets because our limited resource generation area cannot provide all the energy required by our large population.

7. <u>Next Steps</u>

The next meeting will be on May 16. The meeting adjourned at 7:15.

2.2.3 CLIMATE CHANGE

Climate Change Goal: Reduce greenhouse gas emissions contributing to climate change and adapt to become more resilient to a changing climate.

Key Issues/Trends/Insights

[Data for this section drawn from *Chittenden County Climate Change Trends and Impacts.* Another reference that is currently under development is the *Chittenden County Regional Climate Action Plan.*]

- Temperature and precipitation records for the latter half of the 20th century show that Chittenden County's climate has changed: winters became warmer and summers became hotter. Lake Champlain freezes over later and less frequently and the growing season lasts longer. Annual precipitation has increased, but more falls as rain instead of snow.
- Scientists overwhelmingly agree that changes in climate worldwide are a result of human activities, mainly the burning of fossil fuels. Climate model forecasts for the Northeast US predict that during this century temperatures will continue to increase, as will extreme heat days and heat waves. More precipitation and extreme precipitation events are expected to increase, although short-term summer droughts may also become more frequent.
- These current and predicted changes in climate have broad implications for our region.
    - Environmental Quality - Summer air quality will deteriorate, as warmer temperatures promote the formation of smog. More intense rainfall will increase storm water runoff and the potential for flooding. Increased rain and runoff will wash pollutants into our waterways, and warmer waters and nutrients will encourage growth of bacteria and blue-green algae.
    - Natural Communities - Cold-water aquatic species, such as brook trout, will struggle to survive in warmer waters and in competition with better-adapted species. Our forests will change: maple, beech and birch trees will gradually be replaced by oak and hickory trees that are better adapted to warmer, wetter conditions. Invasive species, like the hemlock wooly adelgid, will further affect change in forest composition.
    - Public Health - Warmer temperatures allow the spread of insect-borne diseases, such as West Nile virus and Lyme disease. Air pollution and higher pollen production will increase problems for people with allergies, chronic respiratory diseases and asthma. High temperatures and heat waves will increase the risk of heat stress for the elderly, very young children and other vulnerable populations.
    - Built Environment – Flooding will put homes, businesses and public infrastructure in flood-prone areas at risk. Flooding may impact the safety of the water supply; droughts will also threaten water supplies. Although warmer winters will require less fuel for heating, hotter summers will increase electricity demands for cooling.
    - Local Economy - Warmer temperatures will hurt maple sugar production. Farmers can expect declining yields for cool-weather crops and depressed milk production from heat-stressed dairy cows. Less-colorful foliage seasons will hurt fall tourism. Less predictable snow will jeopardize winter sports and recreation and compromise Vermont's image as a winter sports destination.
- We can respond to climate change in two different ways.
    - **Climate mitigation** strategies will reduce the region's contribution of greenhouse gases. Although Chittenden County may be a small part of global greenhouse gas emissions, it is important that Chittenden County do its part to help solve the problem. More specifically Chittenden County should do what we can to help the State reach the goals of reducing 50% of greenhouse gas emissions from the 1990 baseline by 2028 and 75% of greenhouse gas emissions from the 1990 baseline by 2050.

- **Climate adaptation** strategies help individuals, businesses and communities be able to withstand and bounce back from – or even take advantage of – the impacts of climate change.

Key Indicators

- **Greenhouse Gas Emissions** – Vermont's goal is to reduce 50% of greenhouse gas emissions from the 1990 baseline by 2028 and 75% of greenhouse gas emissions from the 1990 baseline by 2050. In 2010, Chittenden County emitted approximately 1,193,000 metric tons of carbon dioxide equivalents (MTCO2e).

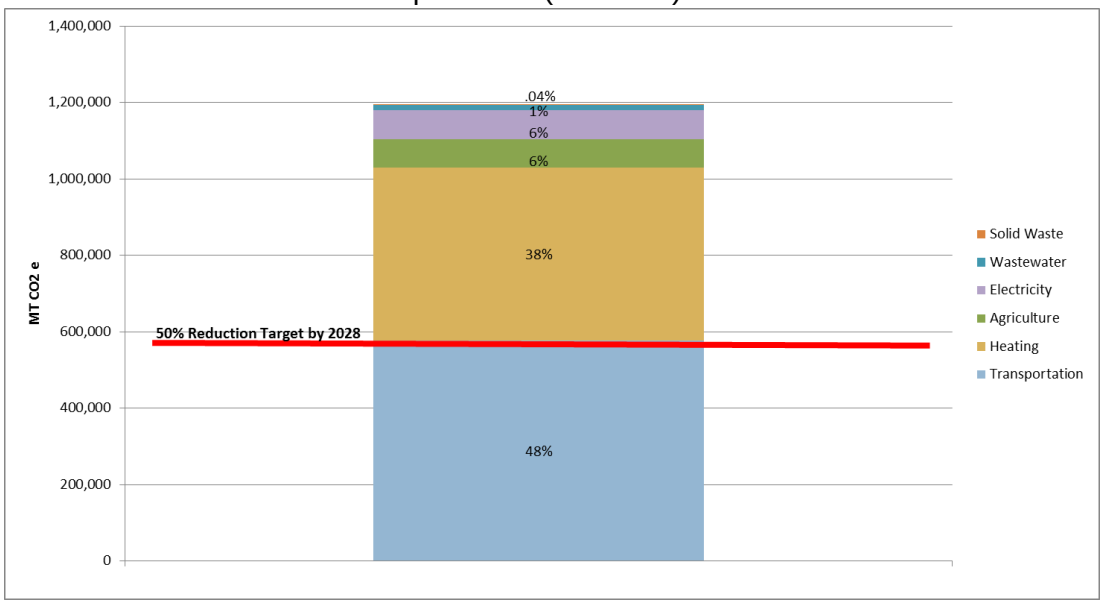


FIGURE 15 - CHITTENDEN COUNTY GREENHOUSE GAS EMISSIONS BY CATEGORY

THIS TABLE WILL ALSO INCLUDE THE 75% REDUCTION TARGET LINE?

Source: Draft 2010 Chittenden County Greenhouse Gas Emissions Inventory Data rounded to three significant figures.

2.5.5 ENERGY

Energy Goal: Transform Chittenden County's energy system to a cleaner more efficient and renewable system that benefits health, economic development, and the local/global climate by working towards the State's Comprehensive Energy Plan goals .
The goals of the 2016 Vermont Comprehensive Energy Plan are to:

- Weatherize 80,000 Vermont homes by 2025
  - Intermediate goal of 60,000 homes by 2017
- Get 90% of Vermont's energy from renewable sources by 2050
  - Intermediate goal of 25% of energy from renewable sources by 2025, including 10% of transportation energy
  - Intermediate goal of 40% of energy from renewable sources by 2035
- Reduce total Vermont energy consumption by more than 1/3 by 2050
  - Intermediate goal of 15% reduction by 2025

Key Issues/Trends/Insights

[Data for this section drawn from: Energy Planning Methodology, Energy Analysis Report and Climate Change Trends and Impacts Report].
Transition to Renewable Energy

- In analyzing Chittenden County's ability to meet the 90% renewal energy by 2050 goal we used the Long-Range Energy Alternatives (LEAP) model to get a sense of the fuel shifts. It is important to note that Chittenden County's LEAP scenario reflects 85% renewable by 2050. The remaining 5% to achieve 90% renewability is accounted for by a reduction in vehicles miles traveled. See the methodology report for more information on this tool. Regardless of the challenges the model shows for meeting this ambitious goal, Chittenden County is well suited to move in the right direction.
- The LEAP model shows a significant reduction in natural gas as one scenario to achieve the ambitious 90% renewal energy by 2050 goal in Chittenden County. This scenario will be challenging because of our current reliance on natural gas for heating in significant portions of Chittenden County, recent and planned service area expansions, and the relative low cost of the fuel source. Therefore, fulfillment of this scenario requires the involvement of private-sector energy developers, regional and state-wide utilities, and individual energy users; as well as energy policy at the state and national levels, such as fossil fuel taxes or efficiency standards for vehicles. Further, thinking of this holistically, a conversion of propane and oil fuel sources to natural gas is a win from a greenhouse gas emissions perspective so increasing natural gas may be a logical step for the immediate future. Even so, CCRPC will work to the best of our ability to meet the 90x2050 goal via the actions discussed in Strategy 3.2.2.
- A transition to renewable energy will require electrifying the heating and transportation sectors and by generating more electricity from renewable sources to power these sectors. Chittenden County, perhaps more so than other regions of the State, can achieve great benefits from its density and infill development goals. For example, this land use pattern can lay the ground work for a switch to electric vehicles, carpooling, transit ridership, walking/biking and a smaller energy footprint per household. Switching home heating away from fossil fuels is a key strategy for meeting our energy goals. Cold climate heat pumps, which use heat from the outside air to heat a home, and biomass systems, such as pellet stoves, are home heating alternatives that do not use fossil fuels.

- Chittenden County citizens, businesses, and industries spent about $617 million on energy in 2009 (25% of Vermont's total). Much of this money leaves the County and state immediately. This outflow of energy dollars acts as a drain on the local economy (data need to be updated).
- The price of energy is forecasted to continue increasing in the future, which will result in an additional burden on the County's residents and businesses, unless energy consumption can be reduced (needs to be updated—is this still true?).
- Fossil fuel combustion increases the atmospheric concentration of carbon dioxide and other greenhouse gases, which are the causes of global climate change. Climate change will have profound impacts on the environment, public health, infrastructure, and economy of Chittenden County.
- Vermont, and the County, relies heavily on fuel oil for building heat and on gasoline and diesel for transportation. Gasoline consumption has increased as more residents drive to and from work, run errands, and consume for goods.
- Chittenden County is home to an international airport and a National Guard base, therefore the transportation fuel consumption in the County not only includes gasoline, diesel, and compressed natural gas, but also aviation gasoline and jet fuel. It is important to note the aviation sector was removed from CCRPC's LEAP analysis and modeling of future energy use as this is a sector the region will have little influence over.

Electric Efficiency

- Chittenden County has a long history of electrical and natural gas energy efficiency programs, dating back to 1990, which have provided significant energy savings and economic benefits to the state and County. These programs along with improvements in federal standards have led to a reduction in per household and per employee energy consumption of electricity and natural gas. Reduction in energy consumption directly results in a reduction in energy bills. See Indicators for data on efficiency gains.
- Electric efficiency programs have always worked to reduce electrical demand especially during peak periods but the development of the Smart Grid will provide a powerful tool to address this issue. Smart Grid coupled with education, behavior change, and load control technologies can help reduce peak demand and defer substation upgrades which can result in substantial cost saving.
- While efficiency programs targeting electricity and natural gas have been largely successful, there is an urgent need to fund and develop similar programs for non-regulated thermal fuels and for the transporation sector. The more widespread adoption of electric vehicles should reduce the total energy consumption in the County, due to better efficiency (an EV gets the equivalent of 100 miles/gallon). To prepare for widespread adoption of electric vehicles, charging infrastructure should be developed. In addition, policies and pricing structures to encourage off peak charging need to be considered to mitigate grid constraints.
- It is necessary to shift the heating sector away from fossil fuel use. Promoting cold climate heat pumps, in addition to wood, biogas and geothermal heating systems, will be key to meeting this goal.
  There is a need for focused study to determine solutions for vermiculite removal as it relates to weatherization, in particular low income weatherization. Vermiculite was used as an insulator for decades (1960-1990) and was mined with asbestos. Thus any home with vermiculite is assumed to be contaminated.

Renewable Energy Generation

- Chittenden County has many non-fossil fuel based, renewable energy production sites owned by utilities, private parties, and municipalities. Reliable, cost effective, and environmentally

sustainable energy availability is critical to support the economy and natural resources of Chittenden County.

- Vermont's rural nature offers challenges for the transmission and distribution of energy. It is important to maintain and develop an energy production, transmission, and distribution infrastructure in Chittenden County that is efficient, reliable, cost-effective, and environmentally responsible. Current energy distribution projects include: Extension of 3-phase power in south Hinesburg along VT116 by Green Mountain Power; Extension of natural gas service in Hinesburg up Richmond Road by VT Gas; and Extension of natural gas service to St. George village center. In addition, Burlington's plan to recapture "waste heat" from the McNeil power plant and distribute it to the Old North End of Burlington and heat greenhouses at the Intervale is a thermal energy project with a more efficient distribution of a previously wasted energy source. See the CEDS Project list in Section 4.2.6 for cost estimates, funding sources and proposed timelines for these projects. (This will be updated to reflect the completion of some projects)
- The cost of electricity is related to the distance it travels. When electricity is transmitted over long distances, a significant amount of electricity is lost. Improving line efficiency or encouraging distributed generation (such as locally sited small scale renewable projects) reduces losses and could result in more cost-effective rates.
- Every three years, Vermont Systems Planning Committee (VSPC) launches a process to update and identify constrained areas and reliability needs for the electric transmission grid. Chittenden County has areas identified as needing improvement. An adequate distribution grid that is able to accommodate the planned increase in electricity use and reduces energy loss is necessary to meet the goals of this section.
- CCRPC has undergone a process to look at areas suitable for solar and wind energy generation to determine our ability to meet the 90% renewable by 2050 goal. See the key indicators below for an analysis of existing generation and future generation possibilities.
- In 2016, the Vermont Legislature enacted Act 174 to improve energy planning and give town and regional plans greater weight or "substantial deference" in Public Service Board proceedings. The effects of "substantial deference" have yet to be tested in PSB proceedings.

Key Indicators [Data for this section drawn from Act 174 County Energy Data Guide

- **Current energy Consumption in the Transportation Sector, and 2025, 2035 and 2050 targets for consumption.** The graph below shows current energy consumption across all sectors and sets targets for future consumption in line with the goals of a greater than 1/3 reduction by 2050.

- **Current energy Consumption in the Heating Sector, and 2025, 2035 and 2050 targets for consumption.** The graph below shows current energy consumption across all sectors and sets targets for future consumption in line with the goals of a greater than 1/3 reduction by 2050.

- **Number of homes energy audits completed.** Vermont has a goal of using more than 1/3 less energy by 2050. Home energy audits develop strategies for residents to use less energy. ### homes have been audited since 2010. (Source: VT Gas, Efficiency Vermont and Burlington Electric department)

- **Current energy Consumption in the Electric Sector, and 2025, 2035 and 2050 targets for consumption.** The graph below shows current energy consumption across all sectors and sets targets for future consumption in line with the goals of a greater than 1/3 reduction by 2050.

- **Number of home weatherization projects completed.** Vermont has a goal of weatherizing 25% of homes by 2020. ### homes, or ##%, have been weatherized since 2010, leading a ##% decrease in energy use. (Source: ???)

- **Percent of natural gas saved in 2010 from building weatherization and heating equipment upgrades.**

Natural Gas (McF)	2010
Consumed	6,363,760
Savings	82,151
% Efficiency Savings	1%

Source: VT GAS, 2010

FIGURE 49 - 2010 NATURAL GAS EFFICIENCY SAVINGS AS A PERCENTAGE OF THE NATURAL GAS CONSUMED

- **Electricity Efficiency Savings as a percent of total electricity consumed.**

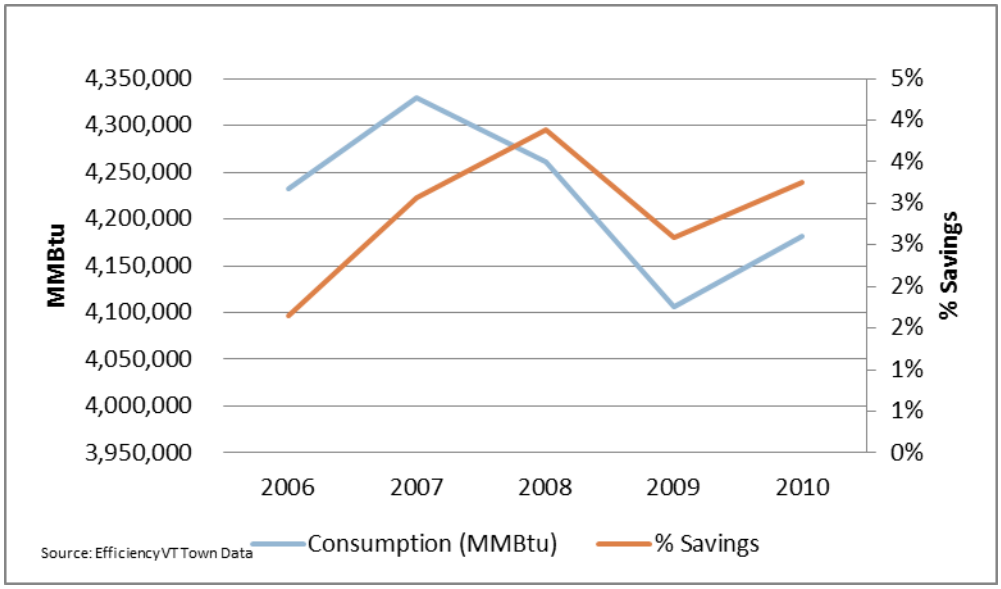


FIGURE 50 - ELECTRICITY EFFICIENCY SAVINGS AS A PERCENT OF TOTAL ELECTRICITY CONSUMED

- **Sources of total regional energy generation.** The graph below shows how energy in the region is currently produced.

Targets for total regional energy generation sources in 2025, 2035 and 2050. The graph below shows the targets for the region to meet the goal of obtaining 90% of all energy in all sectors from renewable sources by 2050.

- **Current Solar Generation in Chittenden County and Solar Generation Goals Needed to Meet 2050 Goals.** The table below shows solar generation and solar generation targets for the region and each municipality. See Map ## for more details.

- **Current Wind Generation in Chittenden County and Wind Generation Goals Needed to Meet 2050 Goals.** The table below shows solar generation and solar generation targets for the region and each municipality. See Map ## for more details.

Concerns

While we celebrate the positive aspects of our community, we also owe it to our children and their children to look to the future and work on addressing problems and aspire to do better. There are many questions that we heard from our community reflecting real concerns for the future. These questions include:

- Will my children and their children:
  - Be able to find good paying jobs here?
  - Be able to afford a home here?
  - Enjoy a cleaner Lake Champlain, streams, and rivers?
  - Breathe cleaner air?
  - See and use our rural landscape, farms, and mountains?
  - Have more transportation options?
  - Have to drive twice as far and long to get to their jobs?
  - Want to live in this community?
  - Be part of an equitable community?
  - Retain our small town neighborliness?
  - Be healthier?
  - Be better educated and successful?

These questions reflect many of the concerns that were identified in developing Chapter 2. These concerns require improvement to realize our goals. These are not prioritized, but rather follow the outline of the topics as discussed in Chapter 2 above. We should all understand that these concerns are based on today's assessment of trends rooted in our current values and will change over time; either as we improve in certain areas or as our values shift over the generations. The current concerns are grouped by broad goal area below.

Natural Systems

1. Habitat Loss - We are experiencing a loss of habitat quality and quantity due to roads, invasive species and development patterns.
2. Unstable Rivers - River corridors are unstable due to alterations and encroachments leaving us susceptible to costly damage from flood events
3. Non-point Source Water Pollution - While we have addressed point sources of pollution, non-point sources are still contributing pollutants to our water bodies.
4. Climate Change - Climate change is a global phenomenon with local impacts. Our region's climate is already changing; warmer, wetter conditions are expected to increase this century. These changes will adversely impact forest and aquatic communities, water quantity and quality, public health, agriculture, winter sports businesses, and buildings and infrastructure in flood and fluvial erosion hazard areas.
5. Greenhouse Gas (GHG) Emissions - Chittenden County emits 1,177,000 metric tons of greenhouse gases (measured as carbon dioxide equivalents). Fossil fuel consumption for transportation and heating accounts for almost 88% of our emitted greenhouse gases.
6. Climate Health Impacts - We can expect hotter summers that increase the frequency and severity of heat-stress illness and vector-borne diseases (such as Lyme disease, West Nile virus and Eastern Equine Encephalitis).

Social Community

7. Tobacco Use and Substance abuse - Rates of tobacco use have decreased from 20% in 1999 to 13% in 2008. Despite this significant decrease, exposure to second-hand smoke is high among youth and adults. Rates of substance abuse are increasing; meanwhile access to mental health services is inadequate.
8. Obesity - The prevalence of obesity is uniformly high across economic groups and has increased dramatically over the last 20 years.
9. Emergency Preparedness – Improvements need to be made in the areas of emergency planning, training, and operations centers.
10. K-12 proficiency - Improvements need to be made pre-K-12 to increase proficiency in reading, writing, math and science.
11. Workforce Development – We must support and expand existing programs to address labor pool and training gaps. We must also design a specific approach to assist current workforce education and training partners to assure that the required skill sets and workplace readiness skills are widely available to business.
12. Inclusion – There is a concern that members of underrepresented communities are not well connected and involved with governmental decisions. This includes the concern about their knowledge of the different government processes.
13. Disparities - Disparities in educational results, health, incarceration, and income exist for people of color and low income populations.
14. Aging – There is a general concern that we focus on and address the aging of our community and what that means for us in the future.

Economic Infrastructure

15. Job Opportunities – We need to keep encouraging our existing and new employers to grow so that our children have employment opportunities here and do not have to leave to find work.
16. Manufacturing Diversity - Our manufacturing sector lacks diversity leaving us susceptible to changes.
17. Industrial Sites - There is a lack of industrial sites to accommodate future economic growth.
18. STEM - We have a strong innovation economy, but increasing the labor force skills in science, technology, engineering and technology (STEM) remains a high need.
19. Housing Cost - Decreasing the cost of housing would help in attracting workers to our region.
20. Working Lands Loss- Sustaining our working lands is a challenge because there is greater monetary value in developing land than maintaining it as a farm or productive forest; in addition some local products are undervalued (i.e. milk, saw timber).

Built Environment

21. Sprawl - Over the last 60 years development trends, zoning regulations, and consumer preference have shifted growth away from metropolitan areas around Burlington to more suburban and rural locales resulting in large amounts of land consumed and high infrastructure costs. This trend seems to have reversed since 2005 and we need to stay on this new course.
22. Lack of Rental Housing – An increase of 1,000 rental housing units is needed in the County by 2015 to maintain a conservative vacancy rate of 1.4%. We will not reach that number based on currently approved developments. In addition, a healthier vacancy rate may be much higher to

increase housing choices and lower rents, while maintaining a vibrant economy. This would result in a need much greater than 1,000 rental units by 2015. However, this must be balanced by a viable market – developers will build more units when most of the existing units are occupied.

23. Affordable Homes - An increase of 1,000 homeownership units in the County priced under $300,000 is needed by 2015 to increase housing choices and lower costs. This need could be met through existing permitted developments, however many are not being built due to challenges with condominium financing. For the same reason as mentioned above, the 1,000 units is based on a conservative vacancy rate figure.
24. Maintenance of Existing Housing – There is a need to adequately maintain existing housing stock to preserve it as a viable option for the future.
25. Supportive Housing - There is a need to increase the number of units of permanent supportive housing throughout the County in addition to Burlington. Supportive housing is a combination of housing and services intended as a cost-effective way to help people live more stable, productive lives. Supportive housing is widely believed to work well for those who face the most complex challenges—individuals and families who have very low incomes and/or disabilities, and/or may suffer from substance abuse, addiction or alcoholism, mental illness, HIV/AIDS, or other serious challenges to a successful life.
26. Mode Share - While our rate of driving alone to work increased by 36% between 1980 and 2000 (to 76% of all work trips), in more recent years this trend has shown improvement to 71% in 2010. We've also seen a nearly 60% increase in transit ridership the past decade. Vehicle Miles of Travel (VMT) per person is also on the decline, down 8% between 2000 and 2010. It is imperative that we maintain these positive recent trends in order to reduce congestion, decrease greenhouse gas emissions, and more efficiently utilize all of our transportation resources.
27. Road System & Funding - Roadway condition is rated poor or worse for over half of the arterial highway mileage in Chittenden County. The costs associated with maintaining and improving this infrastructure exceeds our fiscal capacity to fully address it. Nor do we have adequate funds needed to grow transit, walking/biking, and Transportation Demand Management (TDM) programs. Compounding our poor roadway conditions and inadequate investment, transportation funding in general is overly reliant on the state and federal gas taxes which are decreasing in value as inflation lowers purchasing power and revenues decline due to improving vehicle fuel efficiency and fewer VMT. The prospect of less funding in a time of increasing transportation investment need is a worrisome trend and needs to be addressed.
28. Meeting Vermont's State Energy Goals – Vermont has set ambitious goals to reduce total energy consumption across all sectors (heating, electricity and transportation) by 15% by 2025, and by more than 1/3 by 2050 and to obtain 90% of energy from renewable sources by 2050. Meeting these goals will require a large increase in efficiency measures, the electrification of the transportation and heating sectors, and a significant increase in renewable energy production sited in Chittenden County. Additionally, this goal cannot be met if natural gas use continues at its current rate (see discussion in Section 2.5.5). While CCRPC and municipalities are undertaking a planning effort to meet the State energy goals, the goals require the involvement of private-sector energy developers, regional and state-wide utilities, and individual energy users. Finally, energy policy at the state and national levels, such as fossil fuel taxes or

efficiency standards for vehicles, have significant impacts on energy usage and are beyond CCRPC control.

29. Water and Wastewater– In order for municipalities to implement their plans for future growth in their urban or village improved water and wastewater services (both on-site, community systems, and sewer) are often necessary, including financial assistance. Colchester, Essex Junction, Huntington, Hinesburg, Westford, and Williston were among the municipalities raising this concern.
30. Stormwater Investments – Municipalities are committed to making improvements in storm water quality, but are concerned about the costs and how to pay for them.

We are at a time of choice. Do we allow things to keep going the way they are? Do we take steps to achieve the best future possible?

See Chapter 3 for strategies and actions to address these concerns.

3.2.2 STRIVE FOR 80% OF NEW DEVELOPMENT IN AREAS PLANNED FOR GROWTH, WHICH AMOUNTS TO 15% OF OUR LAND AREA.

The areas planned for growth are defined as the Center, Metro, Suburban, Village, and Enterprise Planning Areas (all but Rural) as displayed on the Future Land Use Map. CCRPC is committed to annually monitoring the quantity and location of development to measure our progress on concentrating 80% of new growth in these Planning Areas at a regional scale (not each municipality). This goal mimics the development patterns we've seen in the recent past (see Section 2.5.1 Indicators for more detail). CCRPC will monitor this through annual updates of its housing, employment, and commercial/industrial square footage databases and also by the State of Vermont's e911 locational database. The databases identify when a structure was built, number of dwelling units, employees, and square footage at a specific location. The major source of information for updating these databases will be gathered from CCRPC's member municipalities. It should be noted that "development" as discussed in this strategy does not include energy generation facilities.

Increasing investment in denser, mixed use growth areas will improve economic opportunities, housing options, transportation options and improve community health. Focusing growth in the appropriate planning areas is also a cost-effective approach to increasing the supply of affordable housing and using existing infrastructure efficiently. Finally, this pattern of growth reduces energy consumption for transportation. Homes are in closer proximity to jobs and other services, making trips shorter and making travel by walking, biking, transit and carsharing more feasible.

Actions

1. **Invest in Areas Planned for Growth** -

    a. Establish wastewater, water infrastructure and public transit in areas currently developed and/or planned for growth.
    b. Target reuse, rehabilitation, redevelopment, infill, and brownfield investments to the non-rural Planning Areas.
    c. Retrofit existing buildings to reduce energy use and greenhouse gas emissions.
    d. Improve design quality of high density areas, and allow flexibility for creative solutions.

2. **Municipal Planning and Zoning** - Strengthen and direct development toward areas planned for growth through infill development and adaptive reuse of existing buildings through municipal plan and bylaw revisions and state designation programs.

    a. Municipal Development Review Regulations should be revised to improve the mix of uses, shared parking, support for transit, access to a variety of services (for example restaurants, grocery stores, parks, entertainment) via active transportation, energy efficiency, renewable energy and the affordability of housing. A particular emphasis is needed on providing for affordable rental housing.
        - FUNDED VITAL PROJECT - South Burlington's Pathway to Sustainability –The overall project includes a series of initiatives to support, develop, and create a community that will be a leader in sustainable food production, housing, transportation, energy efficiency, natural resource protection, transit oriented development, residential quality of life and economic growth. Specifically, ECOS

funding is supporting an overhaul of the City's Land Development Regulations, with a special focus on Form Based Codes, to implement the goals of ECOS and the City's Path to Sustainability.
- FUNDED VITAL PROJECT – PlanBTV Form Based Code. Burlington will develop and adopt form based code zoning for their Downtown and Waterfront districts consistent with PlanBTV.
- FUNDED VITAL PROJECT – Shelburne Road, Shelburne Form Based Code. Shelburne will develop and adopt form based code zoning for the Shelburne Road corridor north of the Village.
- FUNDED VITAL PROJECT – Winooski Gateway Development Regulations. Winooski will develop and adopt updated zoning for their gateway districts.

b. Integrate capital planning and budgeting in planning efforts to provide the right mix of infrastructure over time. Official maps can also be a useful tool to drive infrastructure improvements in the areas planned for growth.
c. Health Impact Assessments (HIA) provide a tool to use at the regional, municipal, agency, and organizational level to assure that planning decisions maintain or improve the public health. Access can be improved by co-locating public facilities, in particular, medical and mental health facilities in areas with easy access via active transportation and public transit. Town health officers should be encouraged to participate in community planning efforts.
d. Empower local officials through trainings and education on strategies to achieve the above plan and bylaw amendments, and implementation of them during development review. This could include how to effectively analyze development costs and benefits, and select appropriate multi-modal congestion mitigation measures.

3. **Affordable Housing** – Producing more affordable housing helps meet basic needs, creates jobs and 50-year hard assets. This is a critical part of the infrastructure of the community and the economy.

a. Implement incentives that encourage more housing construction that is lower cost including, but not limited to, affordable and supportive housing. This housing should be integrated within our communities throughout the County to provide a mix of housing for different incomes and access to jobs and services. These actions include:
    i. Chittenden County Regional Planning Commission and its partners should study the current and projected shortage of affordable housing units by type (rental, owner, multi-family, single family).
    ii. Increase density in areas planned for growth considering community character and design.
    iii. Revise infrastructure requirements with a goal of reducing costs for developers.
    iv. Consider fee waivers or other development review process incentives.
    v. Continue to work with the University of Vermont, Champlain College and Burlington College to develop specific plans to increase the percentage of students who reside in dedicated student housing.
    - FUNDED PROJECT – VHFA is working with South Burlington, Williston, and Essex Junction to analyze their local needs and suggest improved bylaws and programs to create more affordable housing and increase housing choice.

b. Maintain or increase local and state resources that fund additional affordable housing, make housing more affordable, and/or maintain existing affordable housing. These actions include:

i. The state should fully fund the Vermont Housing and Conservation Board with 50% of property transfer tax revenues. This funding should be used to increase the stock of permanently affordable housing in Chittenden County.
ii. Review and amend (if necessary) local ordinances impacting the maintenance and use of existing buildings to ensure they're encouraging maintenance and retrofits of existing housing stock without adding undue cost.
iii. Advocate for more Tax Increment Financing (TIF) districts to help fund infrastructure improvements. Encourage the use of municipal housing trust funds to assist in the financing of affordable housing.
iv. Take steps to preserve existing affordable housing (including protecting subsidized housing and ensuring perpetual affordability through shared equity programs) from being converted to market rate housing; and continue to encourage shared equity for new owner homes.

c. Engagement and education efforts should continue and be improved. These actions include:
   i. Increase fair housing education and outreach for landlords, property managers, real estate professionals, and anyone involved in the sale, rental or finance of housing. Work with the Vermont Refugee Resettlement Program, The Association of Africans Living in Vermont, Opportunities Credit Union, and other organizations to develop strategies for new Americans to quickly develop credit history. Create educational materials that encourage landlords to use alternative criteria for new Americans that don't penalize them for a lack of credit or rental history.
   ii. Provide fair housing and land use planning training for land use professionals and municipal officials throughout the County.
   iii. Train municipal officials and staff, the public, and developers to promote better development practices that achieve a higher level of density with quality design.

d. Increase efforts to comply with fair housing requirements. These actions include:
   i. Identify gaps in municipal implementation of State Fair Housing laws and ADA compliance (including but not limited to municipal bylaws should include language that explicitly permits officials to make reasonable accommodations to accommodate the needs of people with disabilities without delay or public input).
   ii. The Vermont legislature should enact legislation that limits security deposits to no more than one month's rent with no more than one-half month's rent and no more than $200 for pet deposits (excluding assistance animals for persons with disabilities). For tenants with rent subsidized through public programs, security deposit amounts should be based on the tenant's share of the rent before the application of any utility allowance. These limits do not apply to service deposits for residential care/assisted living settings.
   iii. Implement the recommendations (as best as possible within current resource capacities) of the 2010 Burlington Analysis of Impediments and the 2012 State Analysis of Impediments. This includes tracking zoning variances, local permit applications, adjusted residential permit application and denials to identify disparities and trends.

e. Increase enforcement and testing capacity of fair housing organizations such as Vermont Legal Aid. Currently, Vermont Legal Aid is only funded to test the protected classes included in federal fair housing law. Seek funding sources that would allow

Vermont Legal Aid to test and enforce state protected classes (Age, marital status, sexual orientation, gender identity, receipt of public assistance).

4. Energy – Transform the Region's energy system to meet the goals of Vermont's energy and greenhouse gas reduction goals.

a. Reduce energy consumption and decrease greenhouse gas emissions, to support the State's goals:
- Reduce greenhouse gas emissions 50% from 1990 levels by 2028,
- Reduce greenhouse gas emissions 75% from 1990 levels by 2050,
- Reduce per capita energy use across all sectors (electricity, transportation and heating) 15% by 2025,
- Reduce per capital energy use across all sectors (electricity, transportation and heating) by more than 1/3 by 2050, and
- Weatherize 25% of all homes by 2020.

i. Continue partnerships with Vermont Gas, Burlington Electric Department, Efficiency Vermont and the State Weatherization Assistance Program to facilitate the weatherization and increased energy efficiency of housing stock and other buildings.
ii. Promote alternatives to fossil fuels for heating by working with partners such as Efficiency Vermont to educate developers and homeowners on the benefits of technology such as cold climate heat pumps, wood heating and geothermal systems, and by supporting alternative forms of heating. Examples of alternative forms of heating include district heating (for example, using waste heat from the McNeil Plant to heat buildings in Burlington) and biogas generation (capturing the methane produced by landfills or farms and using it instead of natural gas).
iii. Work with partners to promote stretch energy codes and assist municipalities wishing to adopt Stretch Energy Codes.
iv. Reduce fossil fuel consumption in the transportation sector, through the Transportation Demand Management and electric vehicle promotion strategies outlined in Part 6c of this section and in the Metropolitan Transportation Plan (MTP) included in this plan.

~~b.~~ Increase Renewable Energy Generation, to support the State's goal of 25% renewable energy by 2025 and 90% renewable energy by 2050.

(i) Renewable energy generation shall not take place in areas with state or local known constraints, unless located on an existing structure or impervious surface. Renewable energy generation on areas with state or local possible constraints may require mitigation, and further investigation may deem the site unsuitable. See the discussion of Maps ## and ## for further details on known and possible constraints, and for a listing of preferred sites.

While it may not be feasible for energy generation facilities to be bound by this plan's goal of 80% of new development in areas planned for growth, it is this Plan's policy to strongly encourage solar generation on previously developed sites wherever possible, as this promotes distributed generation and lessens greenfield development.

i. Use the Vermont Energy Action Network (VEAN) Energy Dashboard to educate residents and municipalities about opportunities to reduce energy use and switch to renewable energy sources.

5. State/Local Permitting Coordination & Improvement

a. Support changes to the local and state permitting process to make the two more coordinated and effective. Participate in the Agency of Commerce and Community Development's (ACCD) process to improve the State's designation programs designed to encourage development in appropriately planned places and discourage development outside of those areas. This program could be improved with regulatory and/or fiscal incentives. These could include expedited permitting processes for projects in areas that are: a) designated for growth; and, b) where a community has a robust plan, regulations and staff capacity; and reduction of redundancies such as delegation of permitting for certain local and state reviews (such as exemption from Act 250). In conjunction with delegation it may be appropriate to develop more stringent standards and thresholds for development review in rural areas.
b. Collaborate with stakeholders to ensure local and state regulations, bylaws and plans encourage transparency, predictability and timely review of sustainable and environmentally sound development applications.
c. Develop a transportation assessment process that supports existing and planned land use densities and patterns in Center, Metro, Suburban, Village, and Enterprise Planning Areas to allow for more congestion and greater mode choice than allowed by current standards. The CCRPC will collaborate with the Vermont Agency of Transportation (VTrans), the Natural Resources Board, and other state and local stakeholders to develop a process that evaluates the transportation impact from a multi-modal perspective rather than just a traffic flow standpoint.
    - Policies and planning studies that are adopted as part of this ECOS Plan and subsequent amendments will guide CCRPC's position in permit proceedings.

6. Metropolitan Transportation Plan Investments

a. Adequately fund the maintenance and preservation of our existing transportation assets including roads, bridges, rail, transit, walking/biking facilities, and transportation demand management (TDM) programs and facilities.
b. New transportation system investment should focus on the highest priority transportation projects as detailed in the ECOS/Metropolitan Transportation Plan (MTP) Project List. In the next five years, these projects will primarily be those that are included in the Transportation Improvement Program (TIP), as may be amended. The TIP projects are considered FUNDED VITAL PROJECTS for the purposes of the Comprehensive Economic Development Strategy (CEDS).
c. Future project investments and specific focal areas for targeted implementation impact include:
    i. For transportation planning studies that have been adopted as part of this ECOS Plan, the specific recommendations for project, policy, and program investments will guide CCRPC investment priorities.
    ii. Expand Intelligent Transportation Systems (ITS) for the roadway network, and traffic and transit operations, to improve safety and reduce congestion;

iii. Expand the Go! Chittenden County Transportation Demand Management (TDM) program (including park and ride facility development) to reduce single occupancy vehicle (SOV) trips
iv. Increase investment in CCTA transit services to increase user accessibility
v. Expand walking and biking infrastructure to support active transportation and to provide interconnection with the region's transit system
vi. Develop a regional network of electric vehicle charging stations to accommodate the growth in low emissions, low energy costs electric vehicles and support the expanded adoption of natural gas vehicles for heavy duty fleets.
vii. Implement the strategies identified in the Chittenden County Active Transportation Plan.

within the sewer service area. Future development and redevelopment in this Planning Area should be publicly sewered, minimize adverse impacts on natural resources, and protect strategic open space.

Enterprise Planning Areas are areas where local zoning authorizes a future concentration of employment uses that attract workers from the County and multi-county region. Development in these Planning Areas should have adequate wastewater capacity and access to transit or be near these services. Typically, this area encompasses major employers or a cluster of single employers and has current or planned transit service.

Village Planning Areas are areas where local zoning authorizes a variety of future residential and nonresidential development at densities and scales in keeping with the character of a Vermont village, generally between 2 and 12 dwelling units per acre if sewered and between 0.2 and 4 units per acre if not sewered. Village Planning Areas are compact areas of mixed-use activities that maintain the character of a Vermont village. This type of Planning Area is intended to serve its local surroundings as a place where people can live, work, shop and recreate.

Rural Planning Areas are areas where regional and town plans promote the preservation of Vermont's traditional working landscape and natural area features. The Rural Planning Area also provides for low density commercial, industrial, and residential development (generally 1 dwelling unit per acre or less) that is compatible with working lands and natural areas so that these places may continue to highlight the rural character and self-sustaining natural area systems. Development in the rural planning areas is typically outside the sewer service area.

Map 3 – Existing Utilities and Facilities

The Utilities and Facilities Map shows the existing sewer service area, the water supply district, solid waste facilities, natural gas service area, and cellular towers.

Map 4 - Future Transportation Improvements

The Future Transportation Improvements Map gives an overview of the projects that fit within the funding constraints identified in the ECOS project list in Section 4.3.6 of the ECOS Plan. These future improvement projects create a multimodal strategy to address the efficient and long term movement of people and goods, while respecting ECOS goals. For a complete overview of proposed transit investments refer to the 2010 CCTA Transit Development Plan.

Map X- Known State Constraints

Map X- Possible State Constraints

Ma 5 and Map 6 – Solar Generation Potential and Wind Generation Potential

Solar Generation Potential

This map combines GIS analysis of solar generation potential with *known* and *possible* constraints. For more information on the methodology used to determine solar generation potential, please visit http://www.vtenergyatlas-info.com/solar/methodology. This map and the corresponding data are intended to be used to inform energy planning efforts by municipalities and regions. They may also be used for conceptual planning or initial site identification by those interested in developing renewable

energy infrastructure. They should not take the place of site-specific investigation for a proposed facility and should not be used as siting maps.

Known constraints signal likely, though not absolute, unsuitability for development based on statewide or local regulations or designated critical resources. *Possible* constraints signal conditions that would likely require mitigation, and which may prove a site unsuitable after site-specific study, based on statewide or regional/local policies that are currently adopted or in effect. Areas with known constraints are removed from the Solar Generation Potential map completely, leaving:

1. Prime Solar Areas: areas with generation potential and no local or state constraints, and
2. Base Solar Areas: areas with generation potential and possible local or state constraints.

As with all maps included in the ECOS Plan, the solar generation map is intended to provide a general overview of existing conditions. The accuracy of information presented in the maps is limited due to scale. Errors and omissions may exist, including in the analysis of whether a site has solar generation potential to begin with. These maps are not sufficient for delineation of features on-the-ground. To determine whether a site is appropriate for solar development, surveyed information or engineering studies will likely be necessary to determine whether known or possible constraints exist. Finally, the maps indicate land-based potential and existing development is not taken into account. Energy generation may be appropriate on existing structures or impervious surfaces in areas with known constraints.

Wind Generation Potential

This map combines GIS analysis of wind generation potential with *known* and *possible* constraints. For more information on the methodology used to determine wind generation potential, please visit http://www.vtenergyatlas-info.com/wind/methodology. This map and the corresponding data are intended to be used to inform energy planning efforts by municipalities and regions. They may also be used for conceptual planning or initial site identification by those interested in developing renewable energy infrastructure. They should not take the place of site-specific investigation for a proposed facility and should not be used as siting maps.

Known constraints signal likely, though not absolute, unsuitability for development based on statewide or local regulations or designated critical resources. *Possible* constraints signal conditions that would likely require mitigation, and which may prove a site unsuitable after site-specific study, based on statewide or regional/local policies that are currently adopted or in effect. Areas with known constraints are removed from the Wind Generation Potential map completely, leaving:

1. Prime Wind Areas: areas with generation potential and no state or local constraints, and
2. Base Wind Areas: areas with generation potential and possible state or local constraints.

As with all maps included in the ECOS Plan, the wind generation map is intended to provide a general overview of existing conditions. The accuracy of information presented in the maps is limited due to scale. Errors and omissions may exist, including in the analysis of whether a site has wind generation potential to begin with. These maps are not sufficient for delineation of features on-the-ground. To determine whether a site is appropriate for wind development, surveyed information or engineering studies will likely be necessary to determine whether known or possible constraints exist. Finally, the maps indicate land-based potential and existing development is not taken into account.

Known Constraints

- FEMA Floodways
- DEC River Corridors
- National Wilderness Areas
- State-significant Natural Communities and Rare, Threatened, and Endangered Species
- Vernal Pools (confirmed and unconfirmed)
- Class 1 and 2 wetlands (VSWI and advisory layers)
- Local Known Constraints—see table below. Local known constraints are subject to change based on adopted and approved municipal plans.

Bolton	
Conservation District	Very steep slopes (25% or greater)
Flood Hazard Overlay II	Wetland Buffers
Surface Water Buffers	Town-Owned Lands
Burlington	
Historic Districts	Mixed Use, Institutional Core Campus & Enterprise Zoning Districts
Historic Neighborhoods (Eligible for Listing)	Official Map Features and View Corridors
Charlotte	
	Shoreland Setback and Buffer Areas
	Special Natural Areas
	Surface Waters, Wetlands, and Buffers
	Wildlife Habitats
Colchester	
Gd4 Open Space Overlay District	Steep Slopes over 20%
Shore Land Overlay District	Water Protection Overlay District
Essex	
Core Habitat	Scenic Resources Overlay
Habitat Blocks	Steep Slopes 20 Percent or Higher
Essex Junction	
Conserved Lands	
Hinesburg	
Conserved Land	Town-Owned Parcels
State-Owned Parcels	Wildlife - Core Habitat Areas
Steep Slopes (25% or Greater)	
Jericho	
Conserved Land	Primary Conservation Areas (PCA)
Current Use	Well Protection Area
Natural Resource Overlay	
Milton	
Agricultural Soils	Hydric Soils
Conserved Lands	Parks + Rec
Habitat Blocks	
South Burlington	
SPA-Zone 1	

Underhill	
Above 1500'	Very steep slopes (more than 25%)
Mt. Mansfield Scenic Preservation District	Wetland Setbacks (100 ft. from Class I Wetlands (none in town); 50 ft. from Class II Wetlands; and 25 ft. from Class III Wetlands)
Stream and waterbody setbacks (100 ft. from named streams as measured horizontally from the top of the bank or 50 ft. if measured from top of slope; 25 ft. from unnamed streams)	
Westford	
Deer Wintering Habitat	Slopes 25% or Greater
Flood Hazard Overlay District	Water Resources Protection Overlay District, River Corridor and Streams Draining less than 2 square miles
Ledge outcrop	

Possible Constraints

- Agricultural Soils + Hydric Soils
- Act 250 Ag. Soil Mitigation Areas
- FEMA Special Flood Hazard Areas
- VT Conservation Design Highest Priority Forest Blocks
- Protected Lands (State fee lands and private conservation lands)
- Deer Wintering Areas
- Regional or Locally Identified Resources
- Local Possible Constraints—see table below (table will be reformatted for ease of reading)

Bolton	
Forest District	Steep Slopes (15-25%)
Burlington	
Rock Point	Urban Reserve
Barge Canal	
Charlotte	
Historic Protection Overlay District **Historic District, Sites, and Structures**	Town-owned Parks and Recreational Property Land in Active Agricultural Use Scenic View Steep Slopes (15% or Greater) Water Supply Protection Areas
Essex	
Resource Preservation District (Industrial)	Steep Slopes 15-20%
Hinesburg	
Industrial Zoning	Moderately Steep Slopes
Village Growth Area	
Jericho	
Secondary Conservation Areas (PCA)	Village Centers
Shelburne	
Lake Champlain 100-foot Buffer	Scenic View Sheds
Significant View Areas	

South Burlington	
Class 3 Wetland Buffers	Class 3 Wetlands
Habitat Blocks	Riparian Connectivity
Scenic Views	SEQ Natural Resource Protection Area
Slopes 20% or greater	Class 1 and 2 Wetland Buffers (50 ft)
Underhill	
Private Wells	Steep Slopes (15-25%)
Westford	
Prime and state-wide significant agriculture soils	

Map 5 - Water Quality and Safety Map

The Water Quality and Safety Map illustrates the level of impairment for streams and lakes based on the Vermont Department of Environmental Conservation 303d List and the 2012 List of Priority Surface Waters. Additionally, it shows the location of wetlands, fluvial erosion hazard areas, special flood ways, and the 500 year flood hazard area.

Map 6 - Natural Systems Map

The Natural Systems Map depicts sensitive and protected areas in the County. Sensitive areas include ground water source protection zones, deer wintering areas, primary agricultural soils, habitat blocks, core forests, and rare, threatened or endangered natural communities. Sensitive areas are partially protected through the municipal permitting process and Act 250. The map also includes areas that are protected or where development is discouraged. For the purpose of this map, conserved lands, parks, rivers and their buffers, areas over 2,500 ft., special flood hazard Areas, and wetlands make up the protected category. Protection levels and development potential may vary depending upon jurisdiction.

Map 7 - Opportunity and Race Map

The Opportunity and Race Map combines an opportunity index, developed by the U.S. Department of Housing and Urban Development, with U.S. Census data on race. The purpose of this map is to show levels of opportunity in areas where there are the highest concentrations of racial minorities. HUD has developed a process for analyzing opportunity at the Census Tract level. The opportunity index includes data on poverty rate, school proficiency, homeownership rate, unemployment, and job access. Each tract is ranked relative to the others in the county. Tracts that are low opportunity typically have a higher proportion of rental housing, people receiving public assistance, lower school scores, and more unemployment in comparison to other areas. Opportunity mapping is a way to see where to target investments to address disparities in the County.

Map 8 - 2013 Metropolitan Transportation Systems Map

The Metropolitan Transportation Systems Map represents the present transportation network. The Metropolitan Transportation System is the multimodal network of highways, arterial and major collector roadways, transit services, rail lines, bicycle paths, sidewalks, Burlington International Airport, and other inter-modal facilities critical to the movement of people and goods in the region.

Map 9 - 2006-2010 High Crash Locations-Intersections

The High Crash Locations at Intersections Map depicts where the rate of crashes exceeds a threshold known as the critical rate. Locations are ranked by calculating a ratio between the critical rate and actual rate.

Map 10 - 2006-2010 Crash Locations-Segments

The High Crash Locations of Segments Map depicts where the rate of crashes exceeds a threshold known as the critical rate. Locations are ranked by calculating a ratio between the critical rate and actual rate.

Map 11 - Transportation Corridors

The Transportation Corridors Map represents the locations of the corridors where projects, programs, and strategies are implemented within Chittenden County's transportation system.

4.1.2 ACT 250, SECTION 248 & SUBSTANTIAL REGIONAL IMPACT

In accordance with 24 VSA § 4345a(17) a regional planning commission shall, as part of its regional plan, define a substantial regional impact, as the term may be used with respect to its region. This definition shall be given due consideration, where relevant, in state regulatory proceedings. Those proceedings are:

1. Act 250 – Certain proposed developments are required to obtain a permit from one of Vermont's nine District Environmental Commissions in order to establish that the proposed development will satisfy 10 criteria defined by Act 250 (10 VSA §6086). One of these 10 criteria is that the proposed development be "in conformance with any duly adopted local or regional plan or capital program."

2. Section 248 – Certain proposed utility facilities are required to obtain a permit from Vermont's Public Service Board to establish that the proposed facility will satisfy criteria defined by Section 248 (30 VSA §248). One of the Section 248 criteria is that the proposed facility will "not unduly interfere with the orderly development of the region with due consideration having been given to the recommendations of the municipal and regional planning commissions."

3. In addition, the Secretary of the Agency of Natural Resources may not issue a new Solid Waste Management Facility Certification (10 VSA §6605(c)) unless the facility is "in conformance with any municipal or regional plan adopted in accordance with 24 VSA Chapter 117."

In accordance with 24 VSA §4348 (h), in the above three proceedings, in which the provisions of a regional plan or a municipal plan are relevant to the determination of any issue in those proceedings, the provisions of the regional plan shall be given effect to the extent that they are not in conflict with the provisions of a duly adopted municipal plan. To the extent that such a conflict exists, the regional plan shall be given effect it if is demonstrated that the project under consideration in the proceedings would have a "substantial regional impact." **That is, the issue of whether a proposed development has a "substantial regional impact" is important only when there is a conflict between the regional plan and municipal plan.** CCRPC will attempt to reduce the potential for such conflicts through its municipal plan review and approval process.

The following is the required definition of "substantial regional impact," as this term is to be used with respect to Chittenden County:

A proposed development has a substantial regional impact if it is not consistent with the Future Land Use Plan, the Solar Generation Map or the Wind Generation Map of this Regional Plan.

This definition puts the emphasis on the Planning Areas – and stipulates that if a development proposal is not consistent with the Planning Areas, then the Regional Plan will take effect in the State proceedings (as described above) if there is a conflict between the regional plan and the municipal plan. The Planning Areas form the basis for the appropriate areas for growth in the next 20 years as shown in the Future Land Use Plan.

The Planning Areas are consistent with current municipal plans and zoning, so only developments that are NOT consistent with municipal zoning and the planning area definitions would likely prompt the SRI definition. Further, developments that push beyond these defined areas are more likely to have a significant impact on our region, than developments within the defined areas for growth. Upon request by a municipality to make a change to the Planning Areas as a result of a municipal plan, zoning and/or infrastructure service area change, CCRPC will review the request for consistency with the Planning Area definitions prior to any action.

The CCRPC has a role in development review outside of the very limited circumstances in which the substantial regional impact definition will come into play. RPCs "shall appear before district environmental commissions to aid them in making a determination as to the conformance of developments and subdivisions with the criteria of 10 VSA § 6086" (24 VSA § 4345a(13)). Both Act 250 and Section 248 require the permit applicant for a project that is proposed to be located in Chittenden County to submit a copy of the application to CCRPC. CCRPC is a party in any such application for an Act 250 permit and may apply to be a party in any such application for a Section 248 permit.

CCRPC has established an interim policy (Guidelines and Standards for Reviewing Act 250 and Section 248 Applications) for its participation in the permit review procedures of Act 250 and Section 248. Currently under this interim policy:

- CCRPC's Executive Committee considers whether an applicant's proposal is in conformance with the Regional Plan, with specific attention given to the Planning Areas of this Plan (for the same reasons described above for the SRI definition), and the criteria dealing with traffic and other criteria within CCRPC's expertise.
- Staff initially reviews each Act 250 application (with specific attention given to those applications going to a hearing as the FY13 CCRPC contract with the Agency of Commerce and Community Development requires that the CCRPC review and comment on Act 250 and Section 248 applications if a hearing is held).
- CCRPC staff will discuss potential Act 250 and Section 248 projects with Planning and Zoning staff and members of the Planning Advisory Committee to identify emerging development proposals to assess their conformance with the Regional Plan. The intent is that this proactive, collaborative approach attempts to work out any concerns about Act 250 and Section 248 applications prior to their submission.

The Planning Advisory Committee may recommend to the CCRPC revised procedures for participation in Act 250 and Section 248 proceedings in order to better achieve the goals of this Chittenden County 2013 ECOS Plan. These revisions will be established through formal amendments to the Guidelines and Standards for Reviewing Act 250 and Section 248 Applications, and if appropriate, as amendments to this Plan as well. Changes in the review of transportation impacts and CCRPC policies will be

Regional Target Based on Region's Share of State Population					Regional Target based on Region's Share of State Population and Energy Resource Areas									
Target Total MWh	Existing MWh	Target New MWh	Land Area Needed for New MWh (acres)		Solar MWh		Land Area Needed for Solar (acres)		Prime Solar Land Available (acres)*	Wind MWh		Land Area Needed for Wind (acres)		Prime Wind Land
			Low	High	Low	High	Low	High		Low	High	Low	High	
1,265,134	556,623	708,511	5,295	10,994	229,092	374,543	1,494	2,443	9,342	207,295	936,305	270	1,222	7,762

*Local known and possible constraints have been applied

MUNICIPAL ENERGY DATA AND MAPS: CHITTENDEN COUNTY

This document incudes all data required for Chittenden County to plan for these goals at a municipal level. The tables contain data that estimate current energy use and provide targets for future energy use across all sectors (transportation, heating, and electricity). The tables also show the region's targets for renewable energy generation. Please note that these data are a starting point for Chittenden County to consider its energy future. This information should provide the framework for a discussion about changes that will need to occur within Chittenden County to ensure that state energy goals are met.

Estimates of current energy use consist primarily of data available from the American Community Survey (ACS), the Vermont Agency of Transportation (VTrans), the Vermont Department of Labor (DOL), Vermont Gas and the Vermont Department of Public Service (DPS). Where available, real consumption data obtained from utilities are used.

Targets for future energy use are drawn from the Long-range Energy Alternatives Planning (LEAP) analysis for Chittenden County, completed the Vermont Energy Investment Corporation (VEIC). The LEAP model is an accounting framework that shows one possible path for Chittenden County to meet the goals above.

Assumptions used to create the LEAP analysis are slightly different than assumptions used to calculate current regional energy use. Regardless, the targets established here show the direction in which change needs to occur to meet regional and state energy goals. It is also important to remember that the targets established by LEAP represent only one way to achieve Chittenden County's energy goals. Other strategies may allow the region to meet its goals.

Further Explanation on the Methodology under development which will be contained within a technical appendix to the ECOS Plan.

PLEASE NOTE THAT THIS IS A DRAFT AND SUBJECT TO CHANGE.

TRANSPORTATION ENERGY USE

Current Transportation Energy Use

Metric	Municipal Data
Fossil Fuel Burning Cars, 2015	106,936
Fossil Fuel Energy Used for Transportation in 2015 (MMBtu)	4,971,503
Electric Vehicles in 2015 (#)	546
Electricity Used for Transportation in 2015 (MMBtu)	4,347

Sources: VTrans, American Community Survey, Drive Electric Vermont, DMV

Transportation Energy Use, 2015-2050

	2015	2025	2035	2050
Total Light Duty Transportation Energy Use (MMBtu)	7,552,000	6,061,000	3,744,000	1,599,000
Electricity Used for Transportation (MMBtu)	6,000	81,000	543,000	1,124,000
Electric Vehicles (% of Vehicle Fleet)	0%	6%	41%	89%
Biofuel Blended* Energy Used for Transportation (MMBtu)	7,546,000	5,980,000	3,201,000	475,000
Biofuel Blend* Vehicles (% of Vehicle Fleet)	100%	94%	59%	11%

**This measures biofuels blended with fossil fuels. A common example is gasoline with ethanol mixed in.*

Sources: VTrans, LEAP Model

THERMAL ENERGY USE

Current Thermal Energy Use

Current Thermal Energy Use from Natural Gas, 2015

Total Residential Natural Gas Consumption (Mcf)	3,331,770
Percentage of Municipal Natural Gas Consumption	45%
Total Commercial/Industrial Natural Gas Consumption (Mcf)	4,120,470
Percentage of Municipal Natural Gas Consumption	55%
Total Municipal Natural Gas Consumption	7,452,239
Sources: Vermont Gas	

Commercial and Industrial Thermal Energy Use, 2015-2050

	2015	2025	2035	2050
Total Commercial and Industrial Thermal Energy Use (MMBtu)	3,574,500	3,219,900	2,776,400	2,112,000
Percent of Commercial and Industrial Establishments Weatherized by Target Year	11%	20%	22%	39%
Energy Saved by Weatherization by Target Year (MMBtu)	86,500	189,006	259,783	629,830
Commercial and Industrial Establishments Using Heat Pumps (%)	1%	22%	35%	39%
Commercial and Industrial Thermal Energy Use by Heat Pumps (MMBtu)	6,590	284,318	562,046	839,773
Commercial and Industrial Establishments Using Wood Heating (%)	7%	9%	10%	11%
Commercial and Industrial Thermal Energy Use Attributable to Wood Heating (MMBtu)	266,300	424,000	583,700	854,500
Sources: LEAP Model, Department of Public Service, Department of Labor				

Residential Thermal Energy Use, 2015-2050

	2015	2025	2035	2050
Total Residential Thermal Energy Use (MMBtu)	6,281,000	5,597,000	4,772,000	3,382,000
Percent of Residences Weatherized by Target Year	2%	14%	23%	70%
Energy Saved by Weatherization by Target Year (MMBtu)	41,800	250,800	455,400	1,518,000
Percent of Residences Using Heat Pumps	3%	18%	35%	55%
Residential Thermal Energy Use from Heat Pumps (MMBtu)	62,000	362,000	750,000	1,126,000
Residences Using Wood Heating (%)	14%	14%	14%	13%
Residential Thermal Energy Use from Wood Heating (MMBtu)	982,000	1,029,000	1,035,000	931,000
Sources: LEAP Model, Department of Public Service				

ELECTRIC ENERGY USE

Current Electrical Energy Use

Residential Electric Energy Use (kWh)	1,907,653,349
Commercial and Industrial Electric Energy Use (kWh)	3,049,038,676
Total Electric Energy Use (kWh)	4,956,692,025

Sources: Efficiency Vermont, 2013

Electrical Energy Use, 2015-2050

	2015	2025	2035	2050
Total Electric Energy Saved (kWh)	9,000,000	107,000,000	216,000,000	404,000,000
Residences that have increased their Electric Efficiency	3%	31%	58%	98%
Commercial and Industrial Establishments that have Increased Their Electric Efficiency	3%	31%	58%	98%

Sources: LEAP Model and Efficiency Vermont, 2013

ELECTRIC ENERGY GENERATION

Existing Renewable Electricity Generation

	Sites	Power (kW)	Energy (kWh)
Solar	2,410	37,920.34	47,581,822
Wind	22	460.80	1,106,031
Hydroelectric	6	35,800	157,982,000
Biomass	13	66,578	3,363,840
Other	0	0	0
Total	2,451	140,759	210,033,693

Source: Community Energy Dashboard, April 2017

Renewable Electricity Generation Potential

	Power (MW)	Energy (MWh)
Rooftop Solar	103	126,328
Ground-Mounted Solar	1,168	1,432,176
Wind		N/A
Hydro	See Hydro Map	
Biomass	See Biomass Map	
Methane	Unknown	Unknown
Other	Unknown/District Heat?	Unknown/District Heat?

Source: CCRPC and the Department of Public Service

Land Available for Wind and Solar Generation

	Prime (acres)	Base (acres)
Solar	9,342	69,819
Wind	7,724	44,577

Note: Solar acreage estimates above account for local known and possible constraints if applicable. Local known and possible constraints have not been accounted for in the wind acreage because local constraints were only applied to develop local solar targets. To date, CCRPC is only planning for a regional wind target. To see local constraints for both solar and wind, please refer to the maps.

Renewable Electricity Generation Targets

	2025		2035		2050	
	Low	High	Low	High	Low	High
Solar (MWh)	57,275	93,630	114,549	187,261	229,098	374,522
Wind (MWh)	25,636	51,824	51,272	103,648	102,544	207,295
Sources: LEAP Model and CCRPC Modeling						

Figure 1 Total Energy Consumption by Scenario, (aviation excluded)

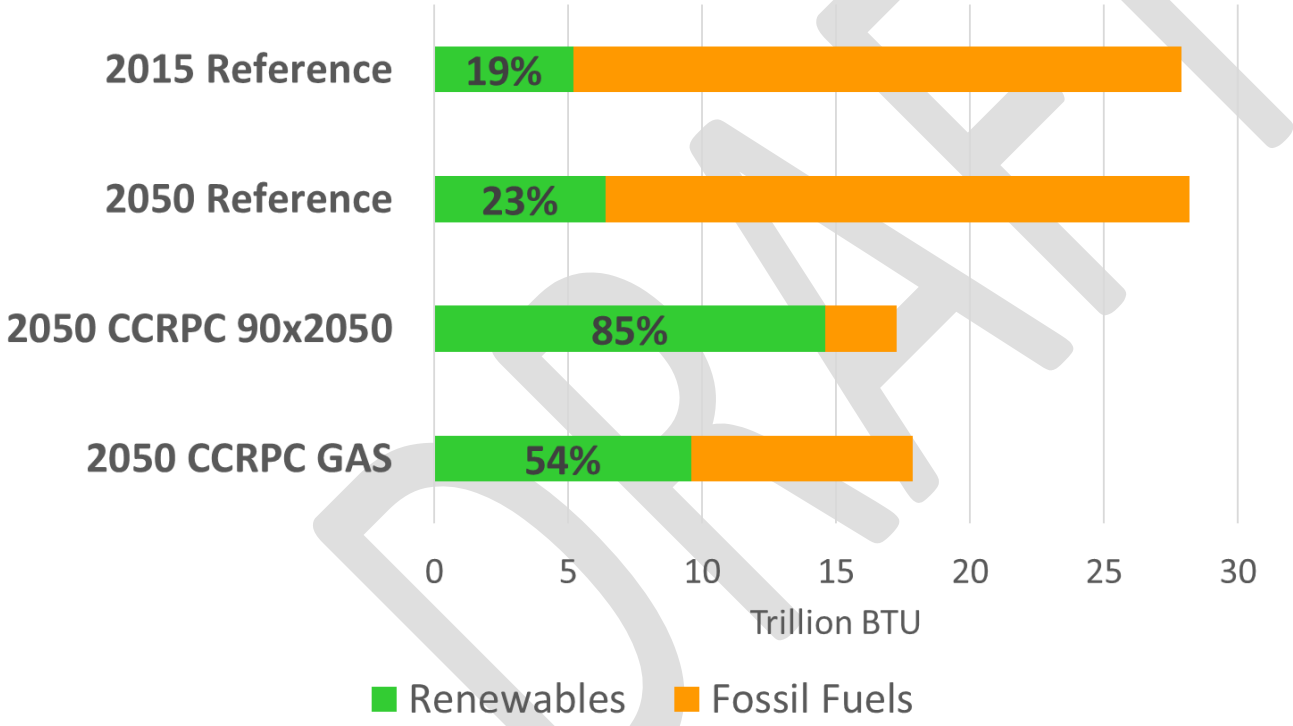


Figure 2 90X2050 Scenario by Sector

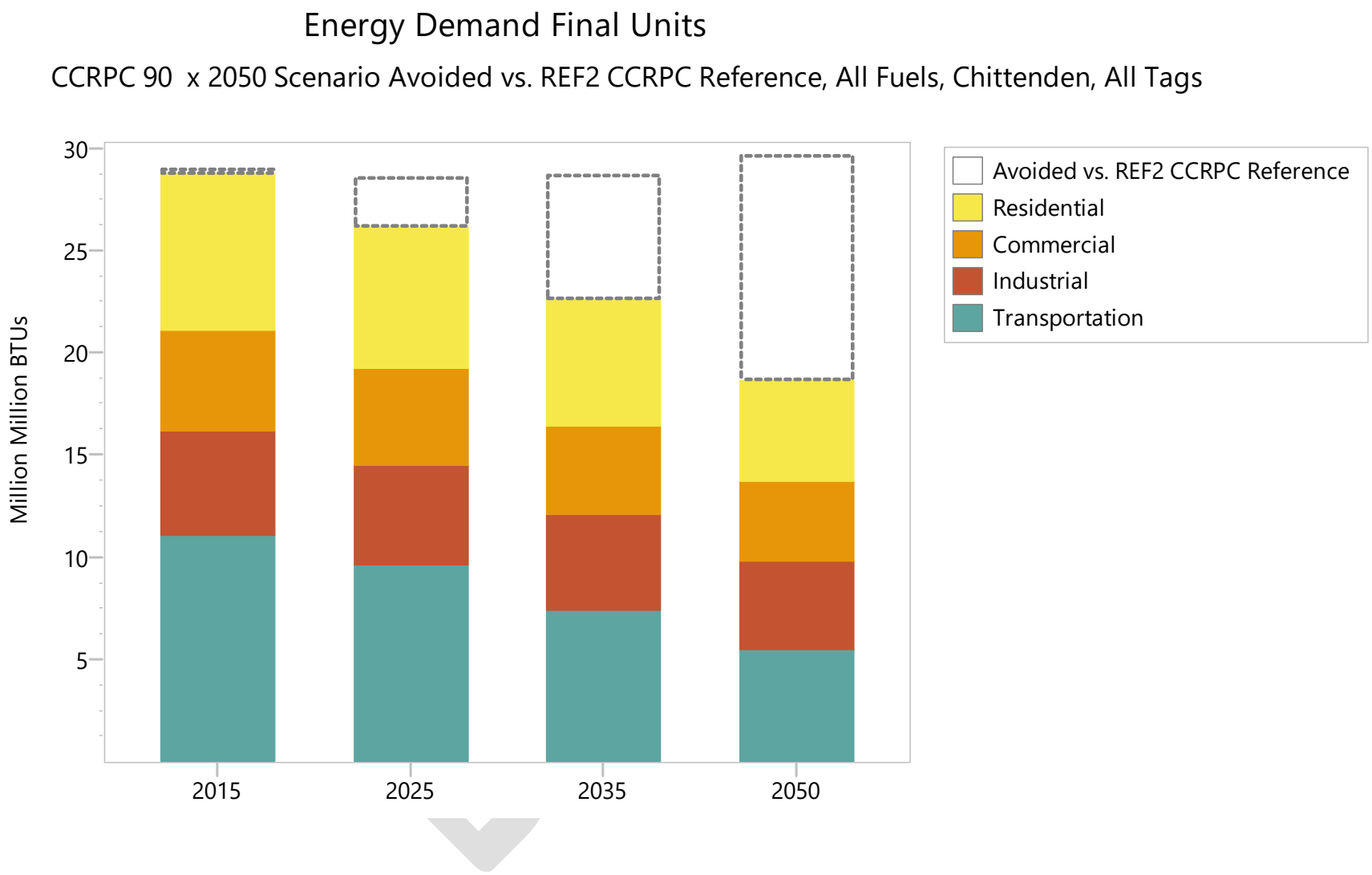
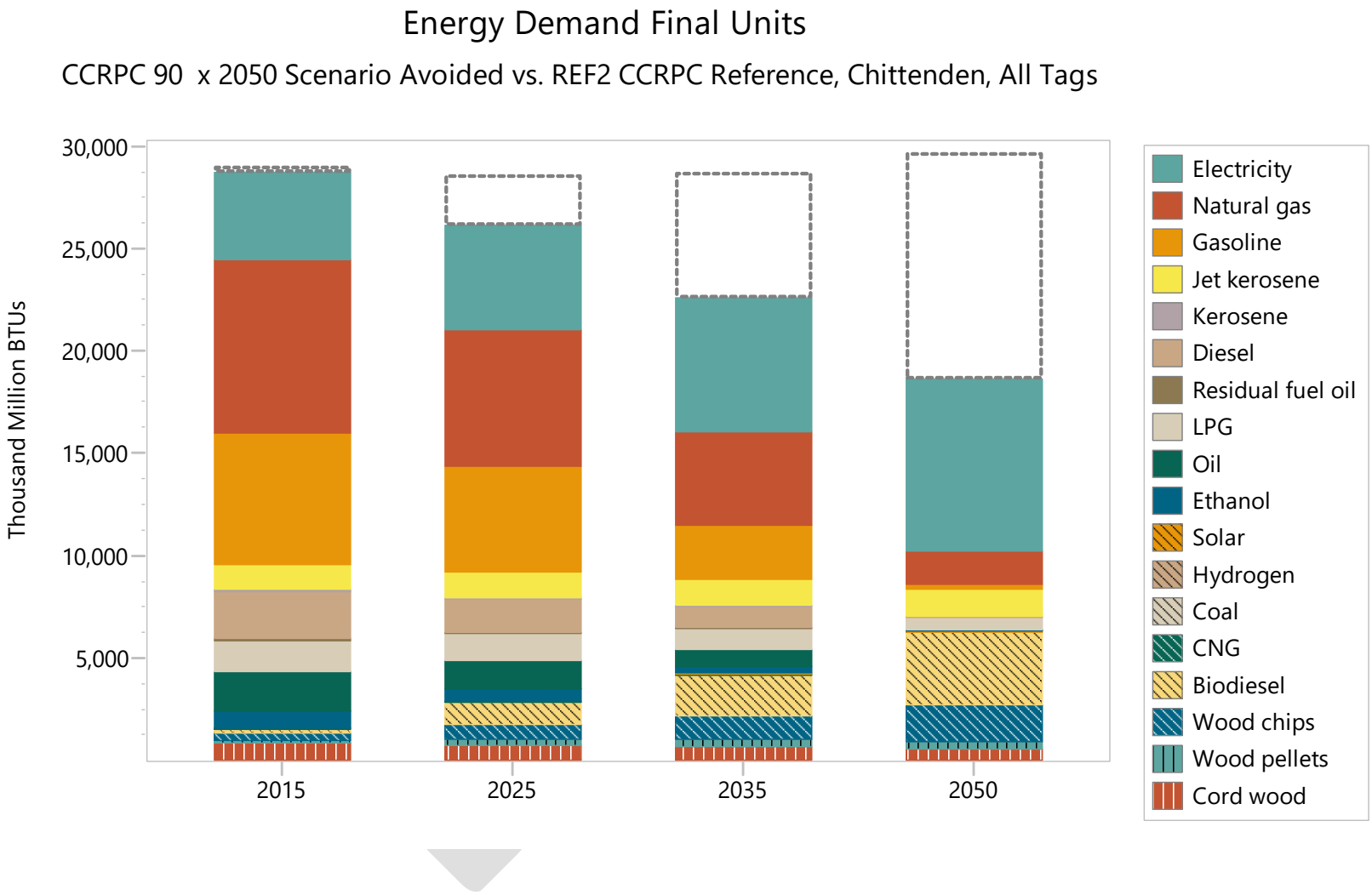


Figure 3 90X2050 Energy by Fuel



Wind Energy Resource Areas

Chittenden County, Vermont
Act 174
The Energy Development Improvement Act of 2016

Date: 5/5/2017

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0 1.75 3.5 7 Miles

N

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Legend

- Prime Wind Potential: Areas of high wind potential for commercial generation and no known state constraints
- Base Wind Potential: Areas of high wind potential for commercial generation and the presence of possible state constraints
- Local Possible Constraints: Presence of resources or conditions that would likely require mitigation
- Local Known Constraints: Presence of resources or conditions that are unsuitable for energy genereation development
- 3 Phase Power Lines
- Transmission lines
- Prime Wind Potential Areas + Local Known Constraints
- Base Wind Potential Areas + Local Known Constraints

DRAFT

Note: This map is intended to provide guidance regarding appropriate and inappropriate places for renewable energy development based on a GIS analysis. Renewable energy development should be discouraged on areas identified as known and possible constraints.

What these maps don't do. Take all local regulations into account and automatically prohibit or allow renewable energy generation and replace the detailed process a developer must go through to propose a site for a renewable energy.

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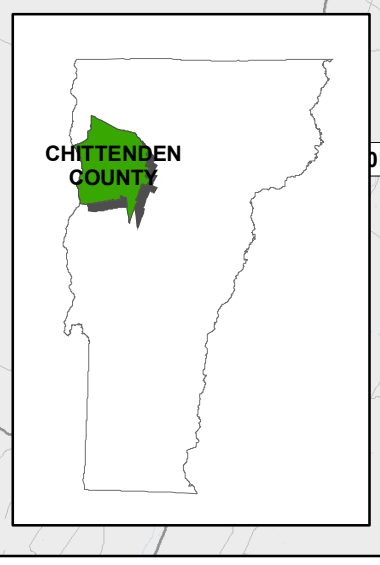

Solar Energy Resource Areas

Chittenden County, Vermont
Act 174
The Energy Development Improvement Act of 2016

Date: 5/5/2017

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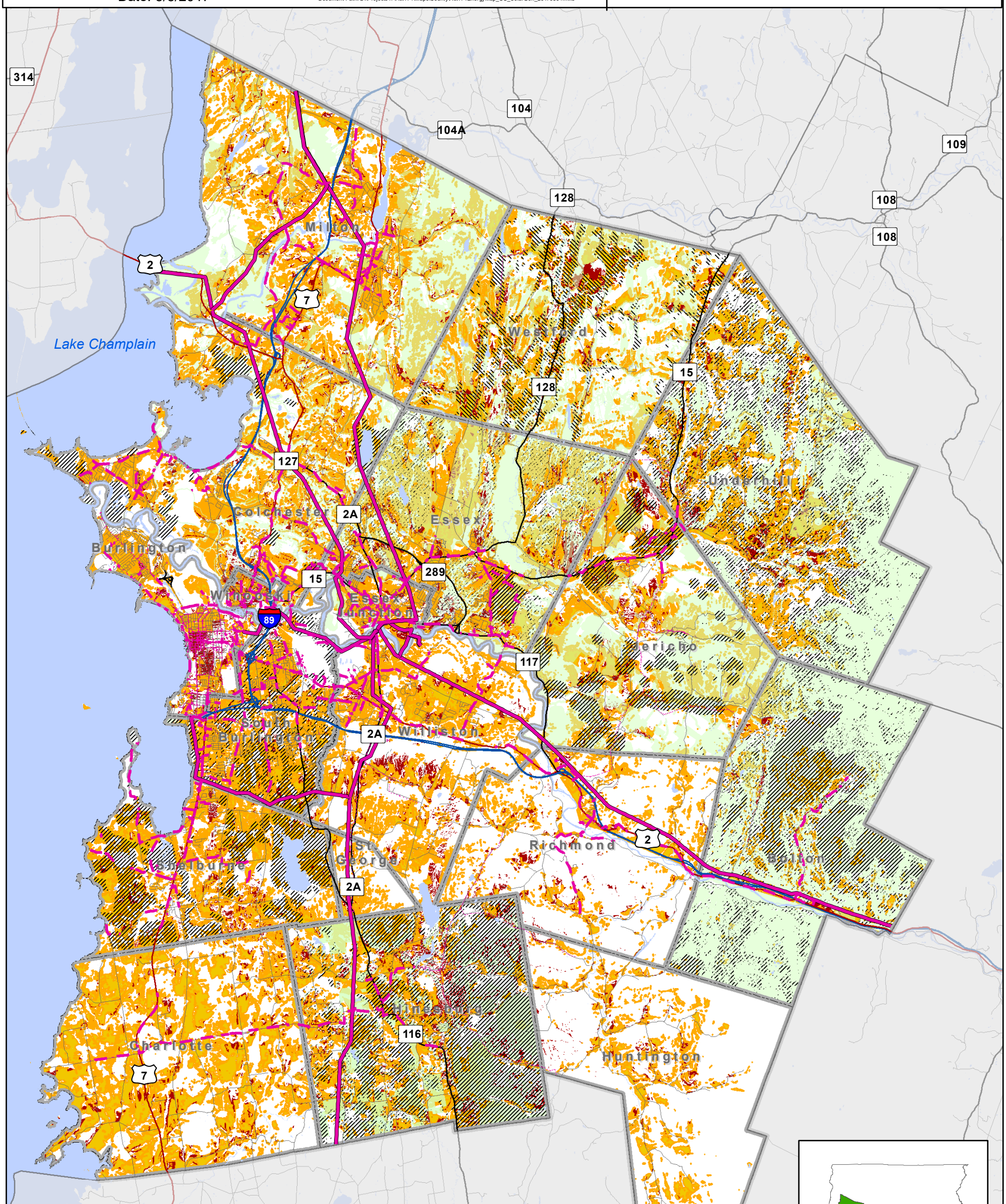
Legend

Solar Energy Resource Areas

Type

- Prime Solar: Areas with high solar potential and no state known constraints
- Base Solar:Areas with high solar potential and a presence of state possible constraints that would likely require mitigation
- Local Known Constraints: Presence of resources or conditions that are unsuitable for energy genereation development
- Local Possible Constraints: Presence of resources or conditions that would likely require mitigation
- 3 Phase Power Lines
- Transmission lines
- Base Solar Potential Areas + Local Known Constraints
- Prime Solar Potential Areas + Local Known Constraints

DRAFT



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Possible State Constraints

Chittenden County, Vermont
Act 174
The Energy Development Improvement Act of 2016

Date: 5/5/2017

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Legend

- FEMA Special Flood Hazard Areas
- Agricultural Soils
- ACT 250 Ag Mitigation Parcel
- Hydric Soils
- Deer Wintering Areas
- Protected Lands
- Priority Forest Blocks (Connectivity)
- Priority Forest Blocks (Interior)
- Priority Forest Blocks (Physical Landscape Diversity)

DRAFT

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CHITTENDEN COUNTY

Sources:
Agricultural Soils; VCGI, 2017
FEMA Special Flood Hazard Areas; VCGI, 2017
Protected Land; VCGI
Act 250 Mitigation Areas; VCGI, 2017
Deer Wintering Areas; VCGI, 2017
Priority Forest Blocks,Vermont Conservation Design
Hydric Soils; VCGI, 2017

Possible State Constraints

Chittenden County, Vermont
Act 174
The Energy Development Improvement Act of 2016

Date: 5/5/2017

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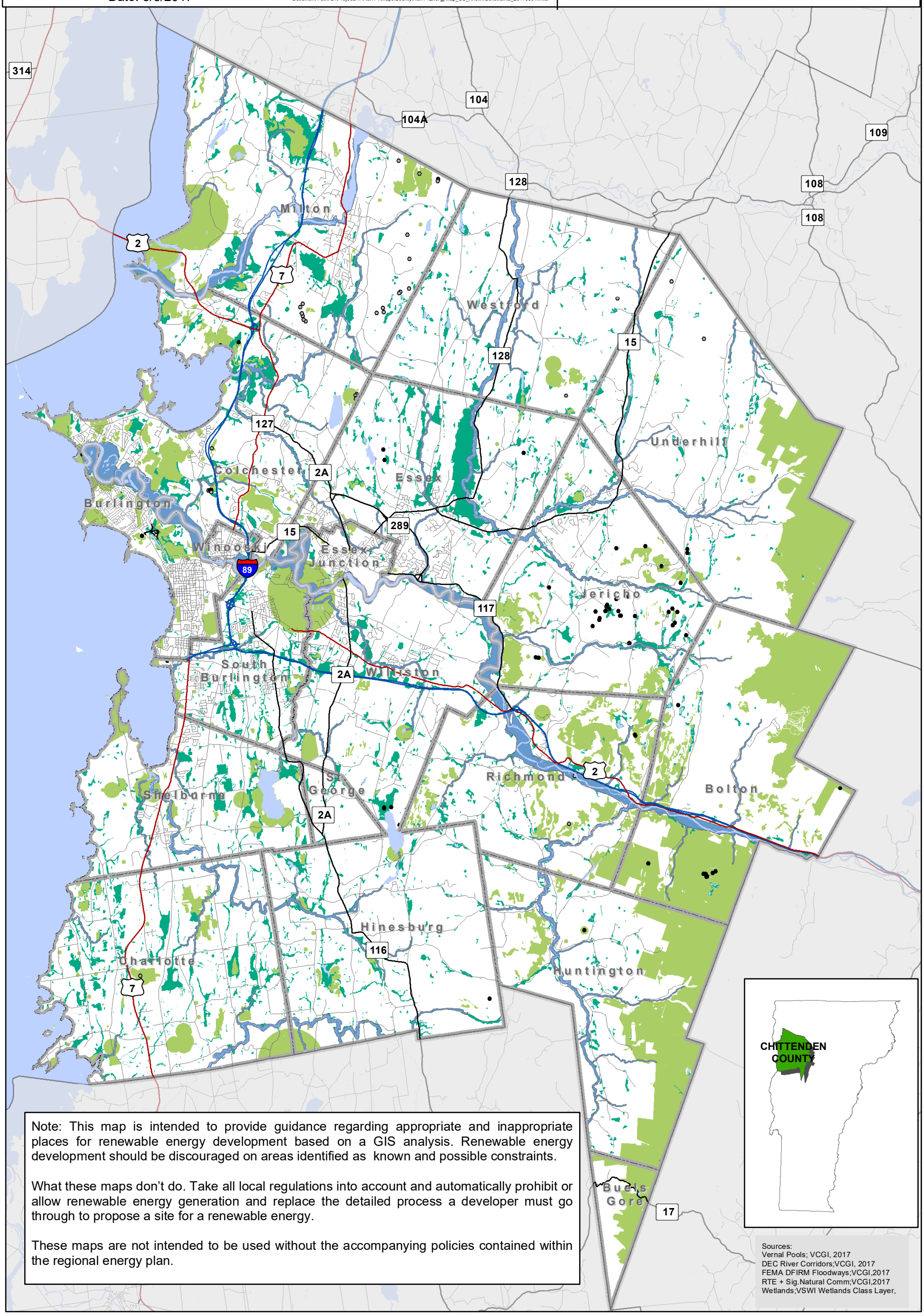
Legend

- Vernal Pools (Confirmed)
- Vernal Pools (Unconfirmed)
- Vermont Department of Environmental Conservation River Corridors*
- State-signific... Natural Communities & RTE Species
- Class 1 and 2 Wetlands

*Note: River corridors are comprisedof meander belt and riparian buffer components for the purpose of achieving and maintaining stream equilibrium conditions.



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Sources:
Vernal Pools; VCGI, 2017
DEC River Corridors;VCGI, 2017
FEMA DFIRM Floodways;VCGI,2017
RTE + Sig.Natural Comm;VCGI,2017
Wetlands;VSWI Wetlands Class Layer,

Hydro- Electric Energy Resource Locations

Chittenden County, Vermont
Act 174
The Energy Development Improvement Act of 2016

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Legend

- Current Operating Hydroelectric Dams
- Unknown Capacity
- > 50kW Capacity
- < 10kW Capacity
- Low Hazard with >50 kW
- Low Hazard with <10KW
- Significant Hazard with <10KW
- 3 Phase Power Lines
- Transmission lines
- OH_Primary
- UG_Primary

N

Date: 4/26/2017

DRAFT

Milton
Lake Champlain
Westford
Underhill
Colchester
Essex
Winooski
Burlington
Essex Junction
Jericho
South Burlington
Williston
Shelburne
St. George
Richmond
Bolton
Hinesburg
Charlotte
Huntington
Buels Gore

CHITTENDEN COUNTY

Note: These maps are intended to provide guidance regarding appropriate and inappropriate places for renewable energy development based on a GIS analysis and to act as an initial resource for identifying suitable areas for energy siting and our region.

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Biomass Energy Resource Locations

Chittenden County, Vermont
Act 174
The Energy Development Improvement Act of 2016

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0 1.75 3.5 7 Miles

Bio

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N

Legend

Woody Biomass Resource Areas

Date: 4/29/2017

DRAFT

Milton
Lake Champlain
Westford
Colchester
Essex
Underhill
Winooski
Burlington
Essex Junction
Jericho
South Burlington
Williston
Shelburne
St. George
Richmond
Bolton
Hinesburg
Charlotte
Huntington
Buels Gore

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