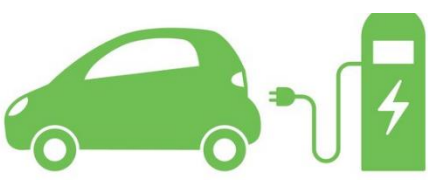
Essex Community Enhanced Energy Plan

Prepared by Chittenden County Regional Planning Commission, in coordination with Town and Village Community Development staff, the Essex Energy Committee, the Village of Essex Planning Commission, and the Town of Essex Planning Commission, with support from the Vermont Department of Public Service.

June 7, 2019



Approved by the Town of Essex June 17, 2019

Adopted by the Village of Essex Junction August 13, 2019

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Purpose

This energy plan is a vision for the Essex Community to advance the State of Vermont's Comprehensive Energy Plan and to align energy planning with local land use policies. This plan is incorporated by reference in the 2019 Essex Junction Comprehensive Plan and will be incorporated by reference in the next update of the Essex Town Plan. This plan was developed according to the Department of Public Service's energy planning standards for municipal plans. When this plan is given a determination of energy compliance from the Chittenden County Regional Planning Commission it will have substantial deference in the Public Utility Commission's (PUC) review of whether an energy project meets the orderly development criterion in the Section 248 process. The Section 248 process is not easily summarized. For an in-depth discussion of the Section 248 process see the guide on Municipal Enhanced Energy Planning in Vermont here. See the energy compliance section in this plan for more information, as well.

For the purpose of this plan, the Town of Essex and the Village of Essex Junction is referred to as the Essex Community

Introduction

Since releasing a *Comprehensive Energy Plan* in 2011, Vermont has been working toward a goal of obtaining 90 percent of its energy from renewable resources by 2050. Renewable energy, as defined by 24 V.S.A. §4303(24), "means energy available for collection or conversion from direct sunlight, wind, running water, organically derived fuels, including wood and agricultural sources, waste heat, and geothermal sources." As of 2017, Vermont only obtains 20% of its overall energy from renewable resources. The electricity sector is the most renewable at 43% source energy or 53% site energy[1]. The thermal sector is 20% renewable and the transportation sector is the least renewable sector at 5% renewable[2]. As of October 2018, the Essex Community generates 27,799 MWh annually of renewable electricity, which is 3.4% of the electricity consumed in 2017.

The state's 2016 *Comprehensive Energy Plan* makes many policy recommendations to move toward the goal of 90 percent renewable. The recommendations aim to foster economic security and independence, safeguard environmental legacy, drive in-state innovation and job creation, and increase community involvement and investment. The plan prioritizes improvements in energy conservation and efficiency and the development of renewable, local sources of energy.

The *Comprehensive Energy Plan* also aims to reduce total energy consumption per capita by 15% by 2025, and by more than 33% by 2050; to weatherize 25% of all homes by 2020; and to reduce greenhouse gas emissions from within the state to 50% of 1990 levels by 2028, and to 75% of those same levels by 2050. The challenges set forth in the Comprehensive Energy Plan are not easily met. Data showing the current trend of total energy consumption is not available. The status of housing weatherization as of 2017 statewide is about 7.6% of the state's housing stock. Greenhouse gas (GHG) emissions estimates in Vermont continued to rise for calendar year 2015, increasing from 9.45 million metric tons CO2 equivalent (MMTCO2e) in 2014 to 9.99 MMTCO2e in 2015. This increase puts Vermont approximately 16% above the 1990 baseline value of 8.59 MMTCO2e and adds to the difficulty of reaching the statewide

[1] Source energy includes all energy generated, transmitted, and consumed. Site energy is the energy directly consumed in buildings and vehicles.

[2] 2017 Energy Action Network Annual Report

goal of 50% below 1990 emissions levels by 2028. Without greater participation and mobilization at a local level, these goals are unlikely to be achieved.

This plan describes how the Essex Community intends to act to implement the state energy goals outlined above. Meeting these goals will require ambitious action to transform the way the Essex Community uses, stores, and produces energy.

The following are transformations needed for the Essex Community, as the most likely pathway to meet these goals by 2050, given current technologies:

- Establish enough renewable energy generation sites to generate between 211,386 to 353,629 MWh of electricity[3].
- Increase electric vehicles to 89% of passenger vehicles registered in the Essex Community
- Fuel 96% of heavy-duty vehicles with biodiesel or other renewable carbon free fuel.
- Weatherize 100% of homes and 38% of commercial and industrial establishments
- Heat 60% of homes with electric heat pumps and 14% of homes with wood
- Heat 38% of businesses with electric heat pumps and 11% with wood

Led by its Energy Committee, the Essex Community is striving to match the state's 90 percent goal. The Essex Energy Committee has taken the position that, "For the Essex Community to achieve the 90 percent renewables level of success for the overall betterment of our community, we must develop and implement plans which aggressively change the way in which we view energy from the standpoint of cost, use and conservation." The Town of Essex Selectboard also adopted the Vermont Climate Pledge Coalition by virtue of a resolution voted on November 2, 2017, recognizing the goal of reducing greenhouse gas emissions by 26 to 28 percent from 2005 levels by 2025 in addition the 90 percent goal. The Village of Essex Junction Trustees have not adopted the Vermont Climate Pledge Coalition.

To meet these goals, the Essex Community has prioritized multiple actions under the following general categories: (i) Land Use Implementation; (ii) Transportation, (iii) Thermal and Electric Energy Conservation and Efficiency; and (iv) Renewable Energy Generation and Storage. See the implementation section for additional information.

Energy Compliance

In 2016, Act 174 established a process for "enhanced energy planning" for municipalities. Enhanced energy planning sets up the framework for municipalities to update their **Municipal Plans** according to a set of energy standards developed by the Vermont Department of Public Service. If a **Municipal Plan** meet these standards, the **Municipal Plan is** given a determination of energy compliance from the regional planning commission. The detailed standards for **Municipal Plans** are available here.

[3] The renewable energy target is expressed in MWh because the target is intended to be technology neutral. The Essex Community's target takes into account both electricity used in the commercial, industrial, and residential sectors. The target is modeled based on population and electricity usage. The Essex Community makes up 43% of electricity used in Chittenden County; therefore, the community's target is among the highest in the County.

A determination of energy compliance means that the PUC will give the **Municipal Plan** substantial deference. This means that a land conservation measure or specific policy shall be applied by the PUC in determining whether a jurisdictional energy siting project meets the orderly development criterion in the Section 248 process, unless there is a clear and convincing demonstration that other factors affecting the general good of the State outweigh the application of the measure or policy. This is a higher standard of review than a **Municipal Plan** would otherwise receive in the Section 248 siting process.

At present, the Essex Community municipalities will seek their own affirmative determination from CCRPC to amend or supplement an existing **Municipal Plan.** This is being done with the understanding that the two plans may eventually be combined for the Essex Community in the future.

Siting

The Essex Community can have input over the siting of renewable generation facilities in a few ways through the policies contained in this plan. The community can define preferred sites for net-metering facilities and include policies to identify the scale and type of renewable energy generation facilities to occur in specific areas within the community. Also, the Essex Community can restrict renewable generation facilities where appropriate.

Vermont's Net Metering Rules (Rule 5.100, effective 7/1/2017) defines preferred sites for renewable energy development (any renewable technology besides hydroelectric). Compared to non-preferred sites, net metering on preferred sites can be larger (up to 500 kW instead of 150 kW) and such projects receive financial benefits in the net metering rates. See the latest Vermont Public Utility Commission Rule Pertaining to Construction and Operation of Net-Metering Systems for details on the financial and scale benefits of preferred sites. Systems up to 15kW and rooftop solar systems up to 500kW go through a registration process rather than the full Public Utilities Commission process. However, all other projects do not have an expedited review process and must meet the same requirements as any other system. Preferred sites as defined under the PUC rule include:

- On a pre-existing structure
- Parking lot canopies over permitted paved areas
- Previously developed land
- Brownfields
- Landfills
- Gravel pits
- Superfund sites
- Municipal-designated sites
- On the same parcel or directly adjacent parcel as a customer taking 50% or more of the output

ACT 174 AND SUBSTANTIAL DEFERENCE

In 2016, Act 174 established a process for "enhanced energy planning," which encourages municipalities to write plans that are "energy compliant." This plan meets the standards for energy planning established by Act 174 and outlined in 24 V.S.A. §4352. Therefore, the policies of this plan will receive substantial deference in §248 proceedings. The Public Utility Commission shall apply the land conservation measures or specific policies in accordance with their terms unless there is a clear and convincing demonstration that other factors affecting the general good of the State outweigh the application of the measure or policy. This is a higher standard of review than "due consideration," which the municipal plan's policies would otherwise receive.

The Essex Community strongly encourages the siting of net-metered systems on parking lots. Municipally designated preferred sites can be identified in a duly adopted municipal plan or through a joint letter of support by the Town and/or Village planning commissions, Town and Village legislative bodies and regional planning commission. Project developers are encouraged to reach out the Energy Committee, the Planning Commission(s), and the Essex Community staff to discuss projects in advance of submitting a petition.

Constraints

Some areas are not appropriate for any type of development, including types of renewable energy generation facilities existing as of the date of this plan. The State of Vermont has defined certain resources as known and possible constraints, which are protected by the ECOS Regional Plan and state agency review during the Public Utility Commission review process. The Essex Community have added additional constraints based on local policy. In determining whether known or possible constraints are present, on-site field verification should be conducted.

Known constraints are areas in which development, including renewable energy generation, is not appropriate. See Map 2 for the location of known constraints within the community. Known constraints are:

State Known Constraints

- FEMA Designated Floodway
- DEC River Corridors
- National Wilderness Areas State-significant Natural Communities
- Vernal Pools (confirmed and unconfirmed)
- Class 1 and 2 wetlands (VSWI and advisory layers)

Local Known Constraints

- Slopes of 20% and steeper
- Recreation/Conservation areas within the Resource Preservation-Industrial District

Possible constraints are areas in which the effects of development, including current types of renewable energy generation facilities, may need to be mitigated. See Map 3 for the location of possible constraints in the community. Possible constraints are:

State Possible Constraints

- Agricultural Soils (*While the State will review agricultural soils, it is not the intent of the Village of Essex Junction to protect primary agricultural soils from development considering agricultural operations (outside of community gardens) are not feasible on small parcels isolated from more intact open agricultural areas. Further, mitigation of these soils through state development approval processes does not seem*

Local Possible Constraints

- Industrial designated areas of the Resource Preservation-Industrial District (see siting policy 8)
- Designated Village Center Historic District in the Village, Town Center and Design Control Districts in the Town
- Scenic Resource Protection Overlay District (including portions of Bixby Hill Road, Browns River Road, Chapin Road, Colonel Page Road, Jericho Road/VT Route 15, Naylor Road, North Williston Road, Old Stage Road, Pettingill Road, River Road/VT Route 117, Towers Road, Upper Main

appropriate in such an urban environment).
- Hydric Soils
- Act 250 Agricultural Soil Mitigation Areas
- FEMA Special Flood Hazard Areas
- Protected Lands
- Deer Wintering Areas
- Vermont Conservation Design Highest Priority Landscape Scale Components. These include highest priority interior forest blocks, surface water and riparian areas, and connectivity blocks, and wildlife crossings.

Street/VT Route 15, Weed Road, and Woodside Drive
- 15 % or steeper and less than 20%
- Vermont Conservation Design Priority Landscape Scale Components. These include priority forest blocks, connectivity blocks, surface water and riparian areas, and physical landscapes).
    - Forest blocks are areas of contiguous forest and other natural communities and habitats, such as wetlands, ponds, and cliffs that are unfragmented by roads, development, or agriculture (Sorenson and Osborne 2014).
    - Connectivity Blocks are the network of forest blocks that together provide terrestrial connectivity at the regional scale.
    - Physical landscapes (often referred to as enduring features) are the parts of the landscape that resist change. They are the hills and valleys, the underlying bedrock, and the deposits left behind by glaciers.
    - Surface Waters and Riparian Areas

Siting Polices

The policies in this section are the land conservation measures to be applied in the Section 248 decision making process with respect to the PUC's review of a petition for a renewable generation facility. The Essex Community will use the following siting policies to determine support for identifying a municipally designated preferred site and in the review of Section 248 applications.

1. The Essex Community strongly encourages development of renewable energy generation facilities on rooftops, parking lots, on parcels or directly adjacent parcels to a customer that has been allocated more than fifty percent of the net-metered system's electrical output, previously-developed sites, brownfields, landfills, former mineral resource extraction areas, and municipally designated sites. In the state designated Village Center in the Village of Essex Junction, the Essex Town Center, and the Historic Preservation and Business Design Control Districts design control best practices must be applied to integrate development into the built environment to the extent feasible. (See Appendix A for these standards).

2. Locate ground-mounted solar and wind turbines outside of the state designated Village Center in the Village of Essex Junction, the Essex Town Center, and the Business and Historic Preservation Design Control Districts.

3. Development of renewable energy generation facilities shall not take place in areas with known constraints and shall first explore alternatives to and then mitigate adverse impacts in areas with possible constraints, as identified in the constraints section of this plan. In determining whether known or possible constraints are present, on-site field verification should be conducted.

4. With the exception of preferred sites listed in policy 1, development of large-scale renewable energy generation facilities (capacity greater than 500kW) shall be located only within industrial zones, including the industrial zoned portion of the Resource Preservation District, in the Town of Essex.

5. Locate energy generation proximate to existing distribution and transmission infrastructure with adequate capacity and near areas with high electric load (See Green Mountain Power's Solar Map) to reduce the need for new distribution and transmission extensions.

6. Avoid or minimize the adverse impacts of development (including renewable energy development and associated transmission and distribution infrastructure) on identified scenic resources, viewsheds and roadscape corridors in the Town of Essex Scenic Resource protection overlay district (See Map 3) through appropriate site planning and design practices. See Appendix A for appropriate planning guidance on siting or site development design standards

7. Apply the Design Control Best Practices (see Appendix A) when locating roof-mounted photovoltaic net metering systems in the Village Center, Town Center, and the Town's Historic Preservation and Business Design Control Districts

8. Within the Resource Preservation Industrial District the following policies apply:

    a. 200-foot vegetative buffer shall be maintained along adjacent residential areas and streets, including VT Route 15, Sand Hill Road and Saxon Hill Road and where development abuts a residential property not located in a residential district.
    b. A 100-foot vegetative buffer shall be maintained along Allen Martin Drive. Parking areas, components of stormwater management systems may not be located within the 100- or 200-foot buffer in this district.
    c. Underground utility easement crossings are permitted only within the 200 ft. and 100 ft. buffer. Utility easements are permitted if ledge, underground water or other conditions make underground installation infeasible. Areas cleared for utility crossings shall be re-vegetated.

9. Development (including renewable energy generation facilities and associated transmission and distribution infrastructure) is discouraged on slopes of 15 % or steeper and less than 20% due to the likelihood of erosion and stormwater runoff problems. Development shall be prohibited on slopes of 20 percent and steeper due to the likelihood of environmental damage.
10. Development (including renewable energy generation and associated transmission and distribution infrastructure) will not destroy or significantly imperil wildlife habitat identified on Map 3 as highest priority and priority landscape scale components) or all reasonable means of minimizing the destruction or imperilment of such habitat or species will be utilized.
11. Where feasible, pair renewable energy generation with electrical energy storage to ensure energy is utilized to the fullest potential, to increase resiliency/reliability of electricity during outages and decrease fossil fuel usage during peak periods. Renewable energy generation projects that can accommodate energy storage are strongly encouraged.

Implementation

Land Use and Development Policies

The relationship between transportation, land use and energy consumption is extremely important and is an area in which the community can have a large impact through development regulations and infrastructure. According to the Vermont Total Energy Study, "more than one third of the state's energy consumption, and nearly half of its greenhouse gas emissions, are tied to the transportation sector." Therefore, a reduction in vehicle miles traveled by passenger vehicles can have a big impact on energy consumption.

In recent years communities are realizing the important connection between transportation and land use, which impacts energy use. Certain land use patterns can reduce dependency on the automobile by providing greater transportation options through compact mixed-use developments where people can choose to walk, bike, use public transportation or drive an automobile.

For new construction and building renovations, the State of Vermont has an energy building code, the Vermont Residential and Commercial Building Energy Standard. Compliance with the energy code is necessary to ensure that new development and alterations to existing buildings are using all types of energy efficiently. To meet the code, the zoning administrator is responsible for providing the energy code to land use permit applicants and must see a completed energy certificate that certifies that the applicant has complied with the code before issuing a certificate of occupancy. Even though a certificate of occupancy may not be needed for all types of buildings, all buildings must comply with the State energy code. Additionally, the Community should consider incorporating language into zoning ordinances requiring new homes and commercial buildings to be built to higher levels of efficiency.

To improve the thermal efficiency of existing commercial and residential buildings, a municipality could implement a time of sale energy retrofit ordinance for rental housing. Time of sale retrofits target older buildings, particularly multi-family housing, that aren't being reached by voluntary incentive programs. Building energy retrofits offer multiple benefits that include saving money on utility bills, improved safety and maintenance, and comfort. Additionally, the money saved from doing energy improvements gets recirculated into the community instead of being exported out of the region. As an example, the City of Burlington has a time of sale energy retrofit ordinance.

Goal: The Essex community is committed to development patterns and building energy use that result in the efficient use of energy.

General Policy: The Town Center in the Town is a focus of concentrated growth and community life intended to encourage energy efficient development and travel. (See the Land Use and Development section of the Essex Town Plan for more detail). Higher density infill and redevelopment is supported in the core areas of the Village to reduce demand on energy. (See the Land Use section of the Essex Junction Comprehensive Plan for more detail).

Actions

1. Consider including the Vermont Building Energy Stretch Code to cover all development in the Zoning Regulations for the Town (including the ETC Next Plan) and in the Village of Essex Junction Land Development Code.
2. Consider implementing a time of sale policy to ensure existing buildings, especially older rental housing, are in compliance with the State of Vermont Building Energy Code.

3. Review the zoning regulations and associated parking standards and sign regulations to encourage installation of electric vehicle charging stations.
4. Adopt a municipal screening requirement for solar generation facilities in accordance with 30 V.S.A. §248(b)(I)(B).
5. Consider reviewing the process for LEED density bonuses to increase utilization, in the Town.
6. Evaluate a process for incentivizing the creation of energy efficient buildings in the Essex Community.
7. Explore the idea of an energy fee or revolving loan fund that would fund public improvements to renewable energy infrastructure, such as rooftop solar and electric vehicle charging stations, with waivers for development that meets energy goals, such as installing electric vehicle charging infrastructure and providing ride-sharing options.
8. Continue to require energy efficient street lighting for new developments and when replacing existing lamps
9. Refer to the land use sections of both the 2019 Village of Essex Junction Comprehensive Plan and the 2016 Essex Town Plan for more information related to land use in the Community.

"Stretch code" means a building energy code that achieves greater energy savings than the base code. All development subject to Act 250 must follow the energy stretch code. Efficiency Vermont offers an incentive-based program to improve insulation/air-sealing and heating systems to support energy projects.

Transportation

The Community has a relatively unique opportunity within the county to support greater transportation choice and reduce automobile dependency since it is a relatively compact community with an extensive sidewalk network, especially in the Village, where local services are within walking distance to residences. The Community is also served by public transportation and rail. Residents have more transportation choices than many neighboring communities that have a more suburban/rural land use pattern. Further support of higher density infill and redevelopment in core areas of the Village may reduce demand on energy.

Goal: The community should be served by varied modes of transportation with automobile use balanced by increased availability of public transit, sidewalks, and multi-use trails to reduce transportation energy demand.

General Policy: Transportation systems shall be integrated with land use policy in such a way that improvements are compatible with the overarching settlement pattern of compact settlement surrounded by a productive rural countryside.

Actions

1. Design and construct pedestrian/bike paths on VT Route 2A, Pinecrest Drive, and Towers Road.
2. Construct a new multi-use path from Susie Wilson Road to the City of Winooski.
3. Reduce single-occupancy vehicle trips by establishing strategic park-and-ride locations, and by partnering with ridesharing, car-sharing, and public transit organizations.
4. Partner with Drive Electric Vermont, nonprofit organizations, vehicle dealers, and/or state agencies to organize high-visibility events where people can see and test drive EVs, such as energy fairs and summer festivals. Particular attention should be made to electric pickup trucks and motorcycles, since these represent nearly ½ the existing non- electric vehicle stock in the community. Events should also leverage local newspaper and public access coverage to showcase residents and organizations that are helping to propel the transition to EVs.

5. Promote the Drive Electric Vermont webpage, which connects users to financial incentives, dealers, and recharging stations for EVs. Promote the Go Vermont webpage, which provides ride share, vanpool, public transit, and park and-ride options.
6. Support employer programs to encourage transit use, telecommuting, carpooling, vanpooling, walking, and biking for employees' commute trips. Encourage employers to offer such programs and provide information on tax benefits that may be available for doing so.
7. Assess current access to public and workplace charging (to the extent known) and identify strategic locations in busy areas (large employers or areas of high visitation in the Village and Town Centers) where charging stations should be added or expanded.
8. Provide charging stations at prominent publicly owned locations such as municipal or school parking lots, as well as parking areas near public transportation and park and rides. Municipalities may develop their own charging stations, or work with private companies.
9. Lead by example by replacing the Town's vehicle fleet with electric or biodiesel fuel vehicles as fossil fuel-burning vehicles reach the end of their useful life.
10. Assess the number of park-and-ride spaces and explore opportunities to expand the number of spaces and provide greater connectivity between public transit and park and ride locations.
11. Work with the school district to maximize ridership for public school busses and minimize use of private vehicles for student transport. Explore working with a bus company who is converting its bus fleet to electric.
12. Present annually to the public, staff, and municipal officials an overview of public transit available in the Town and the Village including information about Green Mountain Transit and the major routes they offer.
13. Continue to work with Local Motion to make the Essex Community safe and welcoming for bicycling.
14. Continue to identify issues and opportunities for walk-bike improvements and connections.
15. Refer to the transportation sections of both the 2019 Village of Essex Junction Comprehensive Plan and the 2016 Essex Town Plan for more information related to transportation in the community.

Thermal and Electric Energy Conservation and Efficiency

Building weatherization is the most cost-effective way of modifying a building to reduce electricity and heating fuel consumption, as well as greenhouse gas (ghg) emissions. Weatherization includes air sealing, insulation, and upgrading heating system and can dramatically reduce a home's heating bills. However, the initial upfront capital to make weatherization improvements on a home can be difficult for some households and businesses. Various organizations like Efficiency Vermont and financial institutions provide incentives and low financing to make thermal and electric efficiency retrofits possible. A critical step to ensuring thermal and electric efficiency in all buildings is implemented is educating residents and businesses about the programs and technologies available. The actions in this section provide a plan for how the community can work with energy vendors and the public to raise awareness about these issues.

Goal: The Essex Community's energy goals and targets shall be met primarily through energy conservation, efficiency, and fuel switching while transitioning away from fossil fuels.

General Policy: The Essex Community shall support regulatory and non-regulatory initiatives that result in decreased greenhouse gas emissions, reduced energy consumption, and increased renewable energy generation.

Actions

1. Fund an Energy Coordinator position to develop energy implementation plans, coordinate efforts for both the Town and the Village and encourage residential and commercial energy conservation. As an initial step, make this goal a priority for the new Building Manager.
2. Continue to explore energy efficiency and renewable energy options for all Town and Village-owned and Town/Village-sponsored facilities, from buildings to street lighting. Findings and recommendations should be based on an audit of all municipally owned and municipally sponsored facilities and a subsequent cost-benefit analysis for upgrading or replacing those facilities
3. Host education programs and collaborate with Efficiency Vermont, utilities, and energy vendors to encourage energy efficiency in existing residential and commercial buildings and to educate residents and businesses about heating pumps, advanced wood heating, geothermal heating, renewable natural gas, and other renewable technologies. Provide residents with information on heating assistance programs on an annual basis to make those in need aware of the programs.
4. Promote wood stove change-out programs that take older non-EPA certified stoves out of service and replace them with more efficient and lower emitting cord and pellet stoves.
5. Facilitate a workshop and/or conduct building walk-throughs for owners of rental housing to encourage implementation of energy efficiency measures.
6. Through the Building Manager, monitor energy used by the Town and Village buildings annually to describe progress towards energy goals, working closely with the Energy Committee
7. Work towards a plan to replace existing municipally owned-streetlamps with solar-generating lamps, provided that these can be harmonized to the extent feasible with design constraints.

Renewable Energy

Goal: Generate 183,587 -325,830 MWh of new renewable energy by 2050.

General Policy: The Essex Community shall support regulatory and non-regulatory initiatives that result in decreased greenhouse gas emissions, reduced energy consumption, and increased renewable energy generation.

Actions

1. Identify and map specific preferred sites for renewable energy generation to send a message to potential developers that these are the locations where the Town and Village would like to see renewable energy generation development.
2. Promote community solar net metering.
3. Encourage and support renewable energy projects consistent with the siting policies of this plan through letters of support to the Public Utilities Commission.
4. Explore possible municipally owned sites for renewable energy generation, such as the Town landfill, rooftop solar on municipal buildings, and parking lot canopies on public lots.
5. Study the capabilities of existing buildings to support roof-mounted solar PV systems in zoning districts where it is deemed appropriate for a better estimate of this potential.

Existing + Future Estimates of Energy Consumption

The data included in this section show one path the Essex Community could take to meet State of Vermont's energy goals. The targets are intended to be a demonstration of one possible scenario to reach 90% renewable by 2050 and are not intended to prescribe a single future path. To meet the goals, the Essex Community must plan for a major shift away from fossil fuels in the transportation and heating sectors to renewable sources of energy, as well as efficiency in transportation, heating and electricity, and an increase in renewable energy generators sited in the Essex Community. However, the actions or technology changes that the Essex Community will take will very likely change between now and 2050, as new and improved technologies become available.

The analysis in this section estimates current energy use and provides targets for future energy use across all sectors (transportation, heating, and electricity). These targets represent the amount of renewable energy that the community should aspire to produce to meet the 90% by 2050 goal. The Essex Community's targets represent the amount of renewable energy generation that the community should aspire to achieving to advance the amount of local renewable energy generation. Please note that these data are a starting point for considering a renewable energy future. This information should provide the framework for a discussion about changes that will need to occur within the Essex Community to ensure that State energy goals are met.

The data in this section are intended to provide an overview of current energy use and a sense of the trajectories and pace of change needed to meet the State's energy goals. Targets for each sector are also provided to demonstrate milestones along the way toward meeting 90% of total energy needs with renewable energy.

Targets for future energy use are drawn from the Long-Range Energy Alternatives Planning (LEAP) analysis for Chittenden County, completed by the Vermont Energy Investment Corporation (VEIC). The LEAP model is an accounting framework that shows one possible path for Chittenden County and its municipalities to meet the state energy goals. See the 2018 Chittenden County ECOS Plan Supplement 6 for information about the methodology.

To achieve these targets a concerted effort in the Essex Community is needed, including residents, businesses, community groups, and government, to conserve energy and transition to renewable sources. The Energy Committee has recommended multiple projects in each area. Completing the projects will lead to energy savings and an improved quality of life for all residents of the Essex Community through financial savings, improved air quality, and reduced greenhouse gas emissions.

Total Energy Use Per Capita

The LEAP model indicates that total energy use will continue to grow over the next 30 years, even as energy savings increase. This is partly due to overall population increase, but also due to fuel switching from fossil fuels to renewably-sourced electricity, including uses within the transportation and heating sectors. As shown in Table 1, total energy use increases but total energy use per capita will decrease because of transformations in the heating and transportation sectors needed to reach the state's energy goals. Although the state goal is to reduce per capita energy by 1/3, modeling was unable to demonstrate this reduction. The uncertainty lies in the model at the local level. The reduction is achievable at the County and state level.

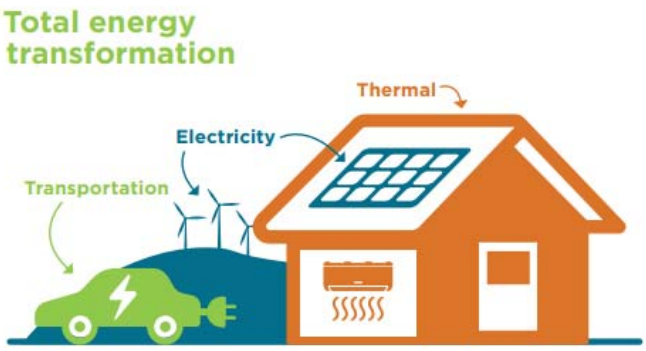


Table 1 Estimated Future Total Energy Use per Capita (excluding industrial electricity use), 2015-2050

	2015	2025	2035	2050
Total energy use (MMBtu)	4,136,978	4,240,447	4,240,447	4,669,525
Population	20,946	22,137	22,895	24,020
Total energy use per capita (MMBtu)	198	192	192	194
Reduction in total energy use per capita since 2015	N/A	-3%	-3%	-2%

***Source: CCRPC LEAP model* *, CCRPC Demographic Forecast (2017)**

Heating

The building inventory in the Essex Community includes government/commercial buildings and homes. Municipally owned structures range from the new, energy efficient Town Municipal Building, to historic inefficient buildings such as Memorial Hall. With a goal of saving tax dollars by improving energy efficiency of Municipal-owned structures, the Essex Energy Committee has conducted an overall energy assessment and is developing a retrofit plan for all municipally-owned properties. Examples of these include the Village Wastewater Treatment Facility's combined heat and electric power system, which uses methane captured from anaerobic digestion to feed the water treatment process and provide service to the facility's buildings. The Town offices at 81 Main Street were renovated in 2016 with a modern HVAC system as well as motion-sensitive lighting, which have reduced heating and electricity use. Improvements to other municipal buildings, such as Lincoln and Memorial Halls, face financial, design, and permitting challenges that will require more resources than other improvements due to their age. However, these investments will save energy and money in the long run and showcase energy efficiency renovations for historic buildings.

According to the American Community Survey, in 2016 about 86% percent of homes in the Essex Community use fossil fuels for heating (see Table 2); this does not account for the fossil fuels in the electricity supply mix for homes heating with electricity. The remaining portion of homes heat with renewable sources of either electricity or wood. It is difficult to know the type of electrical equipment used in homes heated with electricity. Homes heated with electricity could be using electric resistance heat or cold climate heat pumps. Historically, electric heating (through electric resistance) has been expensive and inefficient, but new technology such as heat pumps (which heat and cool air using a refrigerant process) and weatherization of homes will make heating with electricity viable from both a financial and energy planning perspective. The efficiency of wood heating has also improved with the advent of wood pellets and high-efficiency stoves. Further improvements in home heating, such as combined air and water heating with heat storage systems, will also benefit new construction.

Residential energy costs are often overlooked due to the current low cost of natural gas and the stable cost of electricity. Residential incentives, improvements in zoning regulations, and energy education should be at the forefront of

residential energy planning in the Essex Community. Through regulations and incentives, the Essex Community should also encourage rental housing property owners to invest in energy conservation measures, rather than letting heating, cooling, and lighting costs fall to tenants. The state has Residential Building Energy Standards and Commercial Building Energy Standards that establish a minimum level of energy efficiency in new and renovated buildings. The community should investigate incentives. For example, a time sale ordinance would encourage builders and property owners to meet or exceed the basic energy standards by leveraging additional funding for energy efficiency so that housing affordability is not reduced by passing those additional costs to renters or homeowners.

The costs and long-term savings of heating efficiency improvements and switching from equipment dependent on fossil fuels to those using renewable energy will largely be borne by building owners. Efficiency Vermont provides technical assistance, rebates, and referrals to ENERGY STAR®-certified contractors and low-interest energy efficiency loans for homeowners, landlords, and business owners. The Essex Energy Committee also conducts outreach and collects information for the community on such improvements.

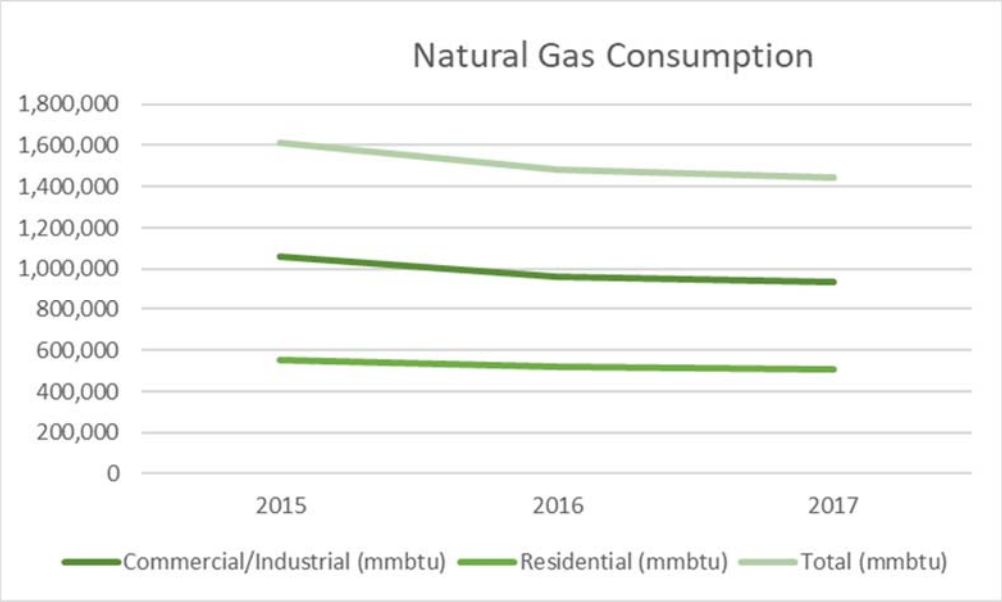
Table 2 Home Heating Fuel Type

Type	Estimate (# of homes)	Percentage	Margin of Error
Total	**8,453**	**100%**	**+/-252**
Utility gas	5,435	64%	+/-375
Propane	437	5%	+/-171
Electricity	845	10%	+/-246
Fuel oil, kerosene	1,408	17%	+/-253
Coal or coke	0	0%	+/-16
Wood	247	3%	+/-87
Solar energy	0	0%	+/-16
Other fuel	66	1%	+/-47
No fuel used	15	0%	+/-24

Source: 2012-2016 American Community Survey 5-Year Estimates

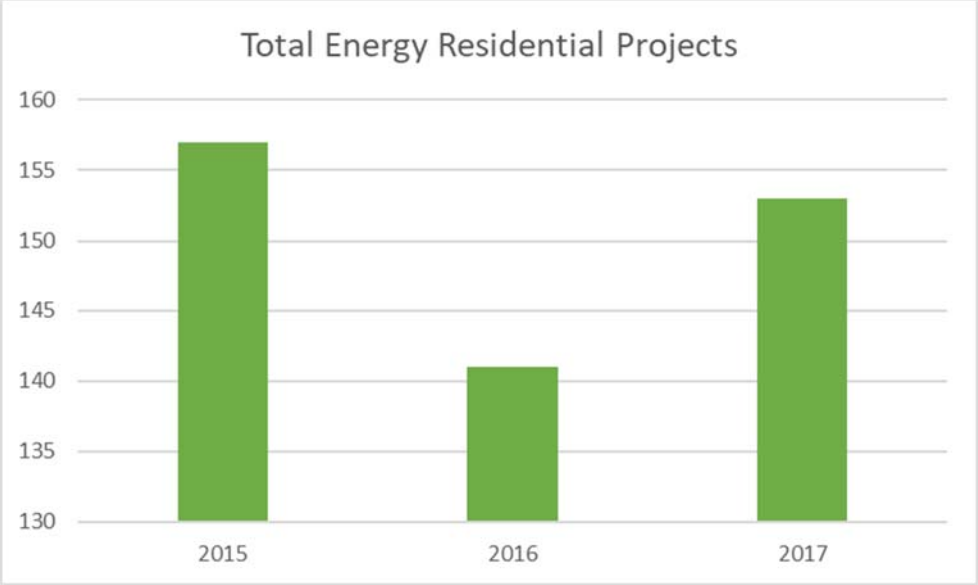
Weatherizing buildings (sealing air leaks and improving insulation), using more efficient heating and cooling systems such as heat pumps, and installing smart thermostat systems to avoid peaks and troughs in heat output are all important steps building owners should take to help reduce heating energy use between now and 2050 (see Table 3 and Table 4). As seen in Figure 1, natural consumption has declined for both residential and commercial/industrial users. Additionally, there has been a steady trend of residential projects undertaking energy efficiency measures which include improvements to the thermal shell, installed efficient appliances and heating equipment (see Figure 2). Keep in mind that data on building weatherization is difficult to track and the data below is not a complete measure of the homes weatherized to date.

Figure 1 Natural Gas Consumption (2015-2017)



Source: Vermont Gas

Figure 2 Residential Energy Retrofits (2015-2017)



Source: Efficiency Vermont

Table 3 Essex Community Future Estimated Residential Thermal Energy Use (2025-2050)

	2025	2035	2050
Total residential thermal energy use (MMBtu)	743,710	630,580	436,586
Percent of residences weatherized	14%	36%	100%
Residential energy saved by weatherization (MMBtu)	1,262	3,448	10,793
Residences using heat pumps (%)	18%	37%	60%
Residential thermal energy use from heat pumps (MMBtu)	48,202	99,170	145,397
Percent of residences using wood heating	14%	14%	14%
Residential thermal energy use from wood heating (MMBtu)	136,573	136,705	120,110

Source: CCRPC LEAP Model, Vermont Department of Public Service

Table 4 Essex Community Future Estimated Commercial Thermal Energy Use (2025-2050)

	2025	2035	2050
Total commercial / thermal energy use (MMBtu)	393,515	374,823	331,537
Percent of commercial establishments weatherized	19%	22%	38%
Commercial energy saved by weatherization (MMBtu)	21,154	29,330	70,685
Commercial establishments using heat pumps (%)	21%	34%	38%
Commercial thermal energy use from heat pumps (MMBtu)	31,909	63,078	94,247
Commercial establishments using wood heating (%)	9%	10%	11%
Commercial thermal energy use from wood heating (MMBtu)	47,615	65,583	96,017

Source: CCRPC LEAP Model, Vermont Department of Public Service, Vermont Department of Labor

Electricity

Total electrical energy use within the Essex Community has decreased since 2015, though the number of residential premises has increased. This is primarily due to energy efficiency appliances and smart technologies. Additionally, utilities are measuring savings from estimated reductions in electricity realized by installed efficiency measures in the commercial sector. The Essex Community has saved 7,644 MWh of electricity from 2015-2017 from commercial and industrial users. The Community should consider working with businesses to accelerate the pace of energy efficiency savings, given that the commercial/industrial sector makes up 90% of electricity consumption. Residential users make up 10% of electricity use in the community. Like the commercial/industrial sector, residential users saved nearly 50% of the electricity saved between 2015-2017. The LEAP model (see Table 7) has estimated future electricity demands and intermediate targets for electricity savings and renewable generation in line with the Vermont CEP to demonstrate the importance of maintaining and accelerating this momentum.

Table 4 Electricity Consumption (2015-2017)

Sector	2015	2016	2017
Commercial & Industrial (MWh)	491,868	485,004	480,218
Residential (MWh)	55,341	54,407	52,836
Total (MWh)	**574,209**	**539,411**	**533,054**
Count of Residential Premises	8,353	8,516	8,593
Average Residential Usage (KWh)	6,625	6,389	6,149

Source: Green Mountain Power, Efficiency Vermont

Table 5 Electricity Consumption (2015-2017)

	2015	2016	2017	Total
Total Electric Savings (MWh)	**4,395**	**4,456**	**5,766**	**14,617**
Residential	2,250	2,213	2,511	6,973
Commercial & Industrial	2,145	2,243	3,255	7,644

Source: Green Mountain Power, Efficiency Vermont

Table 6 Estimate Future Electricity Usage (2025-2050)

	2025	2035	2050
Total electrical energy use (MWh)	859,118	1,098,896	1,436,730
Total electrical energy savings (MWh)	14,092	28,447	53,207
Percent of Residences that should increase their electric efficiency	30%	58%	98%
Percent of Commercial and Industrial Establishments that should increase their electric efficiency	30%	58%	98%
Source: CCRPC LEAP Model, Vermont Department of Public Service			

Within the Essex Community there are currently 432 sites that generate 27,799MWh of electricity from renewable sources, with a total capacity of 12 megawatts (MW). Green Mountain Power's Essex #19 hydroelectric dam on the Winooski River at VT-2A accounts for 18,300 MWh, or 66% of this total. The energy generated from the hydro dam is split between the Essex Community and the Town of Williston because the jurisdictional boundaries split the centerline line of the Winooski River. The next largest producer is the wastewater treatment facility's combined heat and power system, which provides 760 MWh of electricity to the facility (in addition to heat). The remaining 8 MW/8,739 MWh come from 430 roof-mounted or ground-mounted photovoltaic ((PV) solar systems scattered throughout the community. By securing a power purchase agreement with Green Lantern Solar, LLC, which supplies 80% of municipal buildings' electricity needs from a 500 kW PV facility on River Road, the Essex Community has demonstrated leadership in deployment of renewable energy resources. These sources supply approximately 3.4% of the current (2017) electric energy used within the community.

Table 7 Existing Renewable Energy Generation

	Sites	Power (MW)	Energy (MWh)
Solar	430	8	8,739
Hydro	1	4	18,300
WWTP	1		760
Total	432	12	27,799

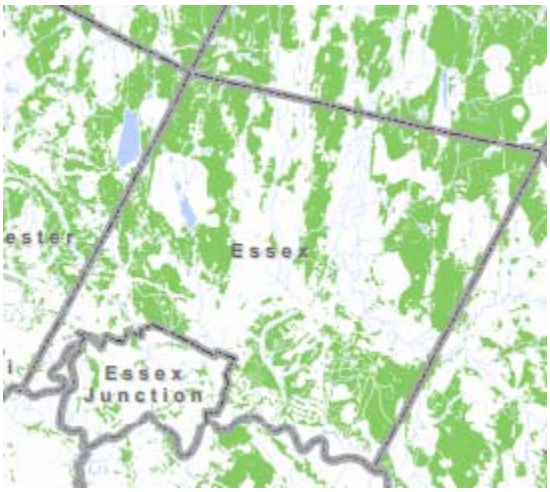
Source: Community Energy Dashboard, 10/23/2018

Renewable Energy Generation Targets

Regardless of ultimate use, the transformation to renewable sources of electricity will require increased generation from a variety of sources including biomass, hydro, solar, and wind. Additionally, electricity storage technologies such as batteries, fuel cells, pumped hydroelectric, and compressed air systems store excess power generated by intermittent renewable sources. These will become more important as the technology develops and the proportion of generation from renewable sources increases. The community should work with electric utility companies to support these infrastructure needs.

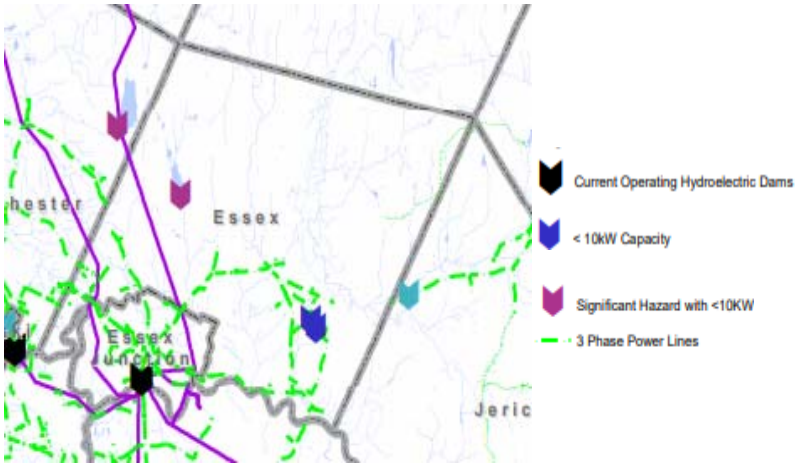
Electricity generation potential from woody biomass is difficult to model, but woody biomass resource areas are shown in Figure 3. These are areas are generally privately-owned forest lands and demand for saw timber and other forest products will compete with firewood, wood chips, and wood pellets. Furthermore, electric generation efficiency from woody biomass is low—around 25% at most—compared to other sources (2016 CEP, p. 339). Woody biomass would be better used for heating or combined heat and power.

Figure 3 Woody Biomass



Hydroelectric generation is unlikely to increase significantly in the community for several reasons. There are few additional sites for large facilities, and smaller facilities have limited generation potential. Furthermore, site design and permitting are extremely challenging due to the significant impacts on stream geomorphology and aquatic habitats. That said, there are several potential sites for micro-hydro in Essex and Essex Junction, shown in Figure 4. The Energy Committee wholeheartedly supports development of micro-hydro and will seek to work with stakeholders to investigate the feasibility.

Figure 4 Potential Hydro Power



Supplying the community's electricity needs primarily through local PV solar systems and wind turbines will require a significant portion of land area. According to CCRPC's mapping analysis, there is enough suitable land for development of renewable energy generation to meet the community's targets. Figure 5 indicates that there is about 13% of the community's land area capable of accommodating solar energy generation facilities to meet the low target (see Table 10 for targets). However, the community only needs about 1,198 acres or 4.75% of the Community's land area to meet the low target for renewable electricity generation. Given that the Essex Community cannot meet its low target solely with 883 acres of prime solar the remaining 325 acres must be developed in areas of base solar. Because the actual development potential of base solar is uncertain, CCRPC's methodology assumes a generation density of 1 MW per 60 acres when calculating land are required to meet the community's overall generation targets. Therefore, once all constraints are accounted for, the actual area occupied by solar development would still be only 1,198 acres in total. Developing this amount of acreage is just one pathway for meeting the target. The are many other technologies (i.e. hydro, district heating, and biomass) that could be used to offset the need to utilize some of the 1,198 acres. Additionally, the policies on siting renewable energy generation facilities should be reviewed and adjusted as steps are taken towards the goal of 90% renewable energy use by 2050. The community should revisit the concept of a community net metering solar array by conducting an engineering study for the former town dump located near the intersection of VT Route 2A and VT Route 289.

Map 4 and Map 5 show the areas in the community where conditions are appropriate for solar and wind energy generation, such as slope, aspect, elevation, and modeled wind speed. These are classified into prime areas (appropriate conditions and no known or possible development constraints) and base areas (appropriate conditions, but with possible constraints to avoid or mitigate). Table 8 describes the land available for renewable energy generation based on the acreage of prime and base areas. Table 9 shows the generation potential (capacity or power in MW, total annual energy output in MWh) based on these prime and base resource areas.

Table 8 Land available for Renewable Energy Generation

	Prime Potential	Base Potential
Solar (acres)	883	7,716
Solar (% of land area)	9%	64%
Solar generation density (MWh/acre)	153	20
Wind (acres)	125	3,307
Wind (% of land area)	0.6%	15%
Wind generation density (MWh/acre)	122	123
Source: CCRPC, Vermont Department of Public Service, Vermont Center for Geographic Information		

Table 9 Potential Renewable Energy by Technology

	Power (MW)	Energy (MWh)
Rooftop Solar	15	18,262
Ground-Mounted Solar – Prime	110	135,323
Ground-Mounted Solar – Base	129	157,707
Wind – Prime	5	15,278
Wind – Base	132	405,570
Source: CCRPC, Vermont Department of Public Service		

Figure 5 Land Area Available to Reach Low Target

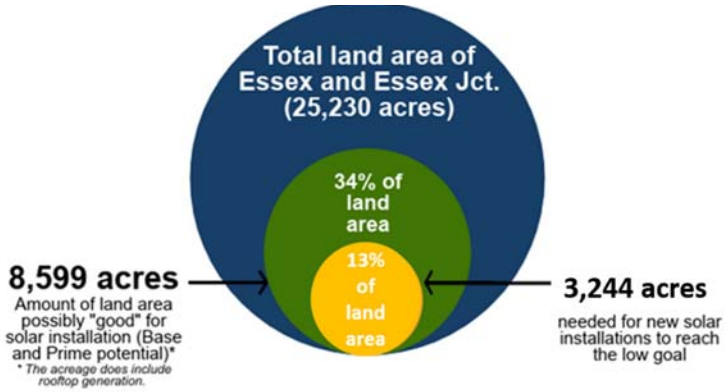


Table 10 Renewable Energy Generation Target

	Low	High
Additional Target (Mwh)	183,587	325,830
Existing (Mwh)	27,799	
Total (Mwh)	211,386	353,629
Additional Acres Needed to Meet Target	1,198 (5% of Community)	2,125 (8% of Community)

Of the total solar generation potential, 15 MW (18,262 MWh) could be located on existing impervious surfaces, such as rooftops and paved areas. Because these sites are already developed, solar generation may be compatible with other land uses if developed in a way that is in harmony with existing development patterns and existing aesthetic norms especially in the Village Center District and the Town's Historic Preservation and Business Design Control Districts. Preferred sites should be the focus of renewable energy development over undeveloped land, or historic districts. The Essex Energy Committee has partnered with solar developers to promote adoption of rooftop solar in the community by hosting informational events for both residential and commercial building owners.

Other preferred sites for net metering systems include brownfields, landfills, and former mineral resource extraction areas. For instance, the Town strongly supported Green Mountain Power's 4.5-MW photovoltaic array and battery storage facility at River Road on the site of a reclaimed sand and gravel extraction area. Wind turbines may also be located on previously-developed sites, but wind generation efficiency drops exponentially with turbine size, and only small-scale turbines should be sited near developed areas, so the generation potential for these sites would be limited. There are nevertheless good reasons to consider small-scale wind on municipal lands as a means of reducing electrical costs and setting an example of the small-but-important steps residents and businesses can take to work towards Essex's goals.

Renewable energy generation facilities shall not take place in areas with known constraints; if impacts to possible constraints cannot be avoided, they shall be mitigated. Renewable energy installers should be encouraged to develop in tandem with other uses that could occur on a given site to add value in a way that speaks to holistic development patterns rather than a standalone facility. This type of development could also locate renewable energy installations on the same site as high energy users and reduce the need for distribution and transmission line upgrades.

Facilities with a generation capacity greater than 500kW are considered utility-scale and shall be located in designated industrial or commercial zones, where constraints are less numerous, impacts are more easily mitigated, and there is less competition for other land uses than in other areas. Other areas would have to be considered on a case by case basis, with developers encouraged to interact directly with Essex's municipal planners and committees in advance of issuing an advance notice under Section 248.

Within the Town of Essex's Scenic Resource Protection Overlay District**,** the designated Village Center District**,** the Town of Essex's Historic Preservation Design Control District, and the Business Design Control District, all renewable energy generation facilities shall follow the siting, design, and screening standards/best practices as other forms of development to avert or minimize undue adverse impact on scenic resources.

Transportation

As noted in the Transportation section of the Essex Village Comprehensive Plan and Essex Town, the Essex Community has been and continues to be**,** a transportation hub. The only Amtrak station in Chittenden County exists in the Village, an active bus terminal, and five state highways are also present. Promoting compact development, providing more options for walking, biking, and public transit, and reducing single-occupancy vehicle trips can reduce energy use in the transportation sector. The park and ride on Landfill Lane provides one option to carpool and reduce single-occupancy vehicle use; the community should explore other strategic locations for park and ride lots.

The Essex Community relies almost exclusively on fossil fuels for its transportation energy. In 2015, there were 15,114 fossil-fuel burning light-duty vehicles registered in the community, in addition to heavy-duty vehicles and locomotives. Heavy-duty vehicles will still rely on internal combustion engines due to power demands, but these can transition to renewable biofuels with changes to vehicle design and fueling systems.

The LEAP model indicates that, to reach 2050 targets, total transportation energy use in the community (including light-duty and heavy-duty vehicles) must decrease significantly and steadily. In addition, light-duty vehicles will create a significant demand for electricity by transitioning from fossil fuels, while heavy-duty vehicles will likely transition to using biodiesel almost exclusively.

Table 11 Estimated Future Transportation Energy Use, 2025-2050

	2025	2035	2050
Total light duty transportation energy use (MMBtu)	890,049	563,787	245,721
Electricity used for light duty transportation (MMBtu)	11,869	81,813	172,669
Light duty electric vehicles (% of vehicle fleet)	94%	59%	11%
Biofuel blended* energy used for light duty transportation (MMBtu)	878,180	481,974	73,052
Biofuel blend* light duty vehicles (% of vehicle fleet)	94%	59%	11%
Heavy-duty transportation energy use from biodiesel (% of total)	33%	58%	96%
Heavy-duty transportation energy use from fossil fuels (% of total)	67%	42%	4%
***This measures biofuels blended with fossil fuels. A common example is gasoline with ethanol mixed in.**			
Sources: VTRANS, CCRPC/VEIC LEAP model			

The technological improvements and decreasing price of hybrid and all-electric vehicles ("EVs") will allow for a steady transition from fossil fuel to renewable sources for light-duty vehicles; in 2017, there were already 49 light-duty EVs registered in the community The community can become "electric vehicle ready" by requiring that buildings (including residences and places of work) are built and retrofitted with EV charging infrastructure, while also encouraging development of public charging stations. Drive Electric Vermont has information on the use of EVs.

Because of the urgent need to make progress towards these goals, the Essex Community should actively pursue both incentive-based and regulatory strategies to encourage conservation and efficiency, such as a revolving loan fund for energy efficiency upgrades, or an energy fee that funds public energy improvements (such as EV charging stations and rooftop solar grants or loans), with waivers or reduced rates for those who make their own improvements.

Government

As the primary source of regulation and enforcement in the community, as well as a source of guidance, the Town and Village governments can champion energy reform and efficiency.

The community needs to prepare for energy-related issues beyond its control. As the community and state take steps to improve efficiency, reduce consumption, and incorporate more renewable energy into the mix, large-scale renewable energy sites such as solar farms may wish to locate in the Essex Community. Though the community could take pride in locally-produced, renewable energy, other Vermont towns can attest to the controversy that can arise when wind turbines are placed atop ridgelines or solar arrays fill previously-undeveloped fields.

The Vermont Public Utilities Commission(PUC), rather than the community, issue permits for electric transmission and electric generation facilities. As a result, energy projects are not subject to direct municipal land use regulation, though the changes made by Act 174 of 2016, provide new means of local control through solar setbacks, site designation, and this plan. Moreover, the community can rely on this plan to engage in the Section 248 process to ensure that local land use policies are considered and enforced in the orderly development criterion of the permitting process conducted by the PUC.

Appendix A

The standards in this section shall apply to all development (including renewable energy generation) located in the specified areas identified.

Design Control Best Practices

This section outlines the best practices for locating net-metered roof-mounted solar facilities up to 500 kW in the Village of Essex Junction's Designated Village Center/historic district and the Town of Essex's Business and Historic Preservation Design Control Districts. The best practices in this section are intended to preserve character-defining features of these areas while accommodating the need for renewable energy generation to the extent practical.

1. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
2. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
3. Utilization of low-profile solar panels is recommended. Panels shall be within ten percent (10%) of the average height of existing adjacent buildings and not be visible from the public right of way. Solar shingles laminates, glazing, or similar materials should not replace original or historic materials. Use of solar systems in windows or on walls, siding, and shutters should be avoided.
4. Panels should be installed flat and not alter the slope of the roof. Installation of panels must be reversible and not damage to the historic integrity of the resource and district.
5. Solar panels should be positioned behind existing architectural features such as parapets, dormers, and chimneys so they are not visible from the public right of way.
6. Use solar panels and mounting systems that are compatible in color to established roof materials. Mechanical equipment associated with the photovoltaic system should be unobtrusive.
7. Solar panels should be installed on rear slopes or other locations that are not visible from the public right-of-way. Panels should be installed flat and not alter the slope of the roof. Installation of panels must be reversible and not damage the historic integrity of the resource and district.
8. Flat roof structures should have solar panels set back from the roof edge to minimize visibility. Pitch and elevation should be adjusted so they are not visible from public right-of-way.
9. Use of solar systems in non-historic windows or on walls, siding, or shutters should not be visible from the public right of way.

Scenic Resource Protection Standards

The scenic resource protection standards should be applied to the Town of Essex's Scenic Resource Protection District. The purpose of these standards is to avert or minimize the adverse impacts of development (including renewable energy generation) on identified scenic resources, viewsheds and roadscape corridors through appropriate siting and design practices. A proposed development along any of the scenic road segments identified in this section shall address any impacts on scenic resources as seen from public roads using these standards.

SCENIC STREETS

Portions of the following streets are included in the Scenic Resource Protection Overlay District. To see which portions of the streets are in the district, refer to the SRPO map.

- Bixby Hill Road
- Browns River Road
- Chapin Road
- Colonel Page Road
- Jericho Road/VT Route 15
- Naylor Road
- North Williston Road
- Old Stage Road
- Pettingill Road
- River Road/VT Route 117
- Towers Road
- Upper Main Street/VT Route 15
- Weed Road
- Woodside Drive

1. To minimize the loss of scenic character renewable energy generation facilities shall be designed and located to minimize the intrusion of incompatible and unharmonious development into existing scenic vantage points as viewed from public vantage points identified in the list of scenic streets.
2. Renewable energy generation facilities shall be positioned so that views to distant mountains remain as natural as possible.
3. Renewable energy generation facilities should be arranged in a manner that protects a significant portion of open space.
4. The use of vegetation to screen renewable energy generation facilities and associated fencing in all seasons is strongly encouraged. Plantings shall be of sufficient height, density and maturity to serve as a visual barrier from buildings and the roadscapes identified in this section
5. Shorter structures may be more appropriate in certain spaces than taller structures to keep the project from obstructing public vantage points identified in this section. Avoid locating a renewable energy generation facility in a location which diminishes the visual impact of the array from the owner's property but places the array immediately within their neighbor's or the public's viewshed. Locate facilities in a manner designed to reduce impacts on neighbors or public viewsheds.

Map 1.
Existing Renewable Energy Sites & Preferred Sites
Essex Community, Vermont

Existing Site Type

- Roof-Mounted Solar
- Ground-Mounted Solar
- Solar Canopy
- Hydropower
- Combined Heat and Power System

State Designated Preferred Sites*

- Closed Landfill
- Sand or Gravel Pit
- Brownfield
- Parking Lot
- 3 Phase Power Lines
- Transmission Lines

*Additional state designated preferred sites not shown on this map include roof-tops, parking lot canopy,a previously developed site, or a parcel or adjacent parcel to a customer that has been allocated more than 50 percent of the net-metered output.

This map and the corresponding data is 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".

0 0.5 1 2 Miles

N

Sources:
Closed Landfill-ANR
Sand or Gravel Pit--ANR
Parking Lots-CCRPC,2008
3-Phase Power-VCGI, BED
Existing Sites-EAN, 11.2018
Major Roads and Railroad - VTrans
Town Boundary and Water Body - VCGI
Map produced with ArcGIS,
State Plane Coordinate System NAD83.

Date: 5/31/2019

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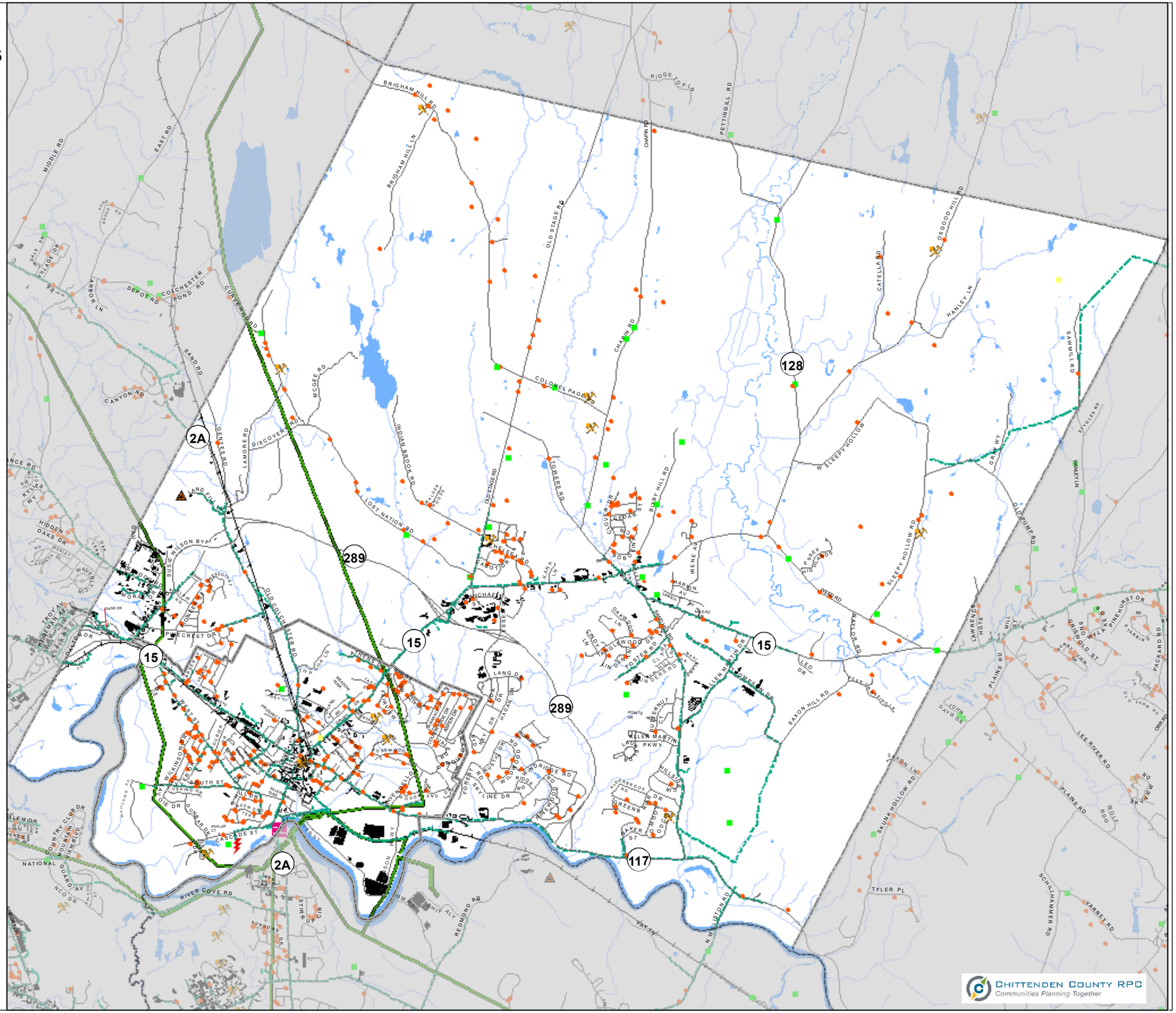
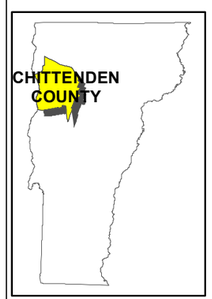


CHITTENDEN COUNTY RPC
Communities Planning Together

Map 2.
Known Constraints
Essex Community,Vermont
State and Local Constraints

- Vernal Pools (Confirmed and Unconfirmed)
- FEMA Designated Floodway
- Vermont Department of Environmental Conservation River Corridors*
- State-significant Natural Communities & RTE Species
- Wetland (Vermont Significant Wetlands Inventory and Advisory Layer)
- Recreation/Conservation Area within Resource Preservation-Industrial Zoning District
- Slopes of 20% and steeper
- Stream Centerline
- Water Body

0 0.5 1 2 Miles



*Note: River corridors are comprised of meander belt and riparian buffer components for the purpose of achieving and maintaining stream equilibrium conditions. Small streams draining 0.5 to 2 square miles and a 50 ft. buffer are also included.

Sources:
Vernal Pools; VCGI, 2017
DEC River Corridors;VCGI, 2019
FEMA DFIRM Floodways;VCGI,2017
RTE + Sig.Natural Comm;VCGI,2017
Wetlands;VSWI Wetlands Class Layer, VSWI Advisory Layer, 2017

Disclaimer:
The accuracy of information presented is determined by its sources. Errors and omissions may exist. The Chittenden County Regional Planning Commission is not responsible for these. Questions of on-the-ground location can be resolved by site inspections and/or surveys by registered surveyor. This map is not sufficient for delineation of features on-the-ground. This map identifies the presence of features, and may indicate relationships between features, but is not a replacement for surveyed information or engineering studies.

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CHITTENDEN COUNTY RPC
Communities Planning Together

Map 3.
Possible Constraints
Essex Community, Vermont

State and Local Constraints

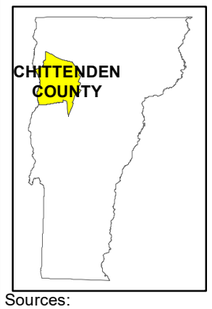
- Stream Centerline
- Water Body
- FEMA Special Flood Hazard Areas
- Agricultural Soils
- ACT 250 Ag Mitigation Parcel
- Hydric Soils
- Deer Wintering Areas
- Protected Lands
- Slope 15% to 20%
- Resource Preservation Industrial District
- Areas where design control best practices apply
- Scenic Resource Overlay

Vermont Conservation Design - Landscape Scale Components

PRIORITY

- HIGHEST PRIORITY
- PRIORITY

0 0.5 1 2 Miles



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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

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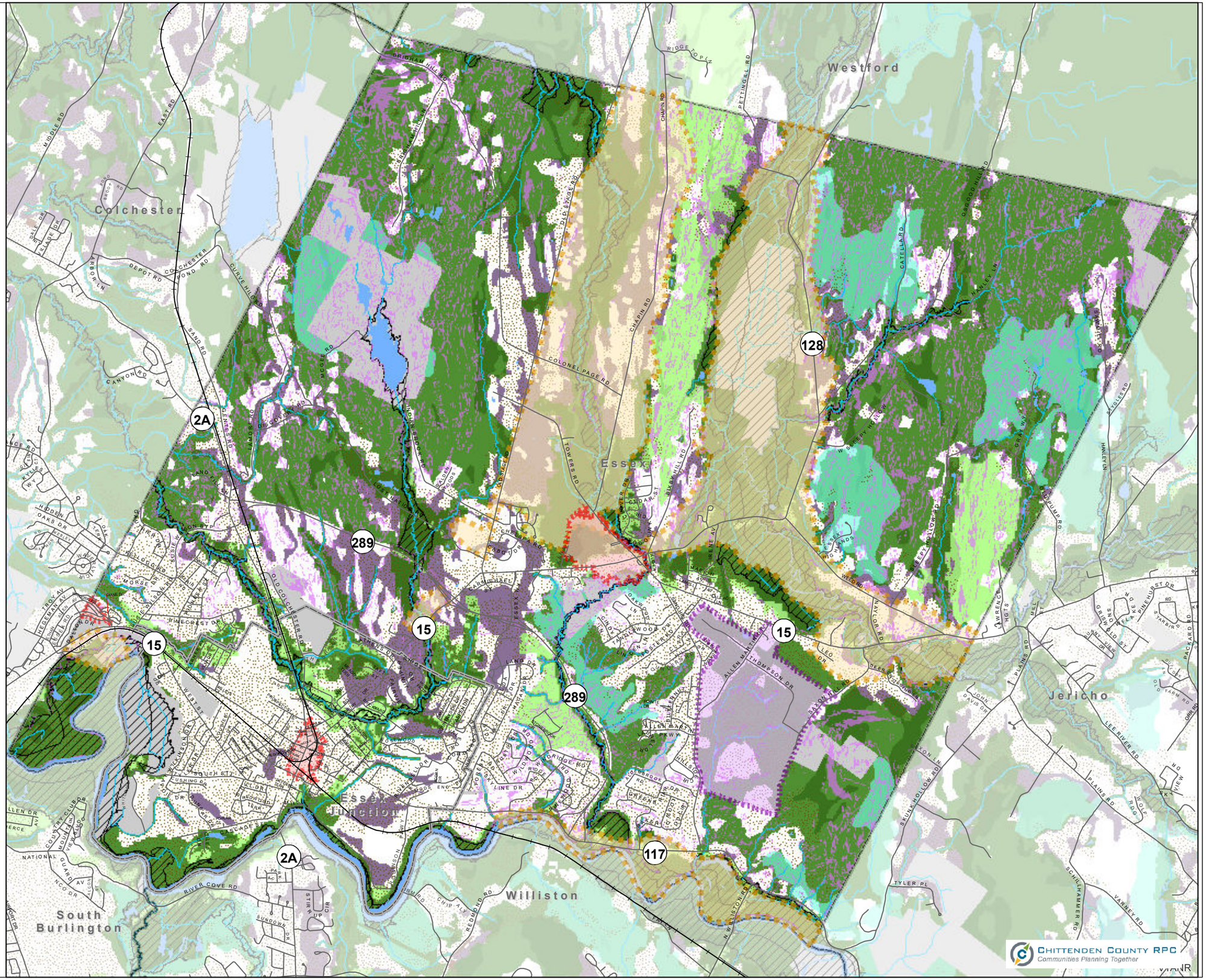

Map 4.
Potential Solar Energy Resource Areas

Essex Community, Vermont

Prime Solar: Areas with high solar potential and no state/local known & possible constraints

Base Solar: Areas with high solar potential and a presence of state/local possible constraints

3 Phase Power Lines

Transmission lines

This map and the corresponding data is 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"

0 0.5 1 2 Miles

Sources:
Solar Energy Resource Areas;VCGI,2017
Disclaimer:
The accuracy of information presented is determined by its sources. Errors and omissions may exist. The Chittenden County Regional Planning Commission is not responsible for these. Questions of on-the-ground location can be resolved by site inspections and/or surveys by registered surveyor. This map is not sufficient for delineation of features on-the-ground. This map identifies the presence of features, and may indicate relationships between features, but is not a replacement for surveyed information or engineering studies.

N

Date: 5/31/2019

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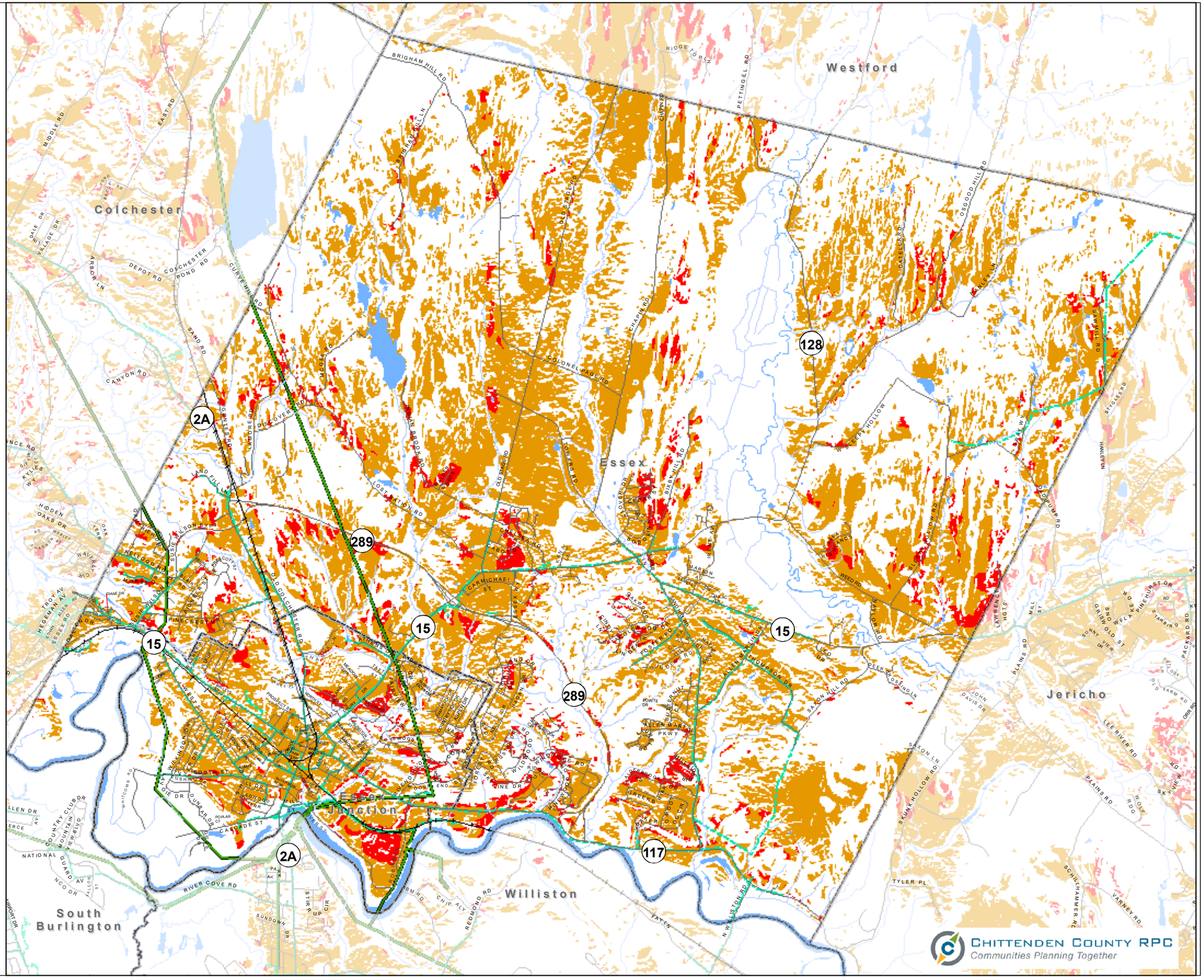

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Map 5.
Potential Wind Energy Resource Areas
Essex Community, Vermont

Prime Wind: Areas with high wind potential and no state/local known & possible constraints

Base Wind: Areas with high wind potential and a presence of state/local possible constraints

3 Phase Power Lines

Transmission Lines

This map and the corresponding data is 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".

0 0.5 1 2 Miles

N

Sources:
Wind Energy Resource Areas;VCGI,2017
Disclaimer:
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Date: 5/31/2019

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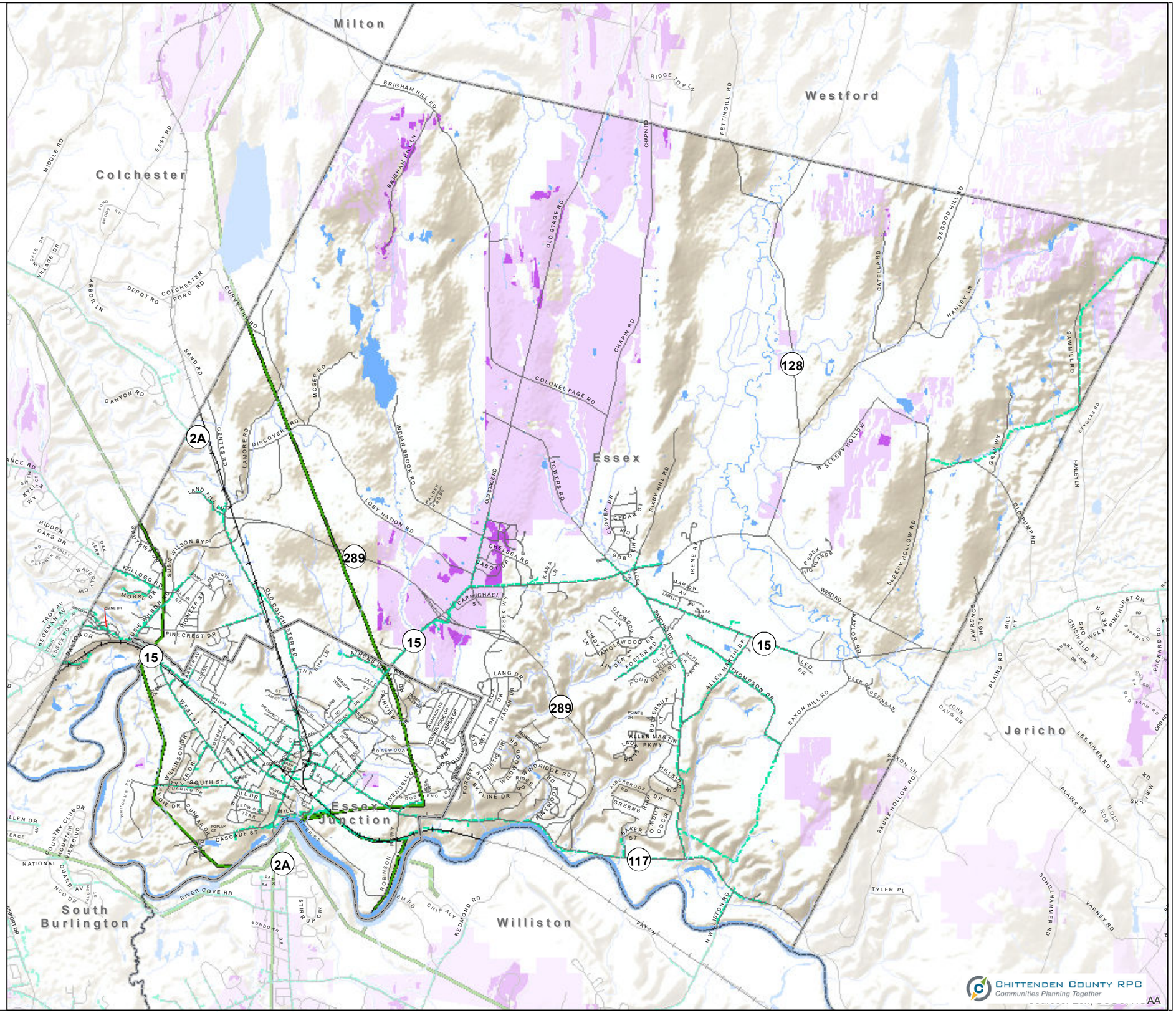

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