

Energy

Purpose of the Plan

The Addison County Regional Planning Commission (ACRPC) developed the Region’s first regional plan including an energy section in 1994. The policies in that plan expressed concern about the future location of large-scale electric generation and transmission facilities in the Region. It supported the development of locally generated energy sources and pointed to their potential contribution to the Region’s economy. The plan also recommended encouraging the concentration of new residential development near existing employment centers and discouraging a scattered pattern of residential development in the rural countryside, thus reducing gasoline consumption. ACRPC subsequently updated its Energy plan in 1994, 2005, 2011, 2018, and 2024. ACRPC’s completion of in-depth energy planning enables Vermont to achieve state and regional energy goals including:



- A. To make efficient use of energy, provide for the development of renewable energy resources, and reduce emissions of greenhouse gasses, including:
 - increasing the energy efficiency of new and existing buildings;
 - identifying areas suitable for renewable energy generation;
 - encouraging the use and development of renewable or lower emission energy sources for electricity, heat, and transportation; and
 - reducing transportation energy demand and single occupancy vehicle use. 24 V.S.A. § 4302(f)(1)
- B. Greenhouse gas (GHG) reduction requirements under 10 V.S.A. § 578(a)
 - 26% from 2005 levels by 2025
 - 40% from 1990 levels by 2030
 - 80% from 1990 levels by 2050
- C. The 25 x 25 goal for renewable energy under 10 V.S.A. § 580
 - 25% in-state renewables supply for all energy uses by 2025

- D. Building efficiency goals under 10 V.S.A. § 581
 - e.g., reduce fossil fuel consumption across all buildings by 10% by 2025
- E. The recommendations for regional and municipal planning pertaining to the efficient use of energy and the siting and development of renewable energy resources contained in the State energy plans adopted pursuant to 30 V.S.A. §§ 202 and 202b
- F. The distributed renewable generation and energy transformation categories of resources to meet the requirements of the Renewable Energy Standard under 30 V.S.A. §§ 8004 and 8005

Although the energy picture often appears abstract and beyond the influence of local communities, sound regional and municipal planning can effectively guide certain types of energy decisions. The Addison Region can move toward a position of sustainable energy use that will maintain a healthy environment and build a foundation for economic vitality. ACRPC and its member municipalities can promote appropriate land use patterns, participate in energy generation development decisions, facilitate alternative transportation options, and encourage energy conservation strategies in the Region. The purpose of this Plan is to identify the opportunities for the Region and member municipalities to facilitate the transition to a more efficient and sustainable energy system.

Introduction

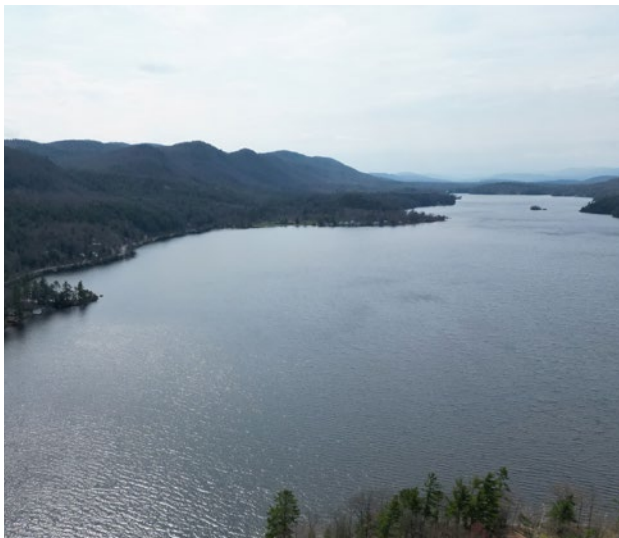
ACRPC created this Plan, within the overall energy planning framework of the State Comprehensive Energy Plan, to prepare for our future energy usage and infrastructure in accordance with the guidance provided by the Public Service Department (PSD). This Plan advances three key energy priorities for the Addison Region:

- ✦ Pursuing a Just Energy Transition
- ✦ Improving our Climate Change Resilience
- ✦ Enhancing our Energy Security

ENERGY JUSTICE

Profound changes to the energy system of Vermont have been underway—our Brave Little State has been a leader in pursuing renewable energy development for decades. To have a just energy transition however, it is crucial that all Vermonters are treated fairly as these changes unfold. As such, it is critical to consider these four questions so that we can conduct more just energy planning in the Addison Region:

1. Who is being helped?
2. Who is being harmed?
3. Who is missing from the conversation?
4. How will we respond?



Lake Dunmore, Salisbury

Table 1: Total Energy Burden by Town

	Total Energy Burden
Addison	8%
Bridport	12%
Bristol	9%
Cornwall	8%
Ferrisburgh	8%
Goshen	10%
Leicester	13%
Lincoln	11%
Middlebury	9%
Monkton	7%
New Haven	9%
Orwell	12%
Panton	10%
Ripton	8%
Salisbury	9%
Shoreham	10%
Starksboro	10%
Vergennes	10%
Waltham	9%
Weybridge	7%
Whiting	11%

In addition, ACRPC’s Energy Plan incorporates the ideals detailed in the Energy Equity Project (EEP) Framework¹ and establishes the following priorities:

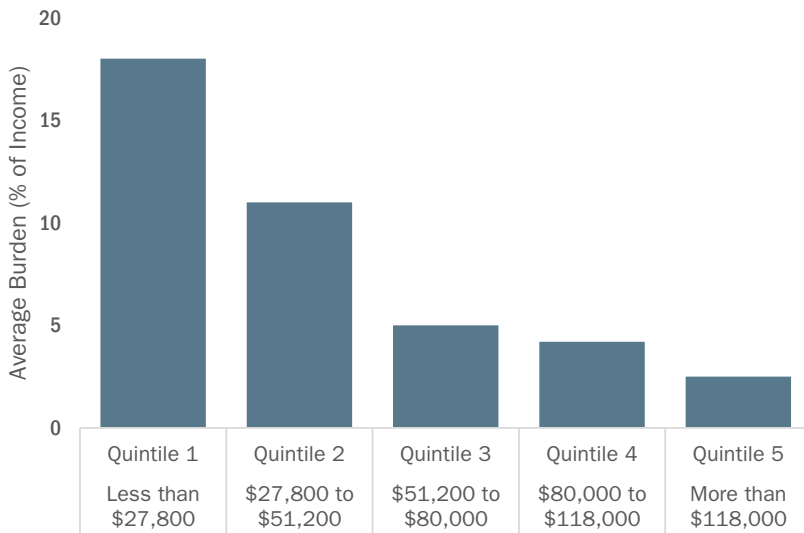
- ✦ Reliability and affordability serve as the two foundational energy goals of the Region; and
- ✦ Utilities should prioritize affordability in the energy projects they provide to minimize the energy burden on consumers.

Beyond these basics, ACRPC supports energy choices that address climate change, reduce social inequity, and encourage participation in energy decision-making at the state, regional, and local levels.

Ultimately, ACRPC’s Regional Energy Plan strives to improve the outcomes for environmental justice populations, as defined by Act 154. For more information on how to internalize equity into policy and a list of populations vulnerable to the impacts of climate change, see the State of Vermont Climate Council’s Guiding Principles for a Just Transition.²

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Figure 1: Total Energy Burden in Vermont by Income



In Vermont, energy expenses disproportionately hurt rural, lower-income, non-white, and non-homeowners.⁵ Energy spending often competes with other basic needs such as housing, health-care, and food. According to one Energy Action Network report (see **Figure 1**), households earning less than \$27,800 spend more than 18% of their income on heating and electricity bills, compared to less than 5% for households earning more than \$80,000.⁶ Lower-income households are more likely to rent or own older homes, which are less efficient and more expensive to heat and cool.⁷

ENERGY BURDEN

Our Region’s strategy for enhancing environmental and energy justice is two-fold:

1. Transitioning from fuels that produce pollutants that have negative public health impacts;
2. Reducing the “energy burden,” defined as the proportion of household income spent on energy costs, for our communities.³

On average, Addison County residents face an energy burden of approximately 10% of the median household income, totaling +/- \$7,300 in annual energy costs per household. **Table 1** provides a municipality-level breakdown of energy burden within the Region. Of Addison County household average energy costs, nearly half (45%) is spent on transportation, followed by heating (33%), then electricity expenses (22%). Nationally, an energy burden greater than 6% is considered high and is correlated with a “greater risk for respiratory diseases, increased stress and economic hardship, and difficulty in moving out of poverty.”⁴ These high energy costs take up a large share of household income, often forcing families to make difficult choices between essentials like food, medical care, and safe energy use.

Energy-burden data helps shape state, regional, and local energy programs. It helps direct resources to households with the greatest financial need.

GENERATION BENEFITS AND BURDENS

The uneven distribution of energy costs felt at the level of individual homes is exacerbated by the uneven distribution of energy generation facilities across the northeast. Vermont has long benefited from energy produced outside its borders, enjoying clean air and a healthy environment while avoiding many of the environmental impacts tied to polluting energy sources.

One example is the effect on Indigenous communities in Canada, where large-scale projects have been developed by Hydro-Québec. As Vermont moves toward a future powered by distributed renewable energy, it must also take responsibility to contribute equitably to energy generation. This means embracing local, renewable energy systems that reduce reliance on out-of-state power and ensure that the benefits and challenges of energy generation are shared fairly. Vermont can lead by example by demonstrating how states can contribute to a more just and sustainable energy system.

CLIMATE CHANGE RESILIENCE

This plan seeks to enable greater climate resilience, defined as the ability to mitigate climate change through greenhouse gas emissions reductions, while preparing for and adapting to the impacts of climate change across the Addison Region.⁸

There is strong scientific consensus that the burning of fossil fuels has substantially increased the concentration of greenhouse gases in the Earth's atmosphere over the last two centuries. This trend began with the widespread adoption of coal and oil-based fuels during the Industrial Revolutions in Great Britain and the United States. It accelerated after World War II, as economic recovery in North America, Europe, and parts of Asia drove a sharp rise in fossil fuel consumption—particularly in the 1950s—and continues today.

Increasing greenhouse gases in the atmosphere have a direct impact on the Earth's natural systems with one of the most significant being the substantial rise in average global surface temperature (see **Figure 2**).

Sources of greenhouse gas emissions increases include the burning of fossil fuels - especially in transportation, electricity generation and heating- and refrigerant leaks from air conditioners, refrigerators, freezers, and heat pumps. Addison Region's climate resilience will increase as actions are taken to transition away from fossil fuel powered energy generation and minimize energy consumption as a whole.

Vermont is a small state, and its per capita CO² pollution from energy use is already much less than other U.S. states.⁹ Vermonters can take pride in their state's relatively low per capita greenhouse gas emissions compared to national averages. In fact, because of its forests, Vermont absorbs more CO² than it produces. Within that context, climate change is real. The threats of climate change require continued and meaningful action. ACRPC recognizes its responsibility to contribute to state, national, and global economic and climate goals, while also upholding the Region's core planning values. Protecting the Region's natural beauty and environmental integrity remain a priority. Accordingly, ACRPC strongly supports best practices for orderly development and land-use—including siting energy generation and transmission projects in suitable locations, avoiding over-development, and designing projects that are compatible with local habitats.

The Addison Region is already experiencing the effects of climate change (see **Figure 2**). Since 1900, Vermont's average temperature has risen about 3°F and is expected to continue rising. These warmer temperatures pose risks to human health and disrupt ecosystems. Indigenous species that rely on cold winters are migrating north, while invasive species are expanding into Vermont. In addition, Vermont's average annual precipitation has increased nearly six inches since the 1960s, causing more frequent and significant flooding across the State. These extreme rainfall and flooding events threaten private and public infrastructure, including energy generation and transmission systems.

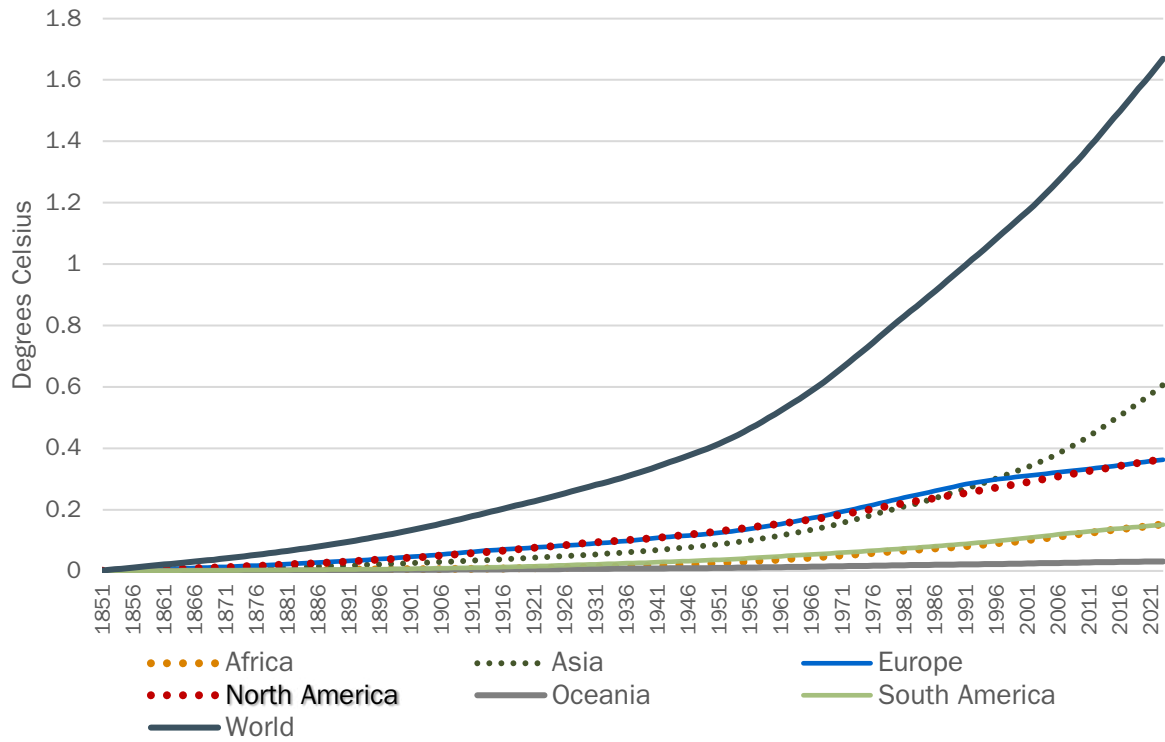
This trend is likely to continue. The U.S. Climate Vulnerability Index, for example, ranks Vermont as the 7th most vulnerable state to climate change-influenced extreme weather events (**Map 1**).¹⁰ This ranking is most likely due to vulnerability to flood events. See **Chapter 7: Flood Resilience**. To build a climate resilient future, the Region must reduce fossil fuel use and adapt its infrastructure and natural systems to withstand more frequent and severe extreme weather events.

Green Mountain Power's **Zero Outages Initiative** is one noteworthy case that, among other measures, pairs the "hardening" of rural distribution infrastructure with strategically placed battery systems to enhance energy system resilience in the Region.¹¹ This initiative will enhance the resilience of the Region's energy system as the effects climate change continue to emerge.

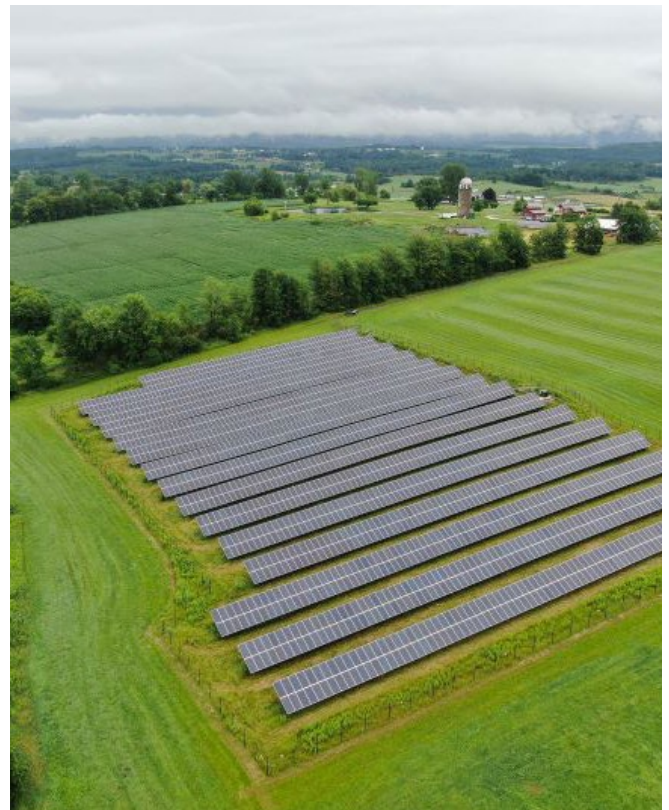
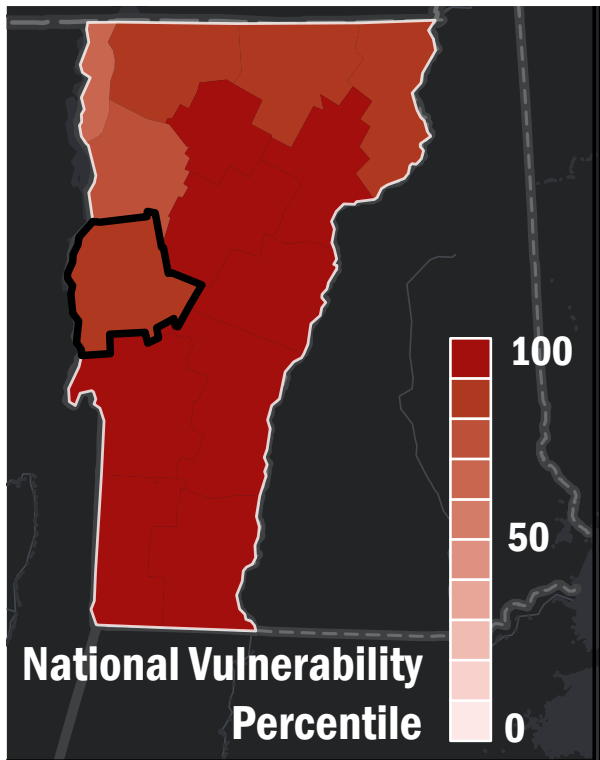
A two-pronged approach to climate resilience—focusing on both climate change prevention and adaptation—is essential to securing a safe, just, and prosperous future for the Region. In "Building for a Resilient Tomorrow: How to Prepare for the Coming Climate Disruption," researchers Alice C. Hill and Leonardo Matinez-Diaz argue that "cutting emissions is the best resilience strategy of all because it can safely spare us from some of the worst impacts of Climate Change." The authors note that adaption measures function as shock absorbers against climate change influenced disruptions—much like a seat belt or an airbag—and reduce harm during disruptive events and expedite recovery.

While adaptation is critical for limiting damage and speeding recovery, it cannot fully protect us from the most extreme climate threats. Just as a seat belt has limits, so too does our capacity to adapt to a rapidly warm-

Figure 2: Change in Global Mean Surface Temperature Caused by Greenhouse Gas Emissions



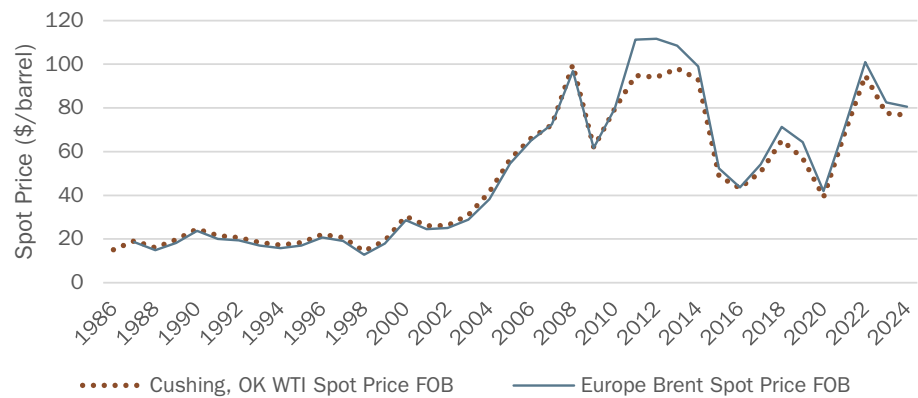
Map 1: Climate Vulnerability From Extreme Events



Solar installation, New Haven

ing world. A climate resilient region is one that has done what it can to limit the warming of the planet while also addressing the negative outcomes that come with a warmer world because there is likely to be a limit to our ability to adapt to that warmer world. As such, the Addison Region supports both climate change prevention and adaptation as the core elements of its climate change resilience goal as it pertains to energy planning.

Figure 3: WTI and Brent Crude Spot Prices (1987-2024)



WTI (West Texas Intermediate) is a grade of US crude oil used as a major benchmark for oil prices, quoted FOB (Free On Board), meaning the price is set at the point of origin before shipping costs.

ENERGY SECURITY

From the oil crisis of the 1970s to the global disruptions caused by the COVID-19 pandemic and the 2022 expanded Russian invasion of Ukraine, geopolitical events have repeatedly posed threats to our energy system and exposed vulnerabilities.

The more an energy system depends on non-domestic sources, the more it is at risk of disruptions beyond its control. Increased and unstable energy prices and, in extreme cases, outright scarcity, demonstrates the need for greater energy security. **Figure 3** shows that Crude oil prices, which drive the cost of heating oil and gasoline, have become more volatile and are trending upward.

ACRPC emphasizes that energy security, defined as access to reliable and affordable energy resources, is a central focus of the Regional Energy Plan to support public health and economic security.

Since 2004, ACRPC’s Energy Plan has recommended reducing regional energy use through conservation, efficiency, and the transition to renewable energy. This includes replacing fossil fuel-based technologies with electric alternatives powered by clean energy sources. To support this vision, ACRPC has engaged in several planning projects to support this approach such as energy production on municipally owned properties and conducting local outreach and education on energy conservation.

ACRPC believes the Region has both the potential and the responsibility to reduce energy demand and increase local energy supply in ways that strengthen

energy security. This includes expanding renewable energy generation and investing in advanced infrastructure like energy storage systems, SMART Grid, and Thermal Energy Networks (TENS).

ACRPC is planning for our Region’s energy future by promoting energy justice, climate resilience, and enhanced energy security. These goals will be pursued in balance with other key social and environmental priorities, including orderly development and sustainable land use. Through this approach, the plan aims to promote the health, safety, opportunity, and well-being of Addison Region’s residents, Vermonters, and the global community.



View of Bristol Fire Department, Recreational Fields, and Mount Abraham Middle and High Schools, Bristol

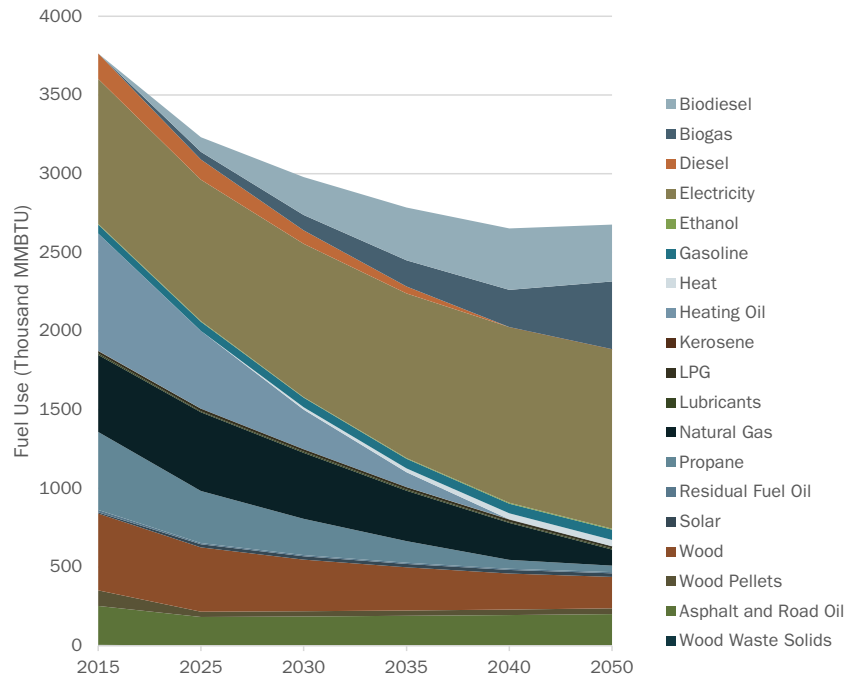
Energy Use

The Addison Region’s 36,000+ residents use energy for transportation, space and water heating, and to power lights and appliances. This Energy Plan identifies technologies and practices that support a shift away from greenhouse gas-intensive systems, providing the Region with tools to help achieve Vermont’s energy goals. **Figure 4** illustrates how energy use could evolve over the coming decades if ACRPC meets the established energy and GHG reduction targets.

In this scenario, Total Energy Use is projected to decline modestly, driven by a combination of reduced demand, fuel switching, and improved energy efficiency.

See Chapter 2 Appendix for additional information on the energy and GHG targets set for the Region.¹²

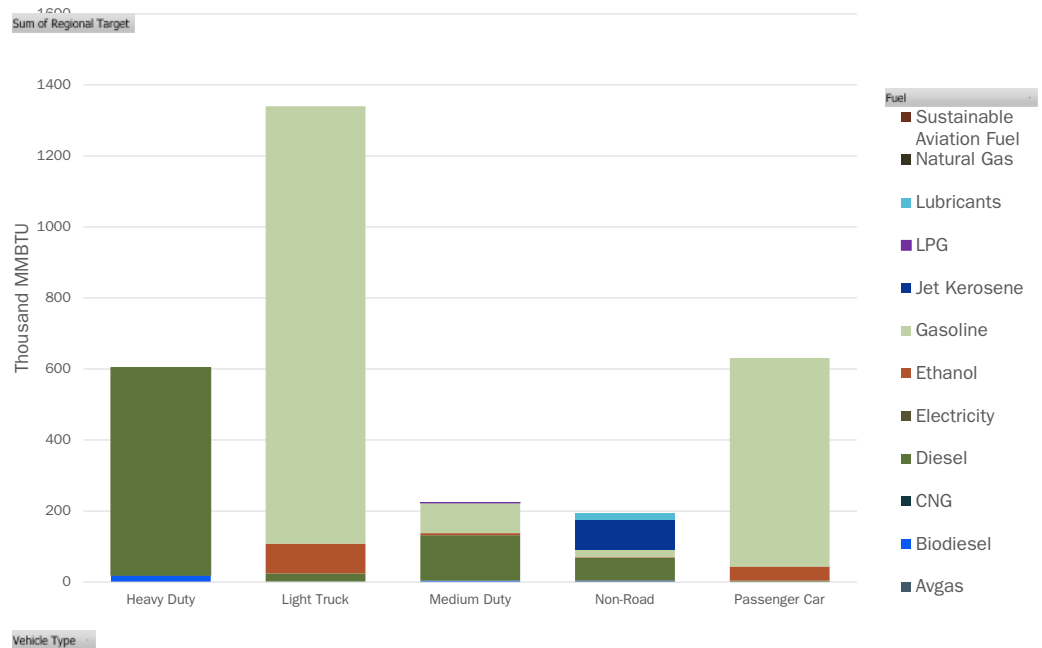
Figure 4: Projected Energy Use by Fuel Type



THE TRANSPORTATION SECTOR

The Addison Region is a predominately rural area, characterized by working farms, forests, small villages, and rural single-family homes, along with three densely populated urban centers. Most commercial and industrial development activity is concentrated in these urban hubs. Due to the Region’s dispersed settlement pattern, many residents rely on personal vehicles for commuting to work, school, and accessing services and recreation. As a result, transportation accounts for a significant share of the energy use in the Region—estimated at 1,591,281 thousand MMBTUs annually. **Figure 5** shows fossil fuels remain the dominant source of energy for transportation in the Region.

Figure 5: Transportation Sector Fuel Mix by Vehicle Type



Most transportation fossil fuel use comes from passenger vehicles and light trucks. Some opportunities to reduce that demand include increased use of public transportation, carpooling, walking, or biking to destinations. Many of these options are easy to access through the Go! Vermont website.¹³ Additionally, the adoption of electric vehicles (EVs) and efficient internal combustion engine (ICE) powered vehicles, will itself reduce overall energy demand.¹⁴ Further, while the Region desires to retain its rural feel, it can adopt land use policies that encourage more densely settled, urban centers while maintaining its rural aesthetic. These urban centers have the capacity to allow for more transportation alternatives within those areas, like walking or biking, which reduce energy use and promote public health. As with other conservation goals, conserving energy by reducing the need for cars can be more cost effective than fuel-switching to electric or other alternatively powered vehicles. Therefore, the Land Use Chapter of this Plan promotes greater density and housing options in the Region's villages. [See Chapter 8: Land Use](#)

The third largest consumer of transportation fuels in the Region are heavy duty vehicles, a class that consumes nearly as much energy as passenger vehicles. Heavy duty vehicles are almost exclusively fueled by climate change inducing fuels (**Figure 5**). Unfortunately, alternatives—both fuel switching and behavioral changes—are currently more limited for heavy duty vehicles than they are for passenger and light duty truck vehicles. The LEAP model created for the previous version of this Plan assumed that heavy biofuels would replace fossil fuel in this area. Those technological advances have not happened. As such the Plan continues to support research, development, demonstration, and deployment projects for low-to-no CO² equivalent heavy-duty trucking.

[From Gasoline to Electricity](#)

Gasoline in the Region is primarily distributed through individual stations affiliated with major oil companies. In rural towns, these are often small, locally owned convenience stores under franchises. Along major highways, stations are more likely to be corporate-owned chains.

This distribution network has historically met the Region's needs, with gas readily available. However, over

the past 30 years, economic shifts, changing consumer habits, and stricter regulations on underground storage tanks have affected the gasoline distribution system. Smaller stores, especially in rural areas, struggle to justify the costs of maintaining fuel services. Consequently, residents in these areas are gradually losing local access to fuel and must travel farther to refuel.

This Plan aims to reduce the Region's dependence on gasoline and other petroleum-based fuels by shifting to renewably generated electricity. It supports lowering gas use through efficient vehicles, public transportation, and active transportation, while promoting a transition to electric vehicles. This Plan supports the expansion of EV infrastructure and discourages new fossil fuel-based infrastructure that increases greenhouse gas emissions.

As of spring 2024, there are nearly 400 public EV charging stations across the state. In the Addison Region, public chargers can be found in 20 locations with about 32 level 2 chargers¹⁵ located in Ferrisburgh, Panton, Starksboro, Shoreham, New Haven, Vergennes, and Middlebury. The 18 fast chargers in the Region are located in Vergennes and Middlebury.¹⁶ While many EV drivers charge at home, expanding public and workplace charging is essential—especially for longer trips and commutes, visitors, or those without home access. ACRPC supports installing EV chargers at key locations such as transit stops, workplaces, schools, community centers, recreation sites, libraries, and village centers, including existing service stations, to provide broad and equitable access.

THE THERMAL ENERGY SECTOR

[Residential](#)

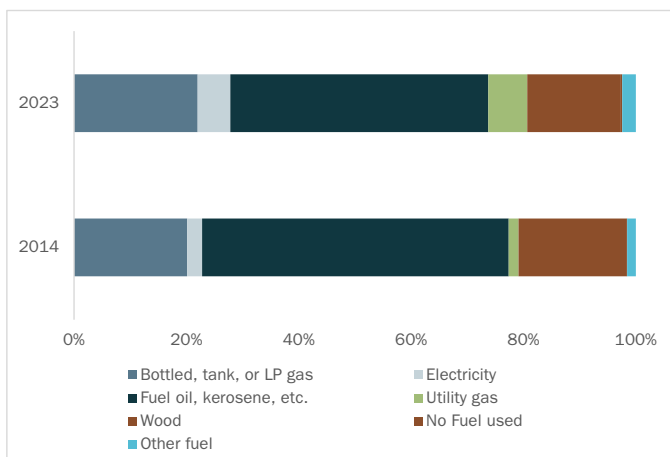
Residential users are the largest consumers of thermal energy in the Region. The greatest share of residential energy use goes toward space heating, cooling, and domestic hot water. Using housing data from the American Community Survey (ACS) and a heating model from the Public Service Department, regional residential heating demand is estimated at approximately 1,610,180 million British Thermal Units (MMBtu), as shown in **Table 2**. This represents about 5.4% of the State's residential space heating consumption.¹⁷

Table 2: Estimated Residential Thermal Energy Demand

Households in the Region	Average Annual Heating (MMBtu)	Total Residential Heating Demand (MMBtu)
14,417	110	1,565,827

A breakdown of that total demand can be seen in **Table 3**. It contains five-year average estimates of the share of the Addison Region households that use a given fuel to heat their homes. Based upon ACS data from 2010 to 2023 and projections estimated 2025, most homes in the Region heated with fuel oil or kerosene (about 43%), followed by propane (about 25%) and wood (about 18%). These three fuels comprise approximately 86% of the Region’s residential heating fuel mix as of 2025. Notably, the estimated share of residential heating demand satisfied by fuel oil or kerosene for heating declined by about 16% over the ten-year period ending in 2025. The share of household demand for wood declined by about 5% during the same period; however, the share of household demand for propane heating increased by about 12% during the same period. Two other key changes highlighted within Table 3 are the increases in the share of households that are using electricity (111%), and the increase in natural gas from no use in 2016 to about 6% of demand in 2025. Although these two fuel sources currently make up a small share of household heating—about 5% and 6%, respectively—they represent the fastest growing segments of heating demand in the Region. Electricity

Figure 6: Residential Heating by Fuel Type



use is expected to rise with more heat pumps in the area. Natural gas use is also growing due to VGS pipeline expansion, which made inexpensive utility gas more accessible.

Fossil fuels such as fuel oil, propane, and conventional natural gas are limited in supply, and their use contributes to climate change. Dependence on these fuels undermines our region’s energy security and climate resilience. However, while fuel oil use for residential heating has declined in the region, a growing share of household heating demand is being satisfied by propane and natural gas use. To meet State mandates and climate goals, this plan supports the State goal to largely eliminate the use of these fuels for residential heating by 2050.

There are three key strategies to reducing fossil fuel consumption in residential heating:

- ✦ Improve thermal efficiency of homes through weatherization and insulation.
- ✦ Upgrade to more efficient heating technologies to reduce energy consumption.
- ✦ Switch to renewable, net-zero, or lower greenhouse gas-emitting fuel sources such as electricity, advanced biomass, or geothermal.

The upfront cost of new equipment is the primary barrier to fuel switching. While the Region cannot control energy pricing, it can promote conservation, efficiency, and affordability especially for low-income households. Incentives like subsidies and tax credits can help ease the financial burden of making the transition to cleaner technologies.

Services available currently providing cost subsidies and/or promoting weatherization and efficiency include:

- ✦ The Champlain Valley Office of Economic Opportunity (CVOEO) provides fuel assistance to income-qualified residents on both a seasonal basis and a crisis basis.¹⁸
- ✦ Champlain Valley Weatherization Service, part of CVOEO, provides free weatherization services to income-qualified Addison County households.
- ✦ Efficiency Vermont has several programs to improve energy efficiency.¹⁹

- ✦ **Neighborworks of Western Vermont** offers audits and subsidized weatherization services through their HEAT Squad program.²⁰
- ✦ Several of the Region’s municipalities run services that supply firewood or other sources of heat to their residents.

In 1997, Vermont enacted residential energy standards. The **Residential Building Energy Standards (RBES)** contains minimum standards and stretch code for energy efficiency for all new residential construction in Vermont.²¹ The Vermont Residential Energy Code Handbook 2024,²² the latest iteration, includes two primary requirements:

1. A list of technical requirements that includes minimum standards for energy-efficient building components and construction practices; and
2. A certification requirement for reporting compliance. Upon completion, State law requires every Vermont builder to self-certify that the home complies with the RBES standards as built. The builder must complete and sign a certificate and submit it to the Town Clerk for filing. This must be on record before the Zoning Administrator issues a Certificate of Occupancy.

The code assigns local Zoning Administrators the duty to distribute information about the Energy Codes. In theory, this provides an opportunity for all towns to communicate with homeowners regarding energy programs and conservation opportunities. In practice, information is rarely distributed and municipalities struggle to enforce the code.

Finally, not all barriers to fuel switching, particularly in the residential space, are financial. Some are behavioral and social.²³ There is also simply a “How do I do this, and where do I begin?” problem. The complexity of personally undertaking an energy transformation project is overwhelmingly difficult to know where to start, who to call, how to pay, how to choose the best option, and how to know what will actually work, especially for a particular house or building.

Without that guidance, it is much more hit-or-miss, likely to be more expensive and less satisfactory. Therefore, financial and regulatory incentives must be paired with effective counseling and guidance to support individuals

in making this challenging transition. Programs such as the Climate Economy Action Center of Addison County’s (CEAC) “Energy Navigator” program which provides residents of the Region with energy-use and weatherization consultations from volunteers within their community is one attempt to address these bundled or aggravated problems of residential fuel switching. Another is the Zero Energy Now (ZEN) program, which undertakes a strategic project design, tying together all the project components with incentives and financing to develop a work scope that is customized, effective, and affordable. ACRPC supports these and similar expanded efforts to address the challenges that prevent residents from adopting new technologies.

Commercial

Estimating thermal energy use in the commercial and industrial sectors is challenging due to variation in energy use between businesses within and between economic sectors. **Table 3** provides an estimate of commercial energy use based on data from the Vermont Department of Labor (VT DOL) and the Vermont Department of Public Service (PSD).²⁴ While approximate, these figures highlight the significant thermal energy use by commercial establishments in the Region, underscoring the importance of their role in conservation and efficiency efforts.

Table 3: Estimated Commercial Thermal Energy Demand (5-year average, 2020-2024)

Number of Commercial Buildings in the Region	Average Annual Heating Load per Building (MMBTU)	Total Heating Load for Commercial Buildings (MMBTU)
967	1,776	1,717,885

THE ELECTRIC SECTOR

Electricity constitutes a significant portion of the Region’s current energy use. **Figure 6** illustrates recent and current electricity demand in the Region. This Plan anticipates a major shift from non-renewable fossil fuels to electric-powered vehicles, heat pumps, and other new technologies, driving increased electricity demand. At the same time, the supply of locally generated, renewable electricity is expected to grow, changing the

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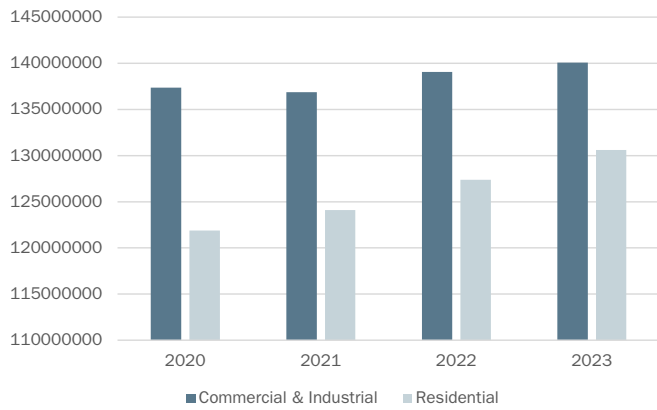
traditional model of centralized energy generation and delivery.

Residential Use

Efficiency Vermont data estimated that residential electricity demand for the Region increased from about 115,000 MWh to about 139,500 MWh between 2019 and 2023. This corresponds with an average change in electric demand of about 5% annually during that period. Additional data about Regional, residential electric demand can be viewed in **Table 5**.

This increase is to be expected. As shown in **Figure 7**, the American Community Survey (ACS) estimates that the number of households in the Region grew by about 3% between 2014 and 2023. As more households in the Region adopt electric appliances and vehicles, electricity demand is expected to rise. However, both policymakers and residents should remain aware of this growth and explore formal and informal strategies to help limit overall consumption. Encouraging energy-effi-

Figure 7: Regional Demand for Electricity



cient technologies, promoting behavioral changes, and supporting local and state-level initiatives will be key to managing this transition sustainably.

Simple, inexpensive actions can significantly reduce energy use. Turning off lights in empty rooms, switching to energy-efficient bulbs, and using timers or sensors to regulate lighting, heating, and cooling are easy ways to cut consumption. Weatherization and insulation of buildings—both new and existing—can greatly improve energy efficiency. Additionally, upgrading to efficient appliances, motors, and heat pumps can further reduce electricity use and lower energy bills.

Table 4: Regional Electricity Demand, Residential (MWh)

End User Type	Residential
2019	115,091
2020	127,369
2021	134,454
2022	136,588
2023	139,482
Avg. Change	4.98%

Commercial and Industrial Use

As shown in **Table 6**, commercial and industrial users in the Region consumed about 146,159 MWhs of electricity in 2023, the most recent year with available data. This amount slightly exceeds residential demand and accounts for just over half of the electric energy used in the Region. Though commercial and industrial customers used more electricity than residential consumers, their demand has increased at a lower rate on average. Between 2019 and 2023, commercial and industrial users’ electricity demand increased by about 1.5% from about 138,092.25 to 146,158.67 MWhs.

Businesses in the Region rely on electricity to power industrial equipment as well as everyday operations like lighting and computers. As sectors continue to electrify, some growth in demand is expected—but must be managed. Green Mountain Power has some excellent business-focused efficiency programs and incentives. To meet future energy goals, ACRPC encourages further investment in conservation and cost-saving measures.

Table 5: Regional Electricity Demand, Commercial and Industrial (MWh)

End User Type	Commercial & Industrial
2019	138,092
2020	134,912
2021	140,627
2022	140,543
2023	146,158
Avg. Change	1.47%

Generation and Infrastructure

Energy is fundamental to the modern economy. Businesses rely on it to produce goods and services, including emerging AI-driven technologies that are increasing demand. Households also depend on affordable, reliable energy to maintain comfort and daily conveniences. Developing new, competitively priced local generation would position the Addison Region to supply clean energy rather than rely on imported power. Distributed generation is beginning to offer this choice for a greater share of the power the Region consumes. Power from solar and wind—made more consistently deliverable by battery storage technology, renewable gas and heat from our farms and waste systems, and geothermal and thermal networks all offer generation potential to help power the Region. In order to continue to support their production, the Region needs right-sized infrastructure to deliver the power to the people and businesses that need it. Infrastructure such as electricity distribution lines, gas pipelines, and sewer systems support development by lowering costs and improving access. Decisions about extending or upgrading infrastructure should carefully consider potential impacts on regional growth patterns.

ENERGY ACCESS IN THE REGION

Residents and businesses in the Region access energy through a combination of the electric grid, delivered fuels (e.g., oil and propane), and the Vermont Gas Systems (VGS) natural gas pipeline. The grid includes:

- ✦ Transmission infrastructure that feeds or passes through the Region;
- ✦ Distribution infrastructure that delivers electricity to end users; and
- ✦ Local generation facilities that contribute to the Region's energy supply.

Electric Transmission

The Vermont Electric Power Company (VELCO) manages the transmission of electricity across Vermont and as part of the broader New England grid. The 2024 VELCO Long-Range Transmission Plan projects that peak electricity demand will rise due to the electrification of heating and transportation. Load management will be essential to accommodate electrification levels over the 10- and 20-year horizon. Load management will be essential to accommodate high electrification levels over the 20-year horizon.

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Addison County Reliability Concerns

Within the 10-year planning window, sub-transmission reliability issues—such as high/low voltage and thermal overloads—are anticipated. A key concern is the Middlebury transformer, which is projected to fail between 2029 and 2033, depending on load growth, if it is not improved or other large-scale changes are not made prior to that timeframe.

VELCO’s proposed solution is to increase the capacity of the West Rutland to Middlebury 115kV line, shown in orange in **Figure 8**. The estimated cost of this upgrade is \$215 million.

An alternative approach would reduce projected load growth by 80 MW by 2033, allowing existing infrastructure to remain functional in the short-term. This reduction could be achieved through:

- ✦ Weatherization
- ✦ Energy efficiency improvements
- ✦ Flexible load management
- ✦ Energy storage solutions

The Region appears to have ample rooftop, impermeable-surface, and land-based potential to meet its long-term renewable generation targets, but doing so will require substantial upgrades to the grid over the next decade. Although it is estimated that the Region currently produces about 152,898 MWh from local renewable generation sources compared to a 2050 target of 194,826 MWh, VELCO’s 2024 Vermont Long-Range Transmission Plan identifies potential, near-term reliability concerns within and between the Region that will need to be addressed. These reliability concerns could emerge as early as 2029.

Further, addressing these concerns will require significant resources. VELCO estimates that increasing the capacity of the West Rutland–Middlebury 115 kV line could cost about \$215 million, suggests that the Middlebury transformer may also require upgrades, and states that, absent such improvements, roughly 80 MW of load reduction by 2033 would be needed instead. Similarly, GMP’s 2024 Integrated Resource Plan similarly emphasizes that hosting-capacity limits, managed load, strategic siting, and battery storage will influence how much new generation the system can actually accommodate. Battery storage may relieve some near-

Figure 8: Regional Transmission Upgrades



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term constraints and support resilience goals, but the Region will still need to explore distribution and transmission solutions in order to meet its generation targets reliably and affordably.

ACRPC supports alternative owner and operator models for energy utility functions such as cooperative, municipal, or other community-based models when they can expand or extend services or reduce costs in ways that traditional utilities firms cannot.

Proposed distribution and transmission projects should be reviewed for consistency with the *Regional Energy Project Siting and Design Standards*, including standards favoring co-location with existing corridors and minimizing skyline exposure, productive farmland conversion, and habitat fragmentation.

Electric Distribution

In 2021, Vermont distribution utilities purchased over 5.8 million MWh of electricity and retired just over 4 million renewable energy certificates²⁵ (representing just over 4 million MWh of electricity) to meet their obligations under Vermont’s Renewable Energy Standards. 72% of the electricity Vermont accounted for was renewable; 90% was low-carbon with the inclusion of nuclear generation.²⁶

Green Mountain Power (GMP) serves most of Addison County except for a portion of Starksboro served by the Vermont Electric Co-op. **Figure 8** shows sources of electricity distributed by GMP in 2021 (before the sale of renewable energy credits (RECs)²⁷. GMP owns several generation facilities, enters into power purchasing agreements with individual power suppliers, and purchases power from the wholesale electricity market, ISO-NE²⁸, delivered to the Region through the transmission system described above. Green Mountain Power draws electricity from the transmission grid into substations that stepdown the voltage and disseminate it through the distribution grid. Currently, the substation and distribution grids constitute the biggest constraint in the electric system on the Region’s ability to locally generate energy. See **Chapter 2, Appendix E, Map 9**, which shows

most of the Region as constrained. If the Addison Region is going to meet its generation targets, we must solve the bottle necks at the substations and within the distribution grid.

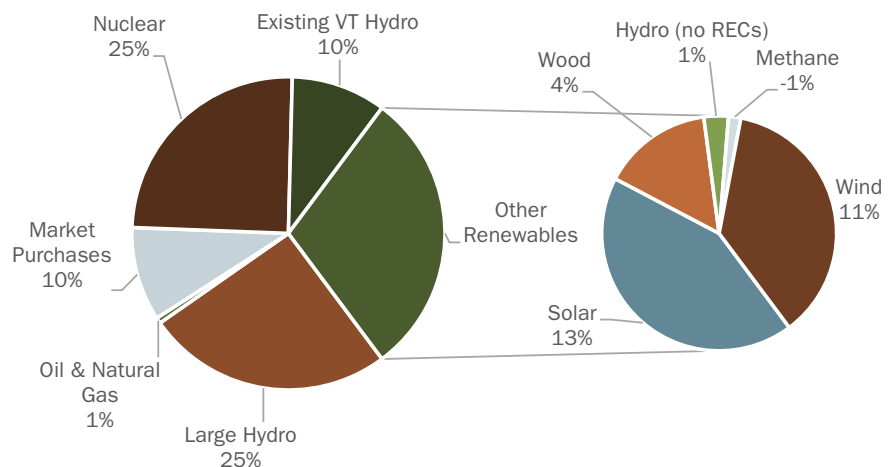
During this improvement process, proposed substations and related utility facilities should be reviewed for consistency with the Regional Energy Project Siting and Design Standards, including standards related to visibility, noise, setbacks, drainage, lighting, emergency access, neighboring land-use compatibility, and resilient grid modernization.

Distributed Generation and Grid Coordination

Currently, distributed generation (DG) projects—such as solar and wind—are reviewed individually, without considering their cumulative impact on the transmission system. This approach must evolve.

To avoid overloading the grid, Vermont must pursue coordinated, statewide transmission modernization. As more DG and storage projects come online, collaboration among VELCO, developers, municipalities, distribution utilities, and regional planners will be critical to achieving energy and emissions goals.

Figure 8: Green Mountain Power Energy Mix, Pre-REC Purchases



This coordination must also prioritize equity and environmental stewardship, ensuring that:

- ✦ Landscapes and natural resources are protected,
- ✦ Benefits are shared broadly, and
- ✦ Historically burdened communities are not left behind.

Delivered Fuels

Several companies in the Addison Region deliver propane and fuel oil to residential, commercial, and industrial customers, primarily for space heating and cooking. These fuels are mostly trucked into the Region, with additional deliveries and storage occurring at a rail facility in Leicester Junction. Retail distribution is available throughout the area.

While this Plan supports a long-term phase-out of fossil fuel use, it also acknowledges the essential role these businesses have played and continue to play in the community. ACRPC supports a just transition for fuel providers and the customers they serve, ensuring that economic and social impacts are addressed as the Region moves toward cleaner energy sources. The transition, while important, must be accomplished within the context of keeping power reliable and affordable.

Natural Gas

Vermont Gas Systems (VGS) has extended a 41-mile natural gas pipeline into the Region and continues to expand secondary distribution. The pipeline serves or is expected to serve customers in up to seven communities, including two of the Region’s three employment centers—Vergennes and Middlebury—as well as village areas in Monkton, New Haven, and parts of Weybridge and Ferrisburgh.

The pipeline has been a source of regional debate. When proposed, natural gas offered a lower-cost alternative to other fuels. However, many residents opposed investing in long-term fossil fuel infrastructure. After extensive discussion, ACRPC conditionally supported the project through a Memorandum of Understanding (MOU) with VGS. Key conditions included:

- ✦ Extending service to villages along the pipeline route to support compact, planned growth;
- ✦ Providing training for local first responders; and
- ✦ Incorporating renewable natural gas (RNG) from agricultural and food waste into the fuel mix.

VGS is working to make RNG opportunities available to local farmers and food manufacturers.

Although natural gas was intended as a transitional fuel, its lower cost has generated strong interest in communities with access to the VGS network, helping reduce energy burdens in the short term. ACRPC will continue to collaborate with VGS to support sustainable economic development while exploring long-term solutions that align with climate and equity goals. These include additional opportunities to generate renewable natural gas from farm and waste products and creating and expanding thermal networks in the Region.

LOCAL GENERATION

The Region’s energy generation is largely consistent with statewide patterns. As of December 2024, roughly 2,055 sites generate 152,898 MWh of solar, wind, hydro, and bio-methane power annually within the Region (Table 7).²⁹ The discussion below covers renewable generation types available to the Region’s residents and how they might be harnessed to regional generation targets and statewide goals. A map of existing renewable generation systems in the Region with capacities above 15 KW can be found in the Chapter 2 Appendix E (Map 1).

Table 6: Regional Renewable Generation

Technology	Capacity (MW)	Annual Generation (MWh)
Farm Methane	1.67	10,983
Hydro	10.70	46,866
Solar	63.61	82,368
Wind	0.42	833
Biomass	1.93	11,847
Grand Total	87.69	152,898.03

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Hydropower

The Region was historically developed with hydropower. The Middlebury River, New Haven River, and Otter Creek powered the first mills in Middlebury, Bristol, and Vergennes respectively. Green Mountain Power now owns seven hydropower facilities in the Region: five on Otter Creek, including one each on Sucker Brook and Leicester River. These facilities range from under 7,000 MWh to over 22,000 MWh annually, collectively producing close to 85,000 MWh, approximately 33% of the Region’s electricity consumption.

Hydropower comes with benefits and drawbacks. Environmental impacts can be significant: projects can change stream character upstream, downstream, and at dam locations, and can alter water chemistry and biology. Both run-of-river and reservoir-based systems can also limit fish mobility and block spawning access. Reservoir fluctuations can cause shoreline erosion, habitat degradation, and harmful phosphorus and nitrogen levels in sediment collected behind the dam.

Climate change presents both challenges and opportunities. Drought threatens water availability and future capacity. However, climate change in Vermont has increased rainfall, generally increasing hydropower potential. Hydropower overall also offers substantial benefits: controllable, carbon-free renewable energy—a critical advantage over intermittent sources. When properly designed and managed, systems also contribute to flood control, increasingly important as climate change makes flooding more likely. Overall, the benefits of local renewable hydropower outweigh the burdens when those burdens are mitigated through run-of-river systems, fish ladders, access improvements and other programs.

Proposed commercial and utility scale hydropower projects shall be reviewed for consistency with the *Regional Energy Project Siting and Design Standards*, which prioritize upgrades and carefully designed additions at already altered sites and do not support projects that would substantially degrade aquatic habitat or increase flood risk.

Solar

Photovoltaic systems (PV) currently provide about one third of the generation capacity in the Region. Most PV

Figure 9: Comparison of PV Sites by Facility Type



systems in the Region have a nameplate capacity below 15 kW. ACRPC expects solar generation to grow to meet future generation targets. Doing so would improve the Region’s resilience to climate change—by reducing greenhouse gas pollution—and enhance its energy security with more domestic production; however, more solar generation will likely result in land use changes that could impact social and environmental considerations like rural river sheds or habitat connectivity. As **Figure 9** shows, the land use needs of commercial-scale and utility-scale solar can be substantial.

Careful consideration of such impacts is essential for a just energy transition in the Region. Fortunately, project design and development practices for solar PV that enhance eco-system function and enable continued agricultural use do exist. Solar canopies are solar projects that are located above parking areas, drive ways, and other impermeable storage areas. Their deployment would allow the Region to expand renewable generation while also encouraging mixed-uses on already developed land. These projects are consistent with the State’s and the Region’s intent to steer new renewable energy development toward preferred locations, including previously developed sites. **A map of potential solar canopy locations in the Addison Region is provided in Chapter 2, Appendix E to help identify places where this type of development may be particularly appropriate.** Collectively, these sites may be capable of generating as much as _____ MWh.³⁰

Beyond photovoltaics, passive solar through proper building orientation and high-efficiency insulation can offset 15-50% of lighting and heating costs.³¹ Similarly,

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solar water heating can reduce water heating costs by up to 65%. This plan supports additional commercial and residential solar projects within the Region. Commercial solar development must include design features preserving riversheds and must be located within areas designated by the local municipal energy plans.

Commercial and utility scale proposed solar projects shall be reviewed for consistency with the *Regional Energy Project Siting and Design Standards*, including the standards for preferred, possible, and unsuitable sites, project scale, agricultural and ecological mitigation, and storage-ready design.

Wind

Wind represents less than 1MW of generation capacity in the Region, mostly from systems under 15kW. The National Renewable Energy Laboratory identifies most of the Region as having Class 1 winds (below 12 mph), unsuitable for commercial-scale wind power. This Plan supports small residential wind development with sufficient setbacks following Public Service Department guidelines in “Siting a Wind Turbine on Your Property”.³²

A small portion of the Region has Class 3 winds (around 12 mph at 100 meters), marginally suitable for large-scale installations. Those economically feasible ridgelines at 2,000-3,500 feet elevation are located in Starksboro, Lincoln, and Ripton. However, much of this land lies in the Green Mountain National Forest, with significant portions designated as Wilderness. This Plan opposes commercial development within “Known Constrained” areas on [Chapter 2](#), [Appendix D](#), [Map 4](#), including wilderness areas, but sets

no further restrictions on commercial wind generation and supports member municipalities’ wind policies.

Proposed wind projects shall be reviewed for consistency with the *Regional Energy Project Siting and Design Standards*, including the standards addressing ridge-line visibility, scenic impacts, habitat fragmentation, sound, shadow flicker, aviation safety, and access-road disturbance

Biogas and Biomass

Biomass resources—including manure, food waste, cheese whey, slaughterhouse waste, and brewery residuals—can produce renewable natural gas, often referred to as “Farm Methane” in state databases. While these projects require significant upfront investment, resulting in relatively few operations in the Addison Region, they offer valuable co-benefits:



- ✦ Diverting waste from landfills
- ✦ Producing fertilizer as a byproduct
- ✦ Generating methane for energy production
- ✦ Creating waste heat for capture through thermal energy networks

Biogas systems raise similar concerns as natural gas because they produce greenhouse gases—mainly methane during compost breakdown and CO₂ when burned. However, due to the co-benefits listed above and the absence of extractive mining, biogas is considered a more sustainable, preferable alternative to traditional natural gas. These climate and co-benefits are part of why the State of Vermont views biogas as one climate solution for the State’s agriculture sector.³³ Challenges with this solution remain, including finding ways to capture a greater share of the gases produced, preventing “fugitive leaks” of the methane captured, and minimizing the impacts of distribution from producers to customers.³⁴ As such, ACRPC supports climate solutions like biogas for rural and agricultural settings and encourages the adoption of strategies that minimize the social and environmental costs such as the recommendations from the Natural Gas STAR Program.³⁵

Another primary form of biomass used to satisfy energy demand—particularly heating demand—in the Region is wood. The use of wood for heating—and electricity in the case of wood-fired power plants – supplied about 6% of the nation’s total energy consumption as of 2005, and, while 23% of wood energy used at that time was consumed residentially, 70% of residential wood energy went to heat rural homes.³⁶ A similar trend can be seen in the Addison Region: about 16.5% of the Region’s homes were still heated primarily by wood stoves as of 2023. Wood heating using wood chips and pellets has also been encouraged as a heating solution for schools and other public or commercial buildings in Vermont. Due to the abundance of wood in Vermont, the renewable nature of the energy source, and its lower carbon footprint when compared to fossil fuels, wood energy will likely remain a key component of the fuel mix in the region.

This understanding is confirmed by State determined LEAP targets for the Region: targets for residential, commercial, and industrial wood energy use for the Region are 13.20%, 17.41%, 1.07% of total energy use

by sector, respectively. As such, ACRPC recommends three primary actions be undertaken to support wood energy use into the future.

1. When residential, commercial, and industrial heating systems need to be replaced, ACRPC recommends that residents consider shifting from old-fashioned wood stoves and fossil fuel powered systems to advanced wood pellet stoves, such as “Catalytic Stoves” which are significantly more energy efficient and that produce less air pollution.³⁷
2. The further development of the local wood-based economy including new “densified biomass fuel manufacturing facilities” and distribution centers to fuel the transition to advanced wood heating.³⁸
3. The expansion of public wood banks such as Monkton and Starksboro Wood Banks as well as the subsidization of the upfront costs of switching to advanced wood stoves so that low to moderate income Vermonters in the Region can benefit from this transition.

Proposed commercial and utility scale biomass projects shall be reviewed for consistency with the *Regional Energy Project Siting and Design Standards*, including standards related to fuel sourcing, truck traffic, air emissions, noise, ash handling, fire safety, and compatibility with nearby land uses.

Energy Storage

The Addison Region currently hosts about 4.5 megawatts of battery storage capacity.³⁹ More than 60% comes from two large GMP projects in Ferrisburgh and Panton, with the remainder distributed across other municipalities. While lithium-ion batteries dominate modern renewable energy storage, alternative solutions include:

- ✦ **Thermal energy storage:** Stores heat in materials like molten salts or water for later electricity generation or direct heating/cooling use
- ✦ **Pumped hydro storage:** Uses excess energy to pump water uphill, storing gravitational potential energy that can be released through turbines
- ✦ **Solid-state batteries:** Next-generation technology using solid electrolytes instead of liquid, potentially offering greater energy density and safety

Table 7: Renewable Energy Generation Capacity, by Municipality, by Generation Type

Municipality	Farm Gas (MW)	Hydro (MW)	Solar (MW)	Wind (MW)	Biomass (MW)
Addison	0.45	-	1.79	0.008	-
Bridport	0.01	-	3.13	0.02	-
Bristol	0.45	-	4.79	-	-
Cornwall	-	-	1.26	0.03	-
Ferrisburgh	-	-	10.83	0.15	-
Goshen	-	-	0.11	-	-
Leicester	-	-	0.47	0.01	-
Lincoln	-	-	0.85	<0.01	-
Middlebury	0.76	2.25	14.56	0.02	1.78
Monkton	-	-	1.7	-	-
New Haven	-	5.85	8.8	0.01	-
Orwell	-	-	1.19	0.01	-
Panton	-	-	6.23	-	-
Ripton	-	-	0.41	<0.01	-
Salisbury	-	-	0.82	-	-
Shoreham	-	-	1.81	-	-
Starksboro	-	-	1	<0.01	-
Vergennes	-	2.6	1.96	0.1	-
Waltham	-	-	0.57	<0.01	-
Weybridge	-	-	0.56	-	0.16
Whiting	-	-	0.76	-	-
TOTAL	1.67	10.7	63.6	0.358	1.94

Each storage technology has distinct benefits and drawbacks. However, all address peak energy demand periods and transmission capacity limitations.

The Region strongly supports pairing new commercial or industrial generation facilities with storage capacity. Storage improves local energy system resilience and reduces expensive peak power purchases. Battery storage costs are declining rapidly at both industrial and residential scales.

At the residential level, programs like GMP’s Tesla Powerwall offering demonstrate this potential. The program provides homeowners with a Powerwall and operating software in exchange for allowing GMP to draw power during peak demand. Homeowners gain backup power for several hours of typical use during outages. ACRPC supports this and similarly designed programs that ad-

dress high upfront storage costs while fairly distributing benefits and costs.

Proposed utility scale battery storage projects shall be reviewed for consistency with the *Regional Energy Project Siting and Design Standards*, including standards related to location near existing infrastructure, fire safety, emergency access, setbacks, drainage, screening, and compatibility with neighboring uses.

Thermal Networks

Infrastructure investments that maximize co-benefits and energy efficiency—such as capturing waste heat or creating thermal energy networks—reduce demand on electric infrastructure while supporting cost and emissions reductions.⁴⁰

Thermal networks capture existing waste heat from buildings such as heat from ventilation or wastewater and then use it to heat or cool buildings with air-to-water heat pumps, which are far more efficient than air-to-air source heat pumps.

Integrating waste heat recovery into planned wastewater system upgrades offers communities a significant opportunity. Heat recovery from wastewater can produce potable hot water and provide heating and cooling for buildings. Wastewater is a continuous, existing source of thermal energy—average residential wastewater temperature is 70°F, while commercial and industrial wastewater can reach 140°F or higher. Heat recovery systems are simple, low maintenance, scalable from single buildings to large district networks, and offer customers lower, predictable heating and cooling bills.

Emerging Technology

The energy resource and storage landscape is rapidly evolving. As new technologies become viable, ACRPC will continue to analyze and distribute information on appropriate uses for orderly economic development and land use in the Region.

Current Municipal Generation

Table 8 displays renewable generation capacity in the Region by municipality as of January 2024. The data comes from several sources and should be considered an estimate, as new renewable generation sites may emerge, and existing sites may expand or close.

To assist with the cohesive implementation of the land use, conservation, resilience, and orderly development policies proposed within this Energy Chapter and its Appendix, the Region has adopted *Regional Energy Project Siting and Design Standards*. **A copy of these standards is included in this Chapter on pages ____.** These standards are intended to guide the siting, scale, design, mitigation, and review of proposed energy generation, storage, transmission, and related utility infrastructure projects in the Addison Region. They should be interpreted as a companion framework to this Chapter and read together with the energy maps and tables contained within the Chapter Appendix that show known constraints, possible constraints, and preferred locations. Additionally, it is crucial for duly developers to consider adopted municipal energy plans or enhanced energy plans that contain more specific local standards or identify locally significant resources as well.



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Energy Siting Guidelines for Transmission, Subtransmission and commercial and utility scale energy projects

EXPLANATION OF SITING AND DESIGN STANDARDS

This section includes regional community standards for the siting and design of new energy projects proposed for the Addison Region. They constitute an element of Addison County Regional Planning Commission’s (ACRPC) Enhanced Energy Plan and shall be followed by those proposing to develop energy projects in the Addison Region.

Purpose

These standards guide the siting and design choices made for energy generation, storage, and electric infrastructure projects proposed for the Region. These standards ensure that development takes place in an orderly manner that is respectful of the land use goals of the Region. Specifically, these standards support sustainable energy development while protecting farmland, forest blocks, scenic resources, wildlife and its habitat, water resources, public safety, and climate change resilience. The standards shall be read together and in concert with regional and municipal maps, plan policies, and applicable state review criteria.

How to Use the Standards

These standards distinguish between projects that are well sited and designed, projects that may be acceptable with mitigation, and projects that are unsuitable for and prohibited within the Region. The standards consist of policy statements supported by four tables created to direct development projects to acceptable outcomes.

Table 1 entitled, “Project Scale Based Standards” defines projects by their respective size and scale and includes this Plan’s requirements for and treatment of each. Table 1 defines project scale by project name plate capacity. Table 1 is supported and enhanced by Tables 2, 3 and 4.

Table 2 entitled, “Regional Siting Framework” contains the Plan’s siting standards. Table 2 details four types of locations or “Site Types” for energy developments: Preferred Sites, Good Sites, Possible Sites, and Unsuit-

able Sites. It also describes ACRPC’s community standards for proposals. The site conditions described in Table 2 correspond to the mapped areas in Maps ____, included within the energy plan’s appendix and incorporated into the Plan.

Table 3, entitled “Technology Standards” contains criteria specific to the type of technology subject to the application. It shall be applied in tandem with project scale and site standards. The standards ensure that energy generation, storage, and distribution technologies are deployed, maintained, and decommissioned in the right way, at appropriate sizes, and in the right place.

Table 4, entitled, “Mitigation Strategies for Proposed Energy Projects.” contains lists of mitigation strategies for applicants to deploy after considering the information contained within Tables 1 through 3. Not all mitigation strategies are appropriate for all places or all types of projects. Other mitigation strategies not contained on the list may be more appropriate for the project proposed. Therefore, applicants are not required to adopt all mitigation strategies. However, the applicant shall have the burden of showing that it has adopted the appropriate mitigation strategies to ensure its project meets ACRPC and its member municipalities community energy standards and that its project supports the orderly development of the Region. ACRPC will review alternative strategies proposed on a case-by-case basis.

Additional Planning Considerations

These standards, particularly Table 2, are supported by Regional Energy Maps ____ - ____ showing known constraints, possible constraints, preferred locations, and other relevant conditions. Where municipalities have duly adopted energy plans or enhanced energy plans that provide more specific local community standards, including preferred sites, areas where energy infrastructure development is prohibited or areas that identify locally significant resources that are different or beyond those contained within the regional standards, this Plan adopts and incorporates those local standards into this Plan. Applicants shall follow the local community standards in addition to the regional community standards contained within this Plan. Finally, new energy projects proposed for the Region must also comply with applicable state and federal regulations.

Siting Standards Table 1: Project Scale-Based Standards

Scale	Capacity	Description
Residential/Small Commercial	$X \leq 15 \text{ kW}$	Residential/Small Commercial scale projects should avoid Known Constraints and should minimize Possible Constraints and obvious scenic or resource conflicts (see Table 2). However, because of their smaller footprints, Residential/Small Commercial scale projects will be viewed as compatible with the Regional Plan.
Commercial	$15 \text{ kW} < X \leq 500 \text{ kW}$	Commercial scale projects must demonstrate that they avoid Known Constraints, minimize impacts on Possible Constraints, practice good siting techniques based upon the technology being deployed, and must adopt appropriate mitigation strategies included in Table 4 as necessary to reduce undue adverse impacts on visual and natural resources.
Utility	$X > 500 \text{ kW}$	Utility scale projects shall demonstrate that they avoid Known Constraints, minimize impacts on Possible Constraints, and practice good siting techniques based upon the technology being deployed. They are presumed to have undue adverse impacts based upon their size and scale and must adopt appropriate mitigation strategies included in Table 4 to reduce undue adverse impacts. Utility scale projects shall demonstrate why the proposal does not impose unfair costs or community burdens.

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Siting Standards Table 2: Regional Siting Framework

Site Types	Typical Characteristics	Regional Response
Preferred	<p>Previously developed or disturbed sites including rooftops, parking lot canopies, and carports.</p> <p>Municipally designated preferred locations.</p>	<p>Projects that are located at Preferred Sites will be viewed as acceptable to this Plan upon demonstrating that they are sited in a Preferred Location. Additional scale and technology-specific considerations, supported by appropriate mitigation strategies, shall also be reviewed (see Tables 1, 3, and 4).</p>
Good	<p>Good sites include those with natural screening by topography or vegetation, co-location in or immediately adjacent to existing generation, storage, or utility corridor development, and locations near existing industrial buildings or infrastructure like quarries, substations, or utility infrastructure.</p>	<p>Additional scale and technology specific considerations, supported by appropriate mitigation strategies, shall also be reviewed (see Tables 1, 3, and 4.)</p>
Possible	<p>Sites with Possible Constraints, which include:</p> <ul style="list-style-type: none"> ✘ AE/VCE unconfirmed vernal pools ✘ FEMA Special Flood Hazard Areas ✘ Prime Ag soils as defined by Act 250 ✘ Deer Wintering Areas ✘ Hydric soils ✘ Conservation Design Layers ✘ Highest Priority Forest and Connectivity Blocks ✘ Surface waters and riparian areas ✘ May be capable of avoidance or mitigation 	<p>Projects that are located in areas with Possible Constraints or other undesirable characteristics shall require the applicant to demonstrate why the location is appropriate and how impacts will be avoided, minimized, mitigated and managed over time. (See standards in Tables 1, 3, and 4 and incorporated municipal standards.)</p>
Unsuitable	<p>Known Constraint locations, which include:</p> <ul style="list-style-type: none"> ✘ Vermont Significant Wetlands Inventory and advisory layer ✘ AE/VCE Confirmed Vernal Pools ✘ FEMA Special Flood Hazard Areas, Floodways Only ✘ VTANR/DEC River Corridors ✘ Significant Natural Communities ✘ Rare, Threatened, and Endangered species areas ✘ National Wilderness Areas in Vermont 	<p>Not Supported.</p> <p>Projects proposed for unsuitable sites shall be prohibited by this Plan.</p>

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Siting Standards Table 3: Technology Specific Standards

Scale	Description
Solar	Disturbed sites, like rooftops, parking lots, brownfields, quarries, and other regionally and municipally preferred locations are strongly preferred for commercial and utility scale solar projects. Commercial-scale and utility-scale solar should be developed within regionally or municipally preferred locations to the extent feasible. When proposing a project for open land, developers should avoid unnecessary conversion of productive farmland or ecologically important areas (See Table 4). Adoption of agrivoltaic or ecovoltaic project design features shall be considered for all projects and must be adopted as mitigation actions in Possible Site locations (see Table 2). Applicants shall design new projects to include storage, be storage ready, or capable of efficient future interconnection with nearby storage and/or other grid-supportive infrastructure.
Wind	Wind projects often occur on highly visible ridgelines. Applicants proposing wind generation development shall consider negative siting impacts including height, sound, shadow flicker, aviation safety, access-road disturbance, and habitat fragmentation concerns. Applicants shall include testimony discussion the siting techniques they used or technologies they deployed to site the project or as a part of their proposed mitigation strategies. Applicants shall design new projects to include storage, be storage ready or capable of efficient future interconnection with nearby storage and/or other grid-supportive infrastructure.
Hydropower	The Region supports upgrades, efficiency improvements, or carefully designed additions at existing dam or impoundment or diversion sites. New hydropower projects shall be designed as run of river and shall demonstrate how impacts on flow, temperature changes, fish passage, and other impacts on aquatic biota are mitigated.
Biomass	Proposed biomass projects should be sited on existing farms or near other manufacturing or waste treatment facilities that supply the feedstock for the proposed facility. Biomass facilities shall conduct careful review of fuel sourcing, truck traffic, air emissions, noise, ash handling, fire safety, and compatibility with nearby land uses. This Plan will prefer projects that use sustainable feedstocks, avoid undue truck dependence, and do not create disproportionate local air-quality burdens.
Battery Storage	Good sites for battery storage include sites located on, adjacent to, or within an industrial zoned area near existing electric distribution infrastructure, critical facilities (e.g. hospitals, large institutions), or existing generation. Applicants shall demonstrate they have met or exceeded fire safety standards, provided reliable emergency access, and provided contextually appropriate visual screening when designing projects. Pairing storage with existing or new renewable generation is encouraged where it improves resilience or grid integration.
Distribution and Transmission Infrastructure	Applicants shall generally co-locate infrastructure within or adjacent to existing rights-of-way, transportation corridors, or previously altered utility corridors where feasible to reduce landscape and resource impacts. New transmission facilities shall be designed to avoid unnecessary skyline exposure, mitigate impacts on productive farmland, and keep habitat blocks intact. Underground lines may be appropriate in particularly sensitive areas. Tower heights shall be limited to height of the existing treeline and shall be no greater than 72' high unless extraordinary circumstances demand additional height.
Substations and Related Utility Facilities	Substations and related utility facilities shall be sited at locations near existing utility infrastructure, in commercial or industrial zoned areas, or near critical facilities, or other similar developed sites. Natural or designed screening shall be required for new substations and related infrastructure. Mitigation shall be required to reduce visibility, noise, lighting, and other similar impacts. Facilities shall be designed to support resilient and cost-effective grid modernization.
Emerging Technologies	Emerging and/or unlisted technologies will be evaluated under general standards.

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Siting Standards Table 4: Mitigation Strategies for Proposed Energy Projects

Scale	Description
Visual and Scenic Resources	Applicants shall demonstrate how they used topography, setbacks, screening, and color and material choices to reduce noise, visibility, and avoid skyline intrusion or prominent contrast with the surrounding landscape. Applicants shall take reasonable steps to avoid shifting visual burdens from the host parcel to neighboring properties or public viewpoints. Where applicants employ screening or managed vegetation is part of a project’s mitigation measures, a maintenance plan is required that identifies the material or species being used, installation timing, maintenance responsibilities, replacement methods, and invasive-species control.
Agricultural Resources	Applicants shall avoid unnecessary loss or fragmentation of productive agricultural land. Where projects are proposed on working lands, the applicant shall demonstrate how they have employed layouts and management plans that maintain meaningful agricultural use or that minimize long-term loss of productive capacity. Mitigation may include adopting “agrivoltaic” project designs that are cohesive with agricultural co-production, such as planting compatible crops between panels, using managed grazing for maintenance, supporting nearby honey production, and similar practices that produce agricultural co-benefits with solar.
Ecological Resources	Applicants shall retain hedgerows, riparian buffers, drainageways, forest edges, wetlands, and wildlife movement corridors. Avoid habitat blocks unless the mapped issue is shown not to exist on the ground or the project clearly avoids the constrained area. Projects may adopt “ecovoltaic” project designs that intentionally maintain or improve the ecosystem function of the site through native and biodiverse vegetation plantings, pollinator habitat, wildlife corridor use, and similar practices that produce ecological co-benefits. For example, where fencing is necessary, design it to reduce fragmentation and allow the passage for smaller animals in ways that are consistent with project safety and security needs.
Stormwater, Erosion, and Soil Stability	Applicants shall minimize impervious area, unnecessary grading, and soil compaction. Use site design, drainage controls, and vegetation management to reduce runoff, erosion, and sediment transport.
Emergency Planning and Public Safety	Projects shall provide safe access, appropriate setbacks, and technology-appropriate emergency response information. Battery storage, biomass, and substation projects shall demonstrate that they incorporated features supporting to fire safety, access, and incident response.
Decommissioning and Restoration	Applicants shall decommission and restore project areas at the end of their useful life in accordance with applicable state requirements. Projects shall include restoration assurances. Utility-scale projects shall demonstrate that they will create and maintain a funding mechanism structured to pay for decommissioning (although the mechanism by which they demonstrate that ability may vary).

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Regional Energy Targets

This Energy Chapter catalogs the Region’s current energy demand and generation capacity. This subsection creates targets for regional energy conservation, use, and generation to guide the Region toward achieving state and regional energy goals. Achieving these goals will be challenging, requiring intensive conservation across all sectors, increased electrification of transportation and space heating (with subsequent decreases in fossil fuel use), and decreased total energy demand despite population growth. Chapter 2, Appendix D contains a comprehensive list of regional energy targets. Appendix F provides the methodology for how regional and municipal targets were developed. Total regional energy demand targets can be viewed here in Table 9:

Table 8: ACRPC Total Energy Demand Reduction Targets, MMBtu

	Current	2025	2035	2050	Change
Residential	1,713	1,332	946	731	(982)
Commercial	990	832	735	727	(263)
Total	3,760	3,232	2,782	2,675	(1,085)

BUILDING TARGETS

Building targets for the Region include reducing total energy demand across residential, commercial, and industrial sectors. PSD’s modeling estimates the Region’s overall energy demand must decrease to meet state goals by 2050. The largest contributors to this reduction will be conservation and efficiency improvements. Thermal conservation and more efficient equipment are projected to shrink the Region’s energy use by about one third. This change is represented by white space in Table 10. VEIC’s model projects that fossil fuel use in the Region will significantly decrease by 2050 (orange, green, and beige bars). Fossil fuels will be replaced by increases

in biomass, wood chips and pellets (purple and pink bars) for heating commercial and industrial spaces, biodiesel (blue bar) for heavy equipment, and electricity (yellow bar) in residential space heating and light vehicles.

THERMAL TARGETS

To achieve energy goals, according to the LEAP model, space heating demand is expected to fall regionally between the present and 2050 due to electrification with the rise of heat pumps and increasing energy savings from weatherization retrofits of existing structures and construction of new buildings compliant with the State’s building energy standards.

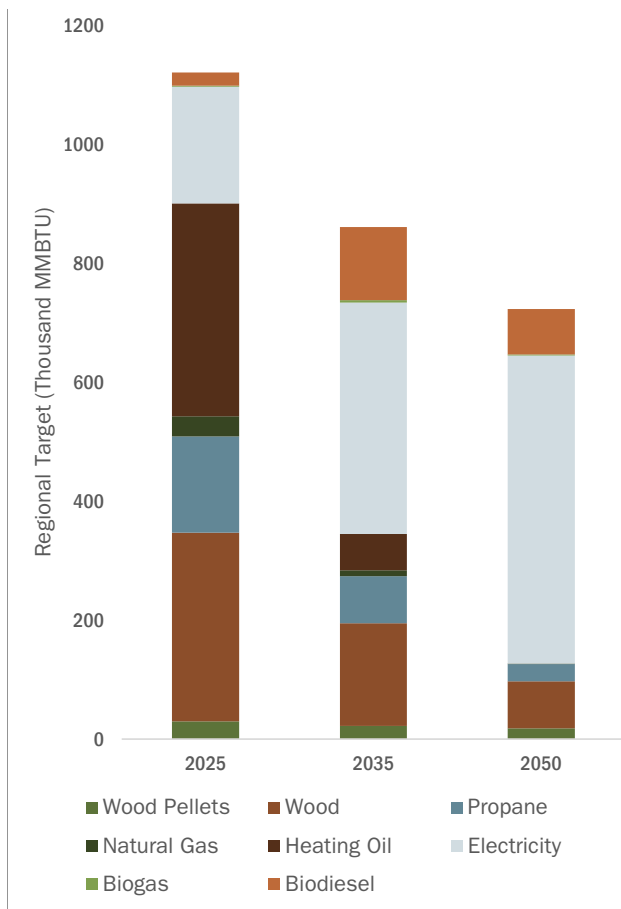
The model results also show significant reductions in fossil fuel use (or in some cases, complete elimination) as a residential home heating source. The regional model shows elimination of coal and fuel oil as heating sources by 2050. Liquid propane and natural gas use are projected to drop substantially during the model time frame. In contrast, electricity demand will increase as heat pumps replace other systems. Heat pumps are most effective when residential properties are fully weatherized; therefore, weatherization rates should dramatically increase, although this version of the model does not provide a specific target. Industrial and commercial space heating demand is also estimated in the LEAP modeling.

Due to the lack of existing data on commercial energy heating, it is difficult to accurately determine the

Table 9: Regional Thermal Energy Project Targets

Building Type	Target	2025	2035	2050
Commercial	New Cold Climate Heat Pumps	2,336	7,064	9,034
Residential	New Cold Climate Heat Pump	4,637	12,468	18,374
	New Heat Pump Water Heaters	3,048	10,151	13,928
	New Weatherization Retrofits	3,356	7,253	11,734

Figure 10: Residential Fuel Demand Change Targets



scale of change necessary. However, industrial and commercial uses will need to transition from fossil fuels to electricity to meet energy goals, including nearly eliminating natural gas usage. This will require a large increase in the number of commercial cold climate heat pumps.

ELECTRICITY TARGETS

The Region will need to focus on efficiency and conservation to minimize electricity use. Since electrical consumption in the Region is split almost evenly between residents (48%) and commercial and industrial entities (52%), targets will require participation from both individual homeowners and commercial and industrial users.

However, even with significant efficiency steps taken by businesses and residents, the Region’s electrical usage will likely increase. This is because many new technologies needed to reduce fossil fuel consumption, like heat pumps and electric cars, replace fossil fuels with electricity. Importantly, this strategy only reduces greenhouse gases if electricity is generated renewably. **Table 11** shows the Region must increase efficiency and conservation by about 52,000 MWh by 2050 to meet proposed targets. This target is based on efficiencies available today. Future technological advances, such as better fuels or motor efficiencies, may help drive this change. However, the Region and its residents will also need significant capital

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Table 10: Regional Program Achievable Electric Energy Efficiency Savings (MWh)

Energy Efficiency Source and Type		2025	2030	2035	2040	2050
Residential	Incremental Annual	1,428	1,500	1,627	1,572	1,748
Residential	Cumulative Annual	2,823	9,620	16,197	20,410	29,880
Non-Residential	Incremental Annual	2,532	2,300	2,303	2,270	2,640
Non-Residential	Cumulative Annual	5,075	16,614	25,489	24,914	22,984
Total	Incremental Annual	3,961	3,800	3,929	3,842	4,388
Total	Cumulative Annual	7,898	26,234	41,686	45,324	52,865

investments in new technologies and efficiencies to meet targets.

Efficiency Vermont is a statewide energy efficiency utility, the first of its kind in the nation. Efficiency Vermont helps consumers reduce energy costs by making homes and businesses more energy efficient. It provides technical assistance and financial incentives to help Vermonters identify and pay for cost-effective approaches to energy-efficient building design, construction, renovation, equipment, lighting and appliances. Efficiency Vermont is funded by an energy efficiency surcharge on electric bills.

TRANSPORTATION TARGETS

Transportation energy demand is a major contributor to regional energy and greenhouse gas emissions. Therefore, ACRPC proposes that regional targets for overall reductions in fossil fuel usage across all vehicle classes must be met to achieve climate change resilience. Further, reducing demand for these non-domestically produced transportation fuels will also enhance energy security by making the Region less dependent on fuel imports. Projections of necessary reductions in demand by fuel type and vehicle type can be seen in **Table 12**.

Much of this transition involves shifting from fossil fuel-powered vehicles to electric vehicles. As EV use grows, this should lead to declining demand for gasoline, diesel, and ethanol. Targets for EV adoption can be viewed in **Table 13**. Meeting these EV and PHEV targets, plus shifting single-traveler, single-destination travel to public options, should help substantially reduce demand for fossil fuels and their additives for road transportation.

Currently the national political climate has moved away from electric vehicle adoption. However, the car manufacturers have made great strides in producing reliable electric vehicles at prices comparable to traditional internal combustion engines. Fast, convenient public charging infrastructure, driver anxiety about mileage range, and resistance to change remain the biggest hurdles to electric vehicle adoption. Even in the current climate, this Plan supports the long-term investment in electric charging infrastructure to support EV adoption.

Public transit, compact land uses, and active transportation constitute the other strategies the Region supports to improve transportation and reduce costs and consumption. [See Chapter 3: Transportation for a discussion of those resources.](#)

Table 11: Transportation Fuel Demand Targets, thousand MMBtu

Fuel	Passenger Car			Light Truck			Medium Duty			Heavy Duty		
	2025	2035	2050	2025	2035	2050	2025	2035	2050	2025	2035	2050
Electricity	11	93	192	14	167	295	20	165	352	10	81	147
Natural Gas	-	-	-	-	-	-	-	-	-	-	-	-
Gasoline	416	202	26	1,050	477	64	147	98	26	0	0	0
Diesel	2	1	0	20	12	1	190	108	22	283	91	9
LPG				-	-	-	2	1	0	-	-	-
Ethanol	35	21	3	90	50	7	13	10	3	0	0	0
CNG	-	-	-	-	-	-	-	-	-	-	-	-
Biodiesel	0	0	0	1	1	0	13	14	5	20	12	2
Total	465	317	222	1,176	707	368	384	396	408	312	183	159

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Table 12: CAP Regional EV and PHEV Targets (Number of Vehicles)

Vehicle Type		2025	2035	2050
Passenger Vehicle EV and PHEV Stock	Battery Electric	606	6,250	14,719
	Plug In Hybrid	115	88	20
	Total	721	6,338	14,739
Light Duty Truck EV and PHEV Stock	Battery Electric	622	8,705	17,753
	Plug In Hybrid	65	86	21
	Total	687	8,792	17,775

Road vehicles are not the only sources of fossil fuel-based transportation fuel demand in the Region. Reducing demand for fossil fuels from non-road vehicles is also a long-term priority to improve energy security and climate change resilience the Addison Region. **Table 14** shows the primary goal for reducing fossil fuel demand for non-road vehicles is encouraging fuel switching from traditional jet kerosene to sustainable aviation fuels (SAF).

GENERATION TARGETS

The PSD’s “determination standards”, or the standards to achieve “enhanced energy plans”, require regional plans establish 2025, 2035, and 2050 targets for renewable energy production. ACRPC worked with PSD guidelines and the provided Generation Scenarios Tool to produce municipal and regional targets for new renewable generation. These targets are listed in **Table 15**.

These generation targets represent only one possible pathway to derive 90% total energy from renewable sources by 2050. The purpose of these targets is to provide an idea for planning future electricity generation in our Region based on estimated demand.

Other potential electricity generation combinations exist and could be better suited for our Region. For instance, this model represents a generation mix that almost certainly would require industrial scale wind. Depending on individual municipalities’ planning, this may not be practical, and a model with more solar and less wind generation might be more appropriate.



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Table 13: CAP Regional, Non-Road Energy Targets (Thousand MMBTUs)

Fuel	2015	2025	2035	2050
Diesel	64	61	61	62
Biodiesel	2	4	8	14
Avgas	2	3	3	3
Jet Kerosene	83	82	69	48
Sustainable Aviation Fuel	-	1	16	37
Gasoline	22	20	21	21
Ethanol	2	2	2	3
Lubricants	18	14	14	14
Natural Gas	-	-	-	-
Total	193	187	194	202

Table 14: New Generation Targets

Municipality	Current Generation	Generation (MWh) Targets		
	2024	2025	2035	2050
Addison	5403	4294	6359	8296
Bridport	4178	3807	5638	7355
Bristol	9164	8083	11,970	15,616
Cornwall	1659	2701	4000	5218
Ferrisburgh	14,376	7665	11,351	14,809
Goshen	136	858	1270	1657
Leicester	621	2186	3236	4222
Lincoln	1084	3362	4978	6495
Middlebury	44,759	27,623	40,904	53,366
Monkton	2161	3943	5839	7617
New Haven	37,044	6946	10,286	13,419
Orwell	1528	3419	5062	6605
Panton	8166	2493	3691	4816
Ripton	521	2450	3628	4733
Salisbury	1039	3013	4463	5822
Shoreham	2302	3957	5859	7644
Starksboro	1277	3866	5725	7469
Vergennes	14,093	6280	9300	12,133
Waltham	728	931	1378	1798
Weybridge	1668	1870	2769	3613
Whiting	992	1098	1627	2123
Total	152,898	100,843	149,333	194,826

The targets analysis using the generation scenarios tool found that annual generation from local renewable energy sources must increase to 100,843 MWhs, 149,333 MWhs, and 194,826 MWhs, by 2025, 2035, and 2050, respectively. As summarized in this Chapter and detailed in **Table 7**, the Region has a nameplate capacity of about 87.69 MWs and produces about 152,898 MWh of electricity annually from renewable generation as of December 2024. Therefore the Region has exceeded its 2025 total generation target early (152% of total generation target), currently produces enough electricity to meet 102% of its 2035 total generation target, and currently generates about 78% of its 2050 renewable generation target.

The Region’s electricity demand may increase somewhat, perhaps significantly, over current demand levels by 2035 and 2050. It is quite likely that generation data and targets will change over coming decades. If reduction of industrial electrical demand proves overly optimistic, then additional generation might well be needed. If energy efficiency improvements produce less demand reduction for direct use electricity or heating, and substantial EV uptake occurs, this could also impact generation needs for the Region. Additional housing developments will also likely increase demand and the need for new generation.

Conversely, technological developments in the energy sector are progressing rapidly and new electric, heating, and transportation technologies may require less energy than currently anticipated. To address these concerns, distributed generation targets for this plan were generated using population and electricity demand estimates that grow gradually over time. Annual population growth was estimated at about 1%, whereas electricity demand was projected to grow 1.5% annually. As such, these projections are best viewed as educated estimates of what will need to be done to usher in the energy future of the Region and meet state standards.

ACRPC supports additional orderly expansion of the Region’s renewable generation capacity and will continue to evaluate impacts of new generation to determine both the feasibility of targets and how they relate to the Region’s demand.

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HABITAT BLOCKS, RENEWABLE ENERGY GENERATION TARGETS, AND CLIMATE CHANGE RESILIENCE

Conserving large, contiguous habitat blocks in the Addison Region helps maintain the Region’s ecological functioning. Connected and healthy habitats provide spaces for work and recreation, support wildlife, and sustain local food systems. They also directly contribute to climate change mitigation goals. Intact habitats support biodiversity, facilitate species migration, and sustain ecosystem services such as carbon sequestration, flood attenuation, wind buffering, and drought resistance—services that are increasingly critical to preventing and responding to changing climatic conditions. Conserving these areas also reduces landscape disruptions that can amplify greenhouse gas emissions through increased soil disruption and the need for expanded infrastructure. Habitat conservation and strategic energy planning are complementary components of a regional energy plan that seeks to increase the region’s climate change resilience.

To evaluate how renewable energy development could proceed without compromising high-value habitat blocks, ACRPC conducted a GIS-based spatial analysis. This analysis relied on data from the Vermont Agency of Natural Resources (ANR), Vermont Center for Geographic Information (VCGI), and the Department of Public Service. First, technical potential for solar and wind energy was assessed across the county using land cover data, slope thresholds, and proximity to transmission infrastructure. Next, land was screened for compatibility with both land conservation priorities and renewable energy siting requirements, with further filters applied to remove hydric soils, wetlands, and steep slopes. Finally, core habitat blocks were identified and excluded from the developable land base. This approach examined whether remaining land area available for renewable energy development was sufficient to meet the region’s renewable energy targets while advancing climate pollution reduction objectives. Results can be viewed in **Table 16** and in **Map 12 and 13** in Appendix E.

The analysis demonstrates that Addison County has more than sufficient land available to meet its renewable electricity generation targets without encroaching upon core conservation blocks. Both the 2050 generation target of 194,826.08 MWhs of domestic, renewable energy generation and an even more aspirational target of 100% of current demand—275,079 MWhs—are well within reach. Even after excluding all high-value ecological areas from the more restrictive “preferred sites” locations, substantial technically suitable land remains for distributed, utility-scale solar and wind projects. The Region’s future generation potential is even greater when considering the role that future rooftop solar will play in our energy transition. This finding underscores the feasibility of decoupling renewable energy development from habitat loss in our communities and reinforces the County’s commitment to climate resilient energy planning. By pursuing energy development goals through conservation-aware siting, The Addison Region can preserve local biodiversity, protect the ecological assets that are foundational to long-term climate adaptation and community well-being, and pursue orderly energy development. Therefore, this Plan requires that commercial scale energy generation projects in the Region avoid core habitat blocks as identified in the study above and locate in other areas, in line with municipal plans better suited to development.

Table 14: Regional Ground-based Solar and Wind Potential, Controlling for Habitat Blocks

	Prime sites, no constraint	Prime sites, no constraint, no habitat blocks	Preferred sites	Preferred sites, no habitat blocks
SOLAR				
MW	1,424	847	854	494
MWh	1,871,403	1,113,383	1,123,075	649,800
WIND				
MW	579	495	149	86
MWh	1,143,140	977,053	294,807	170,572

Energy Resources: A Guide to the Chapter 2 Appendices

- ✦ **Appendix A:** Plan Goals, Objectives, Actions, and Impact
- ✦ **Appendix B:** Energy Units and Conversions
- ✦ **Appendix C:** Comprehensive Energy Targets List
- ✦ **Appendix D:** Energy Map Package
- ✦ **Appendix E:** Target Generation Methodology

These Appendices are hereby incorporated into the Addison County Regional Plan and shall be considered an integral part of the Plan.



Goals, Objectives, and Actions

GOAL 1: Build regional capacity for energy planning and public engagement to support the transition to renewable energy and improved energy efficiency.

Objective 1:

Educate consumers regarding efficiency and energy conservation.

- a. Regularly host a regional energy fair.

Objective 2:

Expand targeted ACRPC energy services for municipalities.

- a. Expand the regional staff position to focus on developing municipal energy projects and advising municipalities on regulations and enforcement.
- b. Work with municipalities to learn what types of energy projects are needed in each town.

GOAL 2: Increase the Region's thermal energy efficiency through municipal leadership and support for residential and commercial heating improvements to meet local and State targets of 90% renewable energy by 2050.

Objective 1:

Promote energy efficiency in municipal buildings.

- a. Work with towns to develop and implement MERP energy assessment recommendations, including facilitating access to grant or bond funding and group purchasing programs to reduce costs.
- b. Advocate for a state-wide, municipal utility tracking software to support ongoing evaluation of the costs and benefits of municipal energy efficiency and weatherization projects.

Objective 2:

Encourage local and sustainably harvested wood and efficient wood heating.

- a. Promote EPA III approved energy efficient wood stoves through education and outreach.

- b. Promote sustainable timber harvest from regional and town forests, in accordance with Natural Resources goals, to provide local heating and electricity fuel sources, prioritizing access for low-income citizens.

Objective 3:

Support weatherization efforts and optimize building design for energy conservation.

- a. Coordinate with CVOEO, Neighborworks, Efficiency Vermont, Vermont Energy Education Program, and CEAC's Energy Navigator program to encourage weatherization participation, including event support, grant assistance, project development, and education/outreach collaboration.
- b. Promote the installation of air source and geothermal heat pumps.
- c. Support thermal energy network development and explore community-based utility models (municipal, neighborhood, cooperative) that build local capacity and resilience.
- d. Encourage municipalities, businesses, organizations, and homeowners to build to higher energy standards (RBES/CBES "Stretch energy code") and work with willing local planning commissions to incorporate these standards into municipal plans and zoning regulations.



John Graham ZEM program, KTP Mobile Home Park, Bristol

GOAL 3: Modernize the Region’s electrical systems and promote efficient energy use in buildings.

Objective 1:

Support energy conservation and efficient use of electricity in buildings.

- a. Discourage the use of “always on” lighting in parking lots and other indoor and outdoor lighting in public places. Encourage the use of technology like motion sensors to light areas when needed.
- b. Advocate for the availability of smart meter technology to help consumers understand and regulate their electricity usage.

Objective 2:

Work with municipalities, electric utilities, and community groups to modernize grid infrastructure and support the clean energy transition.

- a. Help the Region’s municipalities investigate and install, or purchase, cost-effective municipal solar and/or wind net-metered facilities to power municipal energy use.
- b. Work with GMP to ensure that as the Region transitions to distributed electric generation and increased electricity reliance, GMP regularly updates its distribution and transmission infrastructure to provide cost-effective, reliable service to all communities and eliminate current congestion in the Addison Region.
- c. Advocate for interconnection cost policies that support residential-scale distributed generation as a preferred site and as a resilience-enhancing form of energy development, while requiring larger commercial and industrial projects with greater access to capital to fund the interconnection upgrades needed for their development.
- d. Share info with VELCO, GMP, and VEC to ensure that targets for renewable generation in the Region and across the State are optimized to enhance the cost effectiveness of the transmission and distribution system for the State of Vermont. Support grid upgrades where they will provide the greatest cost/benefit.

- e. Strongly encourage the Region’s electric utilities to adopt the new standards for digital substations from the National Electrical Manufacturers Association.
- f. To reduce costs and promote local resilience, strongly encourage new renewable energy projects proposed for the Region to be designed from the outset so they can be connected to onsite or nearby strategically sited energy storage systems to avoid significant retrofitting in the future.
- g. Require newly installed generation systems to meet the following standards when relevant IEEE1547-2018, IEEE2800-2022, IEEE 2030-2011, and IEEE 2030.7-2017 for connection to the grid.

GOAL 4: Reduce transportation energy consumption by transitioning to electric vehicles and promoting a shift away from single-occupancy vehicles.

Objective 1:

Support the development of electric vehicle infrastructure and promote EV adoption.

- a. Plan for and install electric vehicle charging infrastructure on municipal property.
- b. Encourage major employers in the Region to install (additional) EV charging stations for employees.
- c. Develop an EV Readiness report that includes strategic infrastructure improvement recommendations as well as assessments of municipal fleets.
- d. Promote the Drive Electric Vermont website and resources.

Objective 2:

Reduce vehicle miles traveled and support the development of alternative transportation options.

- a. Support Walk-Bike Council of Addison County efforts to increase safe walking and biking access by facilitating complete streets infrastructure and helping municipalities secure funding for incremental bicycle and pedestrian improvements.
- b. Support public transit expansion by working with Tri-Valley Transit to improve rural service access,

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encouraging municipal representation on transit boards, promoting park-and-ride and ride-sharing programs, and advocating for enhanced public transit access during planning proceedings.

- c. Support employer programs to encourage telecommuting, carpooling, and vanpooling for employees' commute trips.

GOAL 5: Transition medium and heavy-duty transportation to cleaner fuel alternatives.

Objective 1:

Support improvements to rail infrastructure and encourage cleaner fuels for large vehicle fleets.

- a. Support transportation goals for expanding passenger and freight rail service (See Chapter 2) to reduce vehicle miles traveled and fossil fuel consumption.
- b. Work with Clean Cities Coalition to encourage large vehicle fleets to switch to conventional natural gas use in situations in which switching to EVs or renewable natural gas is not feasible.

GOAL 6: Advance renewable electricity generation while protecting natural resources.

Objective 1:

Encourage municipal renewable energy generation.

- a. Analyze the feasibility and support the deployment of municipally or community-owned, leased, or otherwise operated distributed generation facilities that are consistent with the *Regional Energy Project Siting and Design Standards*.

Objective 2:

Support responsible siting and development of renewable energy resources.

- a. Work closely with municipalities affected by proposed energy development projects and participate in the PUC process to ensure those projects

are consistent with the *Regional Energy Project Siting and Design Standards*.

- b. Support the expansion of energy storage, microgrids, and other energy system infrastructure in locations and with designs that are consistent with the *Regional Energy Project Siting and Design Standards*.

Objective 3:

Encourage compact settlement patterns and conserve forest land as renewable resources.

- a. Support housing goals for compact development, infill, village center growth, and shared utility infrastructure (see Chapter 5) to reduce transportation energy demand and enable efficient energy systems.
- b. Discourage the conversion of forest blocks and other important ecosystems into exclusively energy generating sites.



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²⁵ Renewable energy credits (RECs) are the accounting system used to track all renewable electricity generation in or sold into ISO New England's regional electric system (ISO= Independent System Operator). These certificates ensure no two entities claim credit for that electricity, and provides a mechanism to buy and retire (aka take credit) for renewable energy generation regardless of their own production and use (or rather to compensate for it).

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