Norwich Energy Plan Working Group
June 2nd, 2026
@ 7:00pm

To be held in person at the
NORWICH HISTORICAL SOCIETY

Zoom Information:
Topic: Energy Plan Working Group
Time: March 18th, 2026, 7:00 PM
https://us02web.zoom.us/j/84163196985
Meeting ID: 850 4576 3743

AGENDA

1. Open meeting
2. Continued review of updated data and text for the Energy Chapter
3. Discussion of Task Assignments/Next Steps
4. Adjourn

Enclosures:
Latest Draft of Norwich Town Plan Energy Chapter_Draft_3-18-2026_Revised updated based on comments from last meeting
Goals, Policies and Objectives of the 2020 Energy Chapter

ENERGY

Overview

We have understood for at least fifty years that human dependence on fossil fuels is not sustainable. Only now are we beginning to grapple with the climate crisis resulting from burning fossil fuels. We also need to develop community resiliency to better withstand the disruptions caused by the changing climate. There is an active grassroots effort in Vermont and around the world to act locally in addressing the climate crisis and in building resiliency.

This chapter details an energy plan for Norwich residents, businesses, and town government in the context of Vermont's "90 percent renewable by 2050" energy goal. Policies and objectives focus on those decisions directly within the control of the town, assuming the current regulatory scope and commitment of resources. Opportunities for promoting changes in residential energy consumption with existing town volunteer resources are also identified. Assumptions made in the Vermont 2022 Comprehensive Energy Plan (CEP) and the shortcomings in available data are noted to encourage more rigorous planning at the state level, where the vast majority of decisions regarding energy markets (fossil fuel and renewable) are made.

Energy Data Sources

In developing this chapter, the town relied upon:

- 2022 Two Reivers-Ottauquechee Regional Commission (TRORC) Municipal Summary Worksheet and Energy Maps. This is included in Appendix X
- The Energy Action Network (EAN) Vermont Energy Dashboard
- The EAN Statewide Greenhouse Gas (GHG) Emissions Dashboard
- Efficiency Vermont's 2023 Energy Burden Report

It should be noted that while above data sources provide useful energy data, other useful energy data is not tracked or publicly accessible. Indeed, some additional energy data was formerly publicly accessible through EAN's Vermont Energy Atlas. EAN's Vermont Energy Dashboard is a scaled-down replacement of the Vermont Energy Atlas. For instance, the number of solar arrays per Town was tracked on the Energy Atlas, but not on the Energy Dashboard.

Some useful energy data is not reported at all. While the Vermont Energy Dashboard tracks the adoption of heat pumps, the dashboard does not report whether these are air-to-air or ground-sourced heat pumps. In addition, there is no tracking of how much heating oil is consumed in Vermont. And there is also no reporting of how many houses use wood as a primary or secondary heating source.

In addition, the energy data reported in Norwich's Municipal Summary Worksheet is from 2022. When TRORC compiled the energy data for the Municipal Summary Worksheet, 2022 was the latest year that energy data was available from all sources. Within that data, there

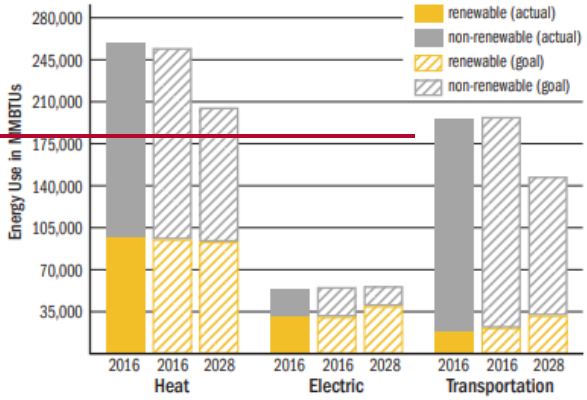
is one issue to note concerning the reported thermal energy consumed by commercial structures. The Municipal Summary Worksheet reports the number of commercial establishments using Vermont Department of Labor's numbers of registered businesses. Given that some registered businesses are home businesses or otherwise do not occupy space within their own commercial building, this is an overcount of commercial buildings and their estimated thermal energy.

Current Energy Use

According to the Energy Action Network's (EAN) Greenhouse Gas (GHG) Emissions Dashboard, Vermont greenhouse gas emissions have generally decreased over the last decade, but not significantly enough to meet the state's GHG reduction goals established in the Global Warming Solutions Act of 2020.

Transportation and thermal energy (heating and cooling) are the largest contributors to the Norwich's GHG emissions. The accepted estimate of the total amount of energy being used in Norwich is from the Two Rivers-Ottauquechee Regional Commission's (TRORC) Municipal Summary Worksheet for Norwich. This source suggests that in 2022 (the latest year actual use figures are available) Norwich consumed 535,679 MMBTUs (million British Thermal Units) for electricity, thermal, and transportation.

Energy use in Norwich reflects the settlement pattern, which is dominated by low density residential lots, and little or no industrial or commercial activity. Transportation accounted for 29.6% of the energy consumed in Norwich in 2022. Almost all of this transportation energy was consumed by internal combustion engine (ICE) vehicles. Thermal heating for both residences and commercial establishments accounted for over half (59.0%) of the energy consumed in Norwich in 2022. The overwhelming majority of this thermal energy consumed is from heating fuels. Lastly, electricity use accounted for about 11.3% of the energy consumed in Norwich. Unlike the sources of transportation and thermal energy, it is likely that a majority of the electricity consumed in Norwich is from renewable sources.



Source: Brighter Vermont Community Energy Dashboard

~~Figure 11. Energy Use and Goals by Sector~~

Transportation

According to the Municipal Summary Worksheet, there were 204 electric vehicles (EVs) and 2,325 ICE vehicles operated by Norwich residents in 2022. This EV figure includes both fully electric vehicles (103) and plug-in hybrids (101). Since 2022, adoption of EVs has increased among Norwich residents, as the EAN dashboard reports there were 353 EVs (199 fully electric vehicles and 154 plug-in hybrids) and 2,240 ICE vehicles in Norwich in 2024. These figures only encompass light duty vehicles, which are those used primarily for passenger or light cargo transportation. This does not include medium and heavy duty vehicles such as box trucks, school buses, garbage trucks, tractor trailers, dump trucks, etc.

Using the figures reported in the Municipal Summary Worksheet, the estimated the total energy consumed by ICE vehicles in Norwich is 155,840 MMBTUs and the total energy consumed by EVs is 2,900 MMBTUs. Together, EVs and ICE vehicles consumed 158,740 MMBTUs in 2022.

The adoption of EVs is facilitated by the installation of EV charging stations. In Norwich, there are several public EV charging stations, including at Dan & Whit's, King Arthur Café & Bakery, and Huntley Meadow. As Norwich residents continue to adopt EVs, there will be an increasing need for more EV charging stations and charging capacity.

Thermal Heating

According to the Municipal Summary Worksheet, 1,299 Norwich households consumed 142,890 MMBTUs of energy on thermal heating in 2022. The Municipal Summary Worksheet also estimated that Norwich's 182 commercial establishments consumed 173,258 MMBTUs of energy in 2022. Together, thermal heating for residential and commercial structures amounted to 316,148 MMBTUs of energy in 2022.

The Municipal Summary Worksheet also used 2022 American Community Survey (ACS) 5-Year Estimates to report the percentage of homes using different heating sources. The overwhelming majority of Norwich households (82.1%) primarily consumed fossil fuels, such as heating oil, kerosene, propane, butane, or liquified petroleum gas, to heat their home. A minority of homes (15.6%) relied primarily on wood or other biomass sources. It is also likely that many Norwich homes supplemented their heating using wood or biomass sources. Lastly, an exceedingly small number of homes (2.3%) used electricity as their primary heating source. It is likely that these homes used either heat pumps or electric baseboard heaters.

The EAN Dashboard reports an increase in the adoption of heat pumps over the last few years. In 2022, the EAN Dashboard reported 313 cold-climate heat pumps and 111 heat pump water heaters in Norwich. By 2024, the EAN Dashboard reported that there were 526 cold-climate heat pumps and 154 heat pump water heaters in Norwich. These figures include cold-climate heat pumps and heat pump water heaters for both residential and commercial structures.

Electric Use

Data on electricity consumption is specific to Norwich and up-to-date because Green Mountain Power (GMP) as a utility regulated by the VT Public Utilities Commission (PUC) provides detailed statistics about electricity generation and use as part of their license to operate. Approximately 79 percent of the GMP portfolio is made up of renewable energy, predominantly hydro-electric from Quebec. Current commercial transportation energy use and future trends were not assessed by TRORC as part of their Act 174 energy planning. The published figures for thermal and transportation energy are rough estimates, based on statewide averages and Census data. More reliable and accurate data is needed for town energy planning to be meaningful and effective.

According to the Municipal Summary Worksheet, Norwich residences consumed 14,050 megawatt hours (MWh) of electricity, while Norwich's commercial structures consumed 3,766 MWh of electricity. Together, Norwich's residences and commercial structures consumed an estimated 17,896 MWh of electricity in 2022. A single MWh is equivalent to 3.412142 MMBTUs. Using this conversion factor, Norwich's residences and commercial structures consumed 60,791 MMBTUs of electricity.

Renewable Energy Resources

Vermont's Renewable Energy Goals

GHG emissions caused from human activities are driving the global climate crisis. In 2011 Vermont adopted a goal to obtain 90 percent of the total energy used in the state (primarily electricity, thermal, and transportation) from renewable sources by 2050. Advisory 2050 targets have been set for each Vermont municipality. The energy and conservation targets

for Norwich are shown in Figure ~~1~~2X. Specific targets for renewable energy generation are included in Appendix ~~B~~X~~, Energy Targets and Conservation Goals~~.

Year	Renewable Energy Generation Target (MWh)	Incremental Renewable Energy Generation from 2022 Baseline (MWh)
2022 (baseline)	4,578	
2025 (target)	4,592	14
2035 (target)	4,818	240
2050 (target)	7,522	2,944

Figure 12. **Norwich Energy Targets**

Year	Renewable	Nonrenewable	Efficiency	Total
2014 (baseline)	144.3	380.1	0	524.4
2016 (actual)	145.4	362.7	8.7	508.1
2025 (target)	160.1	273.8	47.9	434.0
2035 (target)	174.5	177.2	91.5	351.7
2050 (target)	196.1	32.3	156.8	228.4

All values expressed in thousand MMBTUs.
Source: Energy Action Network 2050 Energy Pathway Analysis

Figure ~~1~~2X: Norwich Renewable Energy Generation Targets

Town-level efforts to meet the State's '90 by 50' goal will focus on redirecting energy demand to renewable electric sources. These efforts will be challenged by the limited authority of municipalities to affect energy use outcomes. Energy products (including efficiency and renewables) are allocated via markets which are regulated by State and US governments. Municipalities are best understood as institutional consumers who have no jurisdiction over the structure and operation of energy markets. In the case of Norwich, the town is a very small consumer, even compared to local school districts and larger regional employers.

Municipalities do have the authority to regulate land use (an authority granted to municipalities by state statute and case law). Because land use patterns in Norwich have been consistent for many decades, and the rate of development is exceedingly slow, changing land use patterns will not play a major role in achieving the targets within the timeframes identified by the VT CEP. Nevertheless, Norwich will use this opportunity to review the zoning and subdivision regulations to encourage future development patterns that reduce energy use and preserve forest and agricultural lands for ecosystem services. These concerns are addressed in more detail in the Land Use, Housing and Transportation chapters.

Each year GMP reports the energy mix of its service area. GMP is the sole electric generation and distribution utility servicing Norwich. Seventy nine percent of the electricity consumed in the GMP service area is from renewable sources. Converting current electricity use to renewable sources has been relatively straightforward in response to state policies such as the Renewable Energy Standard, which required utilities like GMP to procure 100 percent of their electricity from renewable sources by 2030. Conversion of transportation and thermal energy (most of the energy used in Norwich) to renewable sources are beyond the regulatory scope of the municipality, and thus the Town can only influence the outcome at the margins.

Energy Costs
Supplies of electricity, gasoline, biomass, or various heating fuels are subject to price volatility and potential disruptions at the global, national, and regional levels. While the Town of Norwich does not have regulatory control over the supply of these energy resources, it is in the Town's interest to encourage its residents, businesses, and civic institutions to compare the upfront costs of fuel switching, weatherization and energy efficiency projects, and new renewable energy generation projects against their potential long-term cost savings.

While this plan acknowledges that weatherization and energy efficiency projects can pose a substantial financial burden for Norwich's residences, businesses, and civic institutions, these programs offer significant cost savings after implementation. The resulting reduction in thermal heating and cooling costs also reduce the consumption of heating fuels, electricity, or biomass. Thus, more of these resources are conserved.

Similarly, fuel switching projects, like replacing ICE vehicles with EVs or replacing older fossil fuel-burning heating systems with heat pumps, will often lead to significant cost savings over time. Again, this plan acknowledges that these projects may pose additional upfront financial burdens on Norwich's residents and businesses. However, an EV consumes far fewer MMBTUs of energy per mile driven than an ICE vehicle. Similarly, the efficiency of modern heat pumps exceeds that of older furnaces and boilers. This increased efficiency results in both cost savings and GHG emission reductions.

Energy Scarcity
There are few scarcities of energy foreseen in the 8-year life of this plan. Total energy demand is likely to shrink modestly in the near term as Norwich's population is not expected to grow much, and more fuel switching, weatherization, and energy efficiency projects are anticipated over the life of this plan. While this plan predicts there will be an ample supply of heating and transportation fuels over the next eight years, this plan nevertheless encourages a shift away from the use of these fossil fuels. Wood is also plentiful local source of heating fuel, and many more cords could be sustainably harvested as a thermal heating energy source. There are also no foreseen scarcities of electricity, as GMP generates and distributes an ample supply of electricity across its service area. GMP will also need to increase its purchase or generation of renewable energy as mandated by

Vermont's Renewable Energy Standard, which requires GMP to produce or procure 100 percent of its electricity from renewables by 2030.

Energy Problems
The lack of any foreseen energy scarcity is not meant to imply that the energy consumed in Norwich poses no known issues. Foremostly, the consumption of fossil fuels for transportation, electric generation, and thermal heating are all contributing to anthropomorphic climate change through the emissions of GHGs. The reduction of GHGs through fuel switching, greater energy efficiency, weatherizing buildings, and the expansion of renewable energy generation are objectives of this plan.

The consumption of GHGs also poses threats to the health of Norwich residents. The burning of any fossil fuel causes air pollution. In indoor settings, inadequate ventilation from appliances that burn fossil fuels can cause deleterious health effects on individuals. And if not properly maintained, any underground or aboveground storage tank has the potential to leak fossil fuels into the ground and groundwater.

As noted above, fossil fuels have varied widely in price over the last several years. While the cost of energy is not an issue for some families, it is still an issue for some. Efficiency Vermont's Energy Burden Report shows that 5.9% of Norwich's households are considered energy burdened in 2023. While this figure is lower than every neighboring town except Strafford, Norwich households spend more on energy than both neighboring Strafford and Hartford. While 10.8% of Hartford households are energy burdened compared to 5.9% of Norwich's households, the average Hartford households spend less on energy ($6,649) than the average Norwich household ($7,207). Consistency with the electric grid can also be a problem in Norwich. The power may fluctuate, which is due to the condition of utility power lines. Norwich also has few 3-phase transmission lines. This limits the siting and implementation of new larger renewable energy generation projects in locations in Norwich without 3-phase transmission lines. Furthermore, many transmission lines are at half capacity, while some are at two-thirds capacity or maximum capacity. This potentially limits the siting and implementation of new smaller-scale renewable energy generation projects.

R**enewable Energy Generation Potential**
Act 174 Maps.

As required by the state under Act 174, TRORC has mapped areas of Norwich that have potential for renewable energy generation (see Appendix ~~B~~X). The maps for solar potential rely heavily on analyzing aspect (south-facing landforms are most suitable for solar generation). The maps do not correct for features that will limit uptake of solar projects including: current land use and lot boundaries, extent of forest cover, proximity to roads, and distance to electric distribution (particularly 3-phase power and transmission infrastructure). Each of these factors presents serious limitations to utility scale (>500 kW) solar energy development.

At present, the most salient factors for determining where non-residential renewable energy projects may feasibly be located is proximity to the existing power grid (3-phase power and transmission lines) and the capacity of the grid to accommodate additional load. As of 2019, the GMP Solar Map 2.0 indicated that there were system limitations on the circuit along the Thetford-Norwich border and to the far west of Norwich near the Sharon town-line. Norwich operates on circuit 71G1 of the Wilder substation, which the utility lists as having 50 percent of its capacity remaining (approximately 7.1 MW). Therefore, installation of numerous 150 kW solar arrays is feasible. Three-phase power lines currently run along Main Street as far as Willey Hill Road, Route 5 South, and Route 5 North (to just south of Farrell Farm Road). Beyond these areas infrastructure upgrades would be required for larger projects.

SOLAR POWER. Using data from the GMP Solar Map 2.0, in 2026 the Town of Norwich has 345 active solar arrays ~~small PV sites in Norwich~~, with a total capacity of almost 4~~1~~,~~800~~ 600 kW~~ (approximately 11 percent of the generation goal)~~. T~~he Norwich Energy Committee tracks solar installations, including households that have purchased shares of solar projects located in other towns. This count tallies 283 residences, businesses, or churches that have "gone solar" — more projects of this scale and type are likely. The EAN Dashboard ranks Norwich 12th out of 250 towns in Vermont for the number of solar electric sites.~~

While large scale development of solar energy will require proximity to a substation and three phase power, the utility grid in Norwich is well-suited for projects of about 150kW or smaller. Indeed, the GMP Solar Map 2.0 shows that ninety-eight and half percent of the active solar arrays in Norwich have a total capacity of less than 150 kW, and that around ninety-one percent of the solar arrays in Norwich have a capacity of less than 15 kW.

Given the remaining capacity in circuit 71G1 of the Wilder substation, there is also no foreseeable capacity issue with the increasing use of plug-in solar panels. Plug-in solar arrays are so named for their ability to easily connect to a standard wall outlet using a microinverter that converts the direct current produced by the panel into alternate current used by the home or business. Because a plug-in solar array does not require hardwiring to the electric grid, these arrays are arrays are portable and are easily installed and removed. unlike ground-mounted or rooftop solar arrays. Plug-in solar arrays usually generate less than 1kW when operating, which is usually enough electricity to power some of the home or business. And any excess electricity generated that is not consumed will be added to the electric grid.

Using the Act 174 mapping methodology, ~~6,341 acres out of a total 28, 620 acres in Norwich has solar potential (southern facing slopes)~~884 acres of Norwich that are not within a forest block and have no constraints are available for potential solar energy generation. ~~But, 22,116 acres (or 77 percent) of Norwich is forested. About 67 percent of the area identified as having solar potential is currently under forest.~~ Aside from the

economic cost of clearing, the release of carbon from cleared lands would diminish the climate benefits of solar development on these sites. The mapping of solar potential also includes the Right-of-Way (ROW) for interstate 1-91 and other lands not available for development.

About 2.1 MW of installed solar would be needed for Norwich to meet its renewable energy generation target of about 7,522 MWh by 2050 (Appendix ~~BX~~). This is the town share of projected statewide energy demand in 2050, in proportion to its population. Based on current solar technology. 2.1 MW of solar generation would require about 39 acres total, or about 0.14 percent of the town's total land area. Assuming that solar panels continue to increase in efficiency, the area needed to meet Norwich energy demand will decrease as a result. Today 150 kW solar arrays typically require about of a third of an acre. To the extent that homes and businesses take up roof and parking lot installations the need for larger ground-based solar arrays will be reduced.

BIOMASS. It is not known how much wood is harvested for fuel in Norwich on an annual basis. Wood is a renewable source of thermal energy and technological improvements have greatly increased the efficiency and reduced the pollution associated with burning wood. A large percentage of homes in Norwich use wood as either a primary or secondary heating source. The State of Vermont is encouraging schools and municipal facilities to install high efficiency wood pellet or woodchip heating systems. ~~More recently Dartmouth College (in neighboring Hanover, NH) is reconsidering a proposal for a biomass plant to replace existing fossil fuel fired heat system, due to concerns about the risk of increasing greenhouse gas emissions (including the impact of trucking woodchips) and local air quality effects.~~ While the climate benefits of burning wood for heat are being reassessed, Norwich will promote ~~the clear path of~~ solar ~~electricity~~ energy generation and switching to electric heat and transportation. This is not to meant to call for a ban on biomass energy generation or thermal heating, rather to state this Plan discourages these methods of thermal heating or energy generation.

GEOTHERMAL. It is currently unknown how many ground-source heat pumps or other geothermal systems exist in Norwich. The Vermont Energy Atlas reported ~~There is~~ one ground source heat pump installed at a residential property in Norwich in 2019~~, according to the EAN Dashboard~~. The new EAN Vermont Energy Dashboard does not track whether heat pumps are ground-sourced or air-to-air sourced. The feasibility of installing geothermal systems needs to be assessed on a site-by-site basis. ~~As of~~Around 2019, the town ~~is~~ consider~~ed~~~~ing geothermal~~ ground-sourced heat pumps for three town buildings (Tracy Hall, the Fire Department apparatus bay, and the Town Garage).

Commented [BK1]: Status of this?

HYDRO POWER. There are no hydropower facilities currently located in Norwich according to the ~~Energy Dashboard~~Municipal Summary Worksheet. Small, run-of-the-river generators would be the only likely future hydro generation, given current state and federal regulations regarding the damming of waterways.

WIND POWER. According to the ~~Energy Dashboard~~Municipal Summary Worksheet and GMP's Solar Map 2.0, there are no wind energy projects installed in Norwich as of ~~2018~~2026. The Wind Energy Potential Map in the Municipal Summary Worksheet shows the areas of Norwich that are suitable for either large commercial, small commercial, or residential wind energy generation. The Wind Energy Potential Map shows that there are a few prime locations for the development of wind energy generation. Prime is defined as having suitable natural conditions, and no known constraints. However, none of these prime areas are near any existing 3-phase power lines. There are more areas of Norwich which have suitable natural conditions but have possible or known constraints.

Vermont's Open Geodata Portal shows which areas of Norwich are suitable for large commercial, small commercial, or residential wind energy generation. There is ~~no~~ limited ~~meaningful~~ potential for utility- or large community-scale wind generation in Norwich given current turbine technology, which generally requires an average wind speed of at least 6.5 meters per second. Only two locations in Norwich identified through the Act 174 mapping process with wind speeds at 6.5 meters per second or above ~~(accessed via turbines set between~~on a turbine between 50 and 70 meters high~~)~~. Both are off Chapel Hill Rd along the Sharon townline. These sites are not currently accessible from roads suitable for this scale of development, nor to a power transmission line.

There is more potential for small commercial or residential wind generation in Norwich. Small commercial wind generation requires a wind speed of at least 5.5 meters per second on a turbine 30 to 50 meters in height. Residential wind generation requires a wind speed of at least 4.5 meters per second on a turbine of at least 30 meters in height. Areas suitable for small commercial or residential wind generation comprise the remainder of the areas mapped on Norwich's Wind Energy Potential Map.

Energy Conservation and Efficiency Targets

STRUCTURES. The scenario for meeting the state's renewable energy goal presented on the ~~EAN Dashboard~~Municipal Summary Worksheet shows that ~~by 2050~~ Norwich residences ~~Norwich~~ will need to ~~use a total of~~cumulatively conserve 1~~,296~~,060 MWh of electricity by 2050. Switching to heat pumps will increase the demand for electricity. Indeed, the Municipal Summary Worksheet establishes a target for one hundred percent of Norwich residences to adopt heat pumps, and sixty-nine percent of Norwich commercial structures by 2050. However, this increased electric demand can be offset by reductions in thermal heating demand from residential and commercial weatherization projects. By 2050, the Municipal Summary Worksheet calls for eighty-three percent of Norwich residences and fifty-four percent of Norwich commercial structures to be weatherized.

~~MMBTUs of energy less than it did in the baseline year of 2014. Under the US and Vermont constitutions, the town has no role in shaping or regulating the market provision of energy conservation or efficiency products and services. In addition, the annual rate of new construction, or even substantial improvement, is very low. Nevertheless, the town can still play a role by encouraging energy code compliance, modeling energy-efficiency in~~

~~municipal facilities, supporting outreach and information-sharing with residents, and investigating how it could take on inspection and enforcement.~~

TRANSPORTATION. The decrease in transportation energy consumed by light duty vehicles in Norwich will be driven by the adoption of fully electric vehicles and plug-in hybrid vehicles. The Municipal Summary Worksheet establishes a target of one hundred percent adoption of light duty EVs by 2050. ~~Of note here is the assumption that the town's total energy use for transportation will go from 205,793 MMBTUs in the baseline year of 2014 to 56,348 MMBTUs in 2050 (see EAN Dashboard, regional energy planning). That is, the town's transportation energy use in 2050 will be 27 percent of what it was in 2014. It is also expected that fully 90 percent of the 2050 transportation energy budget will be provided from renewable sources.~~ This is a major change from the town's current modes of transportation and entirely outside the control of (existing) municipal decision-making. ~~Land-use policy, a clear area of town authority, will play an important role, as will town support for regional public transit and town infrastructure for walking, biking, and electric vehicles. Land use policy can help support reductions in the number and length of car trips — and thus greenhouse gas emissions — by encouraging future development to be located close to job and retail centers and public transit lines, and creating walkable neighborhoods.~~

Future Generation~~, Use and Conservation~~
~~Energy Targets~~

Future targets for energy generation ~~, use and conservation~~ have been set for all Vermont municipalities as part of the state's enhanced energy planning under Act 174 (see Figure ~~12~~X). ~~The planning scenario presented on the EAN Dashboard envisions that total energy consumption of Norwich will decrease from the 2014 baseline consumption of 524,4000 MMBTUs to 228,400 MMBTUs in 2050. A reduction to 44 percent of 2014 levels. Moreover, only 32,300 MMBTUs (or 14 percent of the total) will be from non-renewable sources. This reduction will primarily rely on the efficiencies of weatherization and electric transportation.~~

~~This plan's land use, housing and transportation objectives and policies call for new housing and economic development to be focused in and adjacent to the village and mixed use areas. This is where people can live close to employment, shopping and services. Such proximity allows walking, biking and public transit, all of which reduce transportation energy use. Encouraging such a development pattern through the Town's land use regulations and public infrastructure are the most effective and direct measures Norwich government can take to move towards meeting the state's energy goals.~~

The TRORC Municipal Summary Worksheet ~~recognizes~~ reports that Norwich generated 3.5 MW, or 4,578 MWh in 2022~~.~~ and sets a target for a total of 7,522 MWh of renewable energy generation by 2050. This is an increase of 2,944 MWh over Norwich's 4,578 MWh of renewable energy generated in 2022.

~~This~~ This target is~~is~~ based on Norwich's fraction of the regional population and an assumption that twenty-five percent of the regions' energy demand will be met from in-state renewable energy generation. Previous guidance from the Vermont Department of Public Service (PSD) assumed a scenario where fifty percent of the state's renewable energy would be generated from in-state facilities. However, PSD has revised that assumption as part of their energy forecasting.

The portfolio of renewable energy generating sources ~~includes~~ assumes that ninety-four percent of the renewable energy generated will come from ground-mounted solar, one percent from rooftop solar, and five percent from wind turbines. ~~both rooftop and ground-mounted solar, and wind.~~ The TRORC Municipal Summary Worksheet proposed that only 4.3% of the land in Norwich is needed ~~to host such~~to meet this renewable energy ~~projects~~ generation target (primarily for ground-mounted solar facilities) ~~in Norwich~~.

Energy + Land Use and Transportation Policies

Land-use policy, a clear area of town authority, will play an important role, as will town support for regional public transit and town infrastructure for walking, biking, and electric vehicles. Land use policy can help support reductions in the number and length of car trips — and thus greenhouse gas emissions — by encouraging future development to be located close to job and retail centers and public transit lines, and creating walkable neighborhoods.

This plan's land use, housing and transportation objectives and policies call for new housing and economic development to be focused in and adjacent to the village and mixed use areas. This is where people can live close to employment, shopping and services. Such proximity allows walking, biking and public transit, all of which reduce transportation energy use. Encouraging such a development pattern through the Town's land use regulations and public infrastructure are the most effective and direct measures Norwich government can take to move towards meeting the state's energy goals.

Under the US and Vermont constitutions, the town has no role in shaping or regulating the market provision of energy conservation or efficiency products and services. In addition, the annual rate of new construction, or even substantial improvement, is very low. Nevertheless, the town can still play a role by encouraging energy code compliance, modeling energy-efficiency in municipal facilities, supporting outreach and information-sharing with residents, and investigating how it could take on inspection and enforcement.

Article 36

In 2019, the voters of the Town of Norwich passed Article 36. Article 36 mandated that the Town of Norwich "gradually and continually reduce the Town's direct use of fossil fuels, beginning at a rate of no less than 5% per year starting in the 2019-20 and continuing until they are eliminated entirely." Article 36 also initiated a task force comprised of a Energy Committee member, a Planning Commission Member, a Selectboard member, and two

members of the public to make recommendations to the Town Manager and Selectboard for new or modified policies, programs, and projects that reduce the town's consumption of fossil fuels.

The new or modified policies, programs, and projects focused on benchmarking and tracking energy performance of the town's buildings and vehicles, as well as improving their operations and maintenance through recommended interventions like fuel switching, increasing energy efficiency, and better weatherization of structures. The task force also focused their efforts on promoting awareness and training of fossil fuel reduction.

The efforts of the Article 36 Task Force demonstrate municipal leadership in reducing fossil fuel consumption of the town's buildings and vehicles, as well as their commitment to promote awareness of the benefits of reducing municipal energy consumption.

Equity Discussion

The Town of Norwich is actively considering the potential equity impacts of the energy chapter's objectives, policies, and actions. None of these are anticipated to exacerbate existing inequalities. Indeed, the plan acknowledges that its energy burdened residents face the most difficulty supporting the plan's objectives. To address this, the plan calls for the Town of Norwich to undertake actions that will equitably allow energy-burdened households and individuals to support the plan's objectives.

While increased energy conservation and the efficient use of energy benefits all residents, the benefit will be greatest for Norwich's energy-burdened residents. Regretfully, energy-burdened residents may not be able to afford the upfront costs to renovate and weatherize their properties, install on-site renewable energy generation facilities, or switch to energy-efficient appliances. Therefore, the plan supports income-based financial incentives, rebates, and programs for low- and moderate-income residents available from Efficiency Vermont, Capstone, and other organizations. ~~Furthermore, the plan supports the establishment of Property Assessed Clean Energy (PACE) program, which would provide financing for upfront commercial and residential energy efficiency, weatherization, and renewable energy generation improvements for Norwich's energy-burdened residents.~~

Commented [BK2]: Add spreading word about these programs as an action for the Town of Norwich and its committees.

The plan supports the minimization of energy from the transportation sector by promoting active transportation and multimodal transportation options through developing more pedestrian and bicycle facilities, carpooling, the use of Advance Transit buses, and land use policies like clustering new development in Norwich Village. The plan also supports the Tri-Valley Transit Dial-A-Ride program wherein elderly residents, those with disabilities, or low-income individuals can receive free rides for medical appointments, pick up groceries, or reach critical services. Enacting these objectives, policies, and actions will help lower energy costs for all residents, but in particular those do not own or lack access to a single-occupancy vehicle.

Commented [BK3]: Could mention seeking Tier 1b designation for Norwich Village here.

The plan calls for patterns of land use that are not anticipated to create any inequitable, undue, or unfair burdens or costs on any environmental justice focus population. Furthermore, with the exception of biomass generation facilities, renewable energy generation facilities do not pose a risk to public health or the environment. Therefore, this plan does not foresee any inequitable, undue, or unfair burdens on nearby environmental justice focus populations from these renewable energy generation facilities. For biomass facilities, the Plan calls for the installation of appropriate air pollution control measures and prohibits their siting near any environmental justice focus populations.

Commented [BK4]: Recommend adding these as policies.

Commented [BK5R4]: Environmental justice focus populations are defined in 3 V.S.A. § 6002.

Summary

In summary, it is important to acknowledge that the town's ability to meet the ambitious and necessary state energy goals is limited. It falls primarily in 1) land use regulation, 2) modeling the adoption of energy conservation and renewable energy in Town facilities and equipment, and 3) ensuring local regulations are not a barrier to necessary change. Norwich is, nevertheless, determined to take concerted action to make progress.

ENERGY

Objectives

- Reduce greenhouse gas emissions from Norwich municipal operations, businesses and residents (24 VSA §4302 (c) (7)).
- Reduce overall energy use in Norwich (24 VSA §4302 (c) (7)).
- Shift energy use in Norwich from non-renewable to renewable sources (24 VSA §4302 (c) (7) (A)).
- Increase the amount of renewable energy being produced in Norwich in a manner that is consistent with the goals, objectives and policies of this plan (24 VSA §4302 (c) (7) (A)). Pursue strategies identifies in the State Energy Plan (30 VSA §§202, 202b).

Policies

- Establish a mechanism to collect and appropriate funds to support projects that further the objectives of this Energy Plan.
- Ensure that the review of the Norwich Zoning and Subdivision Regulations is informed by the link between changing land use patterns and reducing fossil fuel use, including, but not limited to, consideration of increasing density adjacent to the existing village district, and the creation of new zoning districts.
- Promote bike and pedestrian as non-vehicular transport modes using best practices for traffic engineering such as sidewalks, bike lanes and dedicated trails.
- Consider lifecycle costs when planning to construct or upgrade municipal facilities. Develop programs that assist low-income households with weatherizing and improving the efficiency of existing dwelling units.
- Expand the authority of the Zoning Administrator to require the issuance of a Certificate of Compliance on all new construction over 800-sq ft ensuring that such work meets the VT Residential Building Standards (VT-RBES).
- Require large-scale commercial and institutional development to install solar panels on roofs and over any parking lots where feasible.
- For solar generation projects sized from 15kW to 500kW the presumption is that all of Norwich meets the Public Utility Commission definition of ‘preferred site’, notwithstanding the existing areas of local concern including the Ridgeline Protection Overlay Area, Shoreline Protection Overlay Area and the historic village district as identified in the Norwich Land Use Regulations.
- Support Advanced Transit in providing a range of commuter services to Norwich, providing connections with locations where residents attend school, work and shop.

Actions

- Advocate before VTrans on behalf of non-vehicular road users for improved accommodations on state highways.
- Review hybrid and electric options for any municipal vehicle purchase or replacement.
- Consider how to address barriers to development related to limitations on wastewater capacity, including a review of the findings of the 2005 study conducted by the Norwich Sewer Committee in light of current challenges and changes in wastewater management. Encourage development projects to install solar collectors on rooftops and parking lots.
- Participate in the Section 248 process before the Public Utility Commission to make decisions that further the goals, objectives, and policies of this plan.
- Implement to the best of our abilities the (non-binding) Article 36 from the Town of Norwich 2019 ballot, which was passed by voters:
  Shall the voters of Norwich direct all Town officials to take immediate and sustained efforts to gradually and continually reduce the Town's direct use of fossil fuels, beginning at a rate of no less than 5 percent per year starting in the 2019-20 fiscal year and continuing until they are eliminated entirely, and shall the Town Manager be charged with monitoring such efforts and reporting on them each year in the annual Town Report, and no capital expenditures shall be made that contradict or undermine this direction, absent a majority vote of the Selectboard?
- Ensure that the Zoning Administrator or their designee has the training and resources to both enforce state Residential Building Energy Standards and issue Certificates of Compliance on development projects greater than 800-sf.
- Provide residents with information on:
  - cold-climate heat pumps, and other non-fossil fuel heat sources in new construction and in existing homes and buildings;
  - replacing fossil fuels powered vehicles with electric vehicles;
  - managing forest land for long-term, sustainable harvesting of wood.
- Raise climate crisis and energy awareness.

Work with community groups and others to support non-vehicular transportation options in Norwich.