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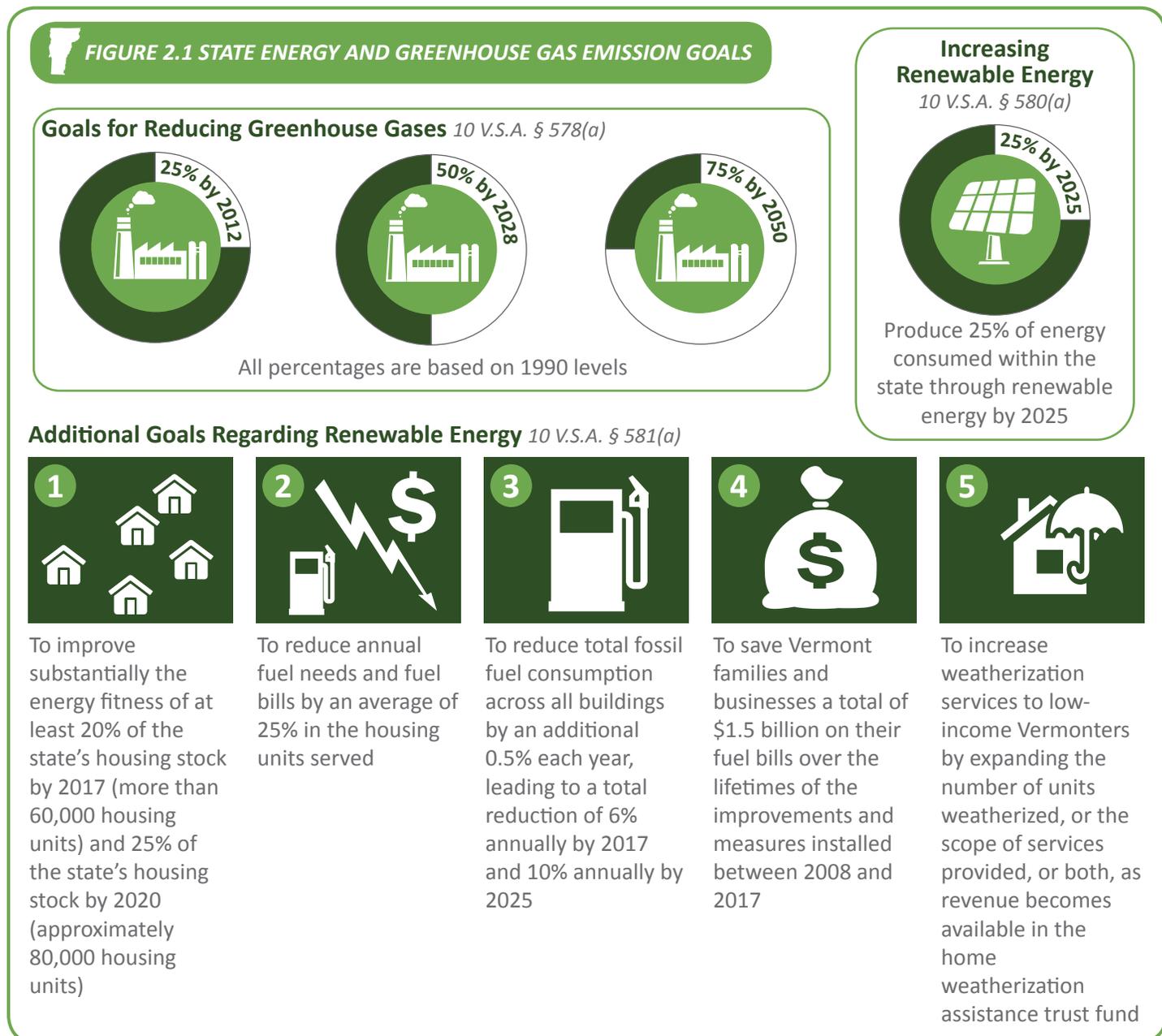
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II. INTRODUCTION

A. BACKGROUND AND VERMONT STATE ENERGY GOALS

The Northwest Regional Energy Plan is a pilot project funded via the Vermont Department of Public Service. The Northwest Regional Planning Commission (NRPC) is joined by the Bennington County Regional Commission (BCRC) and the Two Rivers-Ottawaquechee Regional Commission (TRORC) as members of this pilot project. The intent of the project is to complete in-depth energy planning at the regional level. Subsection B outlines how this goal will be accomplished. The impetus for this project was a recommendation made in the 2013 Vermont Energy Generation Siting Policy Commission's report, which suggested more robust energy planning at the regional level. The Northwest Regional Energy Plan consists of the plan and all plan appendices.

The State of Vermont has adopted several ambitious energy goals. The Vermont Comprehensive Energy Plan, developed by the Department of Public Service, calls for the state to meet 90% of its total energy needs through renewable energy sources by 2050 (90 x 50 scenario). State statute also contains several goals pertaining to greenhouse gas emissions, energy generation, and energy efficiency (Figure 2.1):



Additional energy goals have also been set for Vermont’s public utilities for renewable energy generation, distributed generation, and fossil fuel use through Act 56 (the Vermont Renewable Energy Standard).¹ It is important that these goals be kept in mind while reading and using this document. The goals and strategies in this plan will provide a path to achieving regional and state energy goals.

B. PURPOSE OF THE PLAN

The NRPC has identified regional goals and strategies for energy conservation and renewable energy generation that will support the attainment of Vermont’s energy goals. The NRPC has also identified specific implementable strategies appropriate to the region to accomplish these goals.

The NRPC collaborated with Vermont Energy Investment Corporation (VEIC) to create a regional energy model to identify targets for energy conservation and renewable energy generation. VEIC used the Long-range Energy Alternatives Planning (LEAP) modeling system to create a statewide model as well as regional models for the regional planning commissions (RPCs) participating in the pilot project. The models provide one possible scenario of accomplishing the state’s goal of meeting 90% of total energy demand through renewable energy resources by 2050 and analyze the potential energy demand within the region. They also look at regional energy generation needs. Specific information about the models and their results can be found in Section IV.

The modeling work completed by VEIC provided a framework for two other tasks completed by the NRPC:

- Creation of specific strategies to help the region achieve state energy goals
- Creation of regional maps prioritizing locations for the development of future renewable generation facilities in the region

Regional strategies are outlined in Section V. The regional energy maps as well as information regarding the process by which the maps were developed are located in Section V, Appendix B, and Appendix C.

While reading this document, it is also important to keep in mind what the Regional Energy Plan will not do. Much like the Vermont Comprehensive Energy Plan, the Regional Energy Plan does not intend to directly address every specific energy-related issue within the region, and it does not discuss or provide recommendations regarding specific renewable energy generation projects that have been proposed in the region. Although it provides a prospective vision of the mix of renewables that may be developed in the region to attain state goals, the Regional Energy Plan does not specify the mix of renewable energy generation facilities that will actually be built or contracted by utilities serving the Northwest region. In addition, the plan does not provide direct information about the costs of implementing the plan or the costs of failing to implement the plan.

The energy landscape in Vermont has rapidly changed over the past 10 years. This has been driven by climate change, policy changes, materials cost reductions, and quickly evolving technologies. The NRPC anticipates that methods of generating, distributing, and conserving energy will continue to evolve over the next 30 to 40 years. This plan should be revisited and revised—perhaps more frequently than other regional plans adopted by the NRPC—to account for changes in federal and state policy as well as regulatory framework, and for changes in environmental conditions due to climate change.

The NRPC will work to incorporate the strategies identified in this plan into the Northwest Regional Plan during 2017.

C. KEY ISSUES

While it is important to understand the energy goals established by the legislature, it is more important to understand the reasons why the goals were established. The “why” behind this plan can be explained by looking at three different motivations that are important both regionally and statewide: energy security, environmental protection, and economic needs and opportunities.

¹Act 56: Vermont Renewable Energy Standard (<http://legislature.vermont.gov/bill/status/2016/h.40>)

ENERGY SECURITY

Vermont and the Northwest region are reliant upon other states and countries for a large portion of their energy needs. To address this issue, a state statute (10 V.S.A. 580(a)) has set a goal that by 2025, 25% of the energy consumed within the state will also be produced in the state by renewable generation.

Transportation energy is a clear example of the threats to both state and regional energy security. Vermont imports all of the gasoline and diesel fuels that are required to operate passenger and heavy vehicles in the state. And while there are varying opinions about “peak oil,” there is no debate that fossil fuels are a finite resource. The continuing reliance on a finite resource combined with the volatility of the fossil fuel market will result in higher transportation costs with potentially far-reaching implications.

Transportation energy isn’t the only example of a threat to energy security. The source of electrical energy is also a concern. Vermont currently obtains much of its electricity from hydroelectric facilities located out of state, primarily Quebec. Although these sources of electricity currently provide the region with low-cost, renewable generation, the prospective construction of high-capacity transmission lines from Quebec to southern New England may create increased competition for electricity between Vermont and other, faster-growing states that are seeking electricity from renewable sources. With increased competition, costs typically increase. Maintaining or decreasing reliance on electricity from sources located outside Vermont will certainly make both the state and the region more energy secure, especially in a future where electricity demand is anticipated to almost double by 2050 (see Section IV).

It is possible to have a state and a region that are less reliant on others for their energy needs. By utilizing the resources that exist inside both the state and the region, long-term security concerns about energy supply and energy costs can be alleviated.

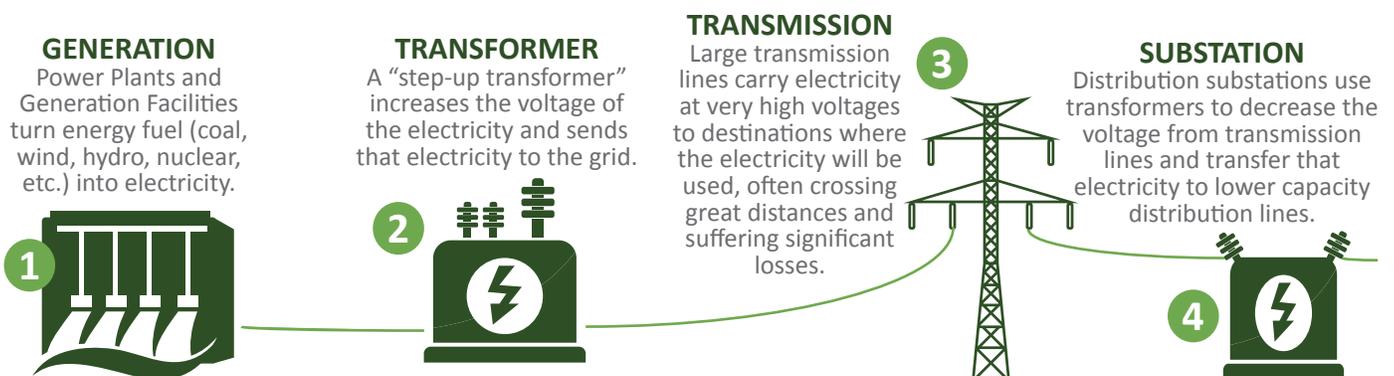
ENVIRONMENTAL PROTECTION

Human energy needs over the past few centuries have had confirmed negative impacts upon environmental quality worldwide—primarily due to fossil fuel use. And while these effects have often seemed intangible in the past, Vermonters are becoming well acquainted with the influence of climate change.

The changing composition of the state and region’s forest may have a real impact on the future of the sugaring industry. This is an issue of immense importance in the Northwest region, the highest-producing maple

FIGURE 2.2 UNDERSTANDING THE GRID

The major components in the US electrical generation and distribution grid are enumerated and described in the diagram below (continued on the following page)



syrup region in the state. Pollution from coal-burning power plants in the Midwest continues to cause acid rain, which also threatens forests. In addition, higher temperatures threaten the future of the ski industry in Vermont as well as the industries that support skiing and tourism. More frequent and substantial precipitation threatens public infrastructure—bridges, culverts, etc.—and financially burdens local governments’ ability to pay for repair or replacement. Climate change alone has provided more than an adequate basis for seeking alternative, renewable fuel sources and striving to achieve the 90 x 50 goal.

ECONOMIC NEEDS AND OPPORTUNITIES

Energy costs have historically increased in both the state and the region. As fossil fuels have become more difficult to obtain, the costs to extract and bring fuels to market have also risen. These additional costs have been passed on to the consumer. In the long term, this trend could potentially have devastating consequences on Vermont and the region. In April 2017, NRPC estimated that regional residents spend approximately \$60 million a year on gasoline for transportation (not including local businesses’ expenses). While some of this money may be retained by local distributors, much of the money spent on gasoline leaves the state, the region, and sometimes the country. A similar scenario exists for other fossil fuel–dependent activities. The ability to retain even a fraction of the money spent each year on fossil fuel–related expenses in the region would mean a tremendous financial gain for regional residents and businesses.

Prices of other energy sources have also historically risen, including electricity. However, programs like net metering have provided Vermonters with the ability to produce their own electricity and “zero-out” their own costs, eventually delivering cost savings to those individuals.

It should also be noted that the industries that support small-scale solar and other “clean energy” technologies—installers, distribution, sales, etc.—have created jobs in the state. There are now 2,519 “clean energy”–related business establishments employing 16,231 in-state workers, according to the Public Service Department’s Vermont Clean Energy – 2015 Industry Report.

The NRPC understands that achieving the goals established by the state legislature and the Comprehensive Energy Plan will require significant change in the Northwest region. These changes will affect local governments, institutions, and individuals. Some of the changes may have economic costs, especially in the short term. The NRPC aspires to have the economic impacts from energy-related decisions in the region—both pro and con—spread as equally as possible across the region. The commission also hopes to ensure the continued viability of the public utilities serving the region, including municipal utilities. This plan broadly addresses the potential economic impacts of energy transformation on the region over the next 35 years, but it does not delve into the specific accounting costs of enacting this plan (or the costs of inaction). This plan remains focused on accomplishing goals that will positively affect the long-term environmental and economic sustainability of the Northwest region.

