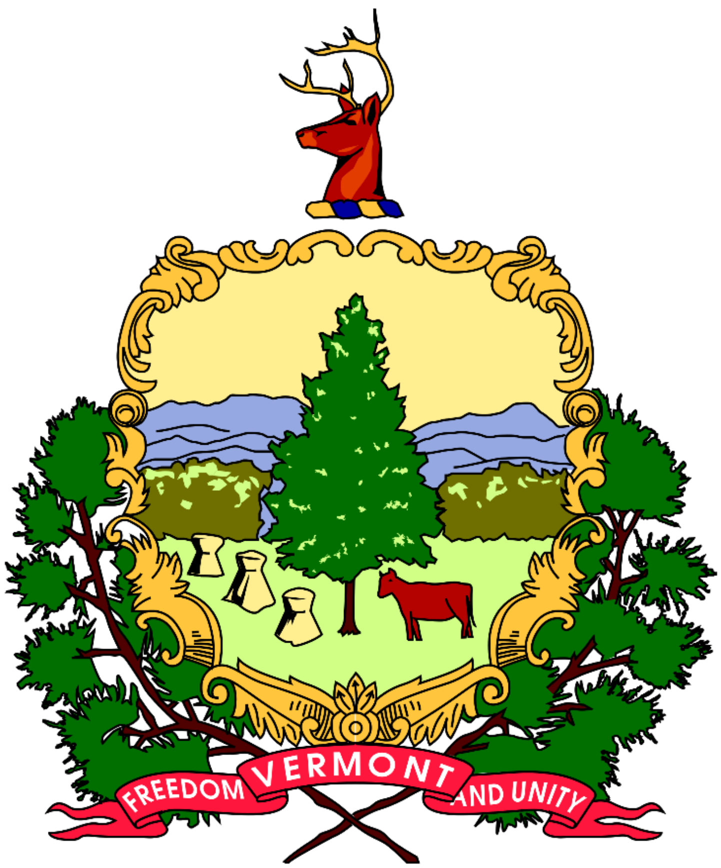
STATE OF VERMONT

ENERGY ASSURANCE PLAN



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STATE OF VERMONT

ENERGY ASSURANCE PLAN

Revision 1.0

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ACKNOWLEDGEMENT

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DOCUMENT REVISION RECORD

Revisions to this document are tabulated below. Each row contains the entry for a separate revision.

DOCUMENT REVISION RECORD				
REVISION	REVISION DATE	AUTHORED	REVIEWED & APPROVED	DESCRIPTION OF REVISION
0.0	10/27/2011	Karl Johnson	Bill Jordan	Initial Draft EAP
1.0	8/14/2013	Allan St.Peter	Bill Jordan	Updated from Draft to Final version.

DOCUMENT REVISION & DOCUMENT CONTROL

The Vermont Public Service Department (PSD) is the lead state government entity responsible for housing and maintaining the Vermont Energy Assurance Plan. All revisions to this document are to be logged and tracked on the Document Revision Record above.

No less often that once every 2 years, the VT EAP and supporting documentation will be reviewed and/or revised for accuracy and completeness. When there are lessons learned and/or other changes that need to be incorporated to ensure proper functionality of the EAP, those revisions shall be completed as required as soon as practicable.

TABLE OF CONTENTS

Table of Contents

Introduction

This first Energy Assurance Plan (EAP) for Vermont is being submitted on the 10^{th} anniversary of the so-called Northeast Blackout of 2003, which occurred on August 14, 2003, and affected over 50 million people in the Northeastern United States and the Canadian province of Ontario. Although Vermont did not experience electrical outages due to this event (southern New England was affected, however) this type of event illustrates the importance of energy assurance planning.

Energy Assurance is defined as:

> "The ability to obtain, on an acceptably reliable basis, in an economically viable manner, without significant impacts, due to Energy Supply Disruption Event(s), or the potential for such events, sufficient supplies of the energy inputs necessary to satisfy Residential, Commercial, Governmental, and non-governmental requirements for Transportation, Heating (space and process heat), and Electrical Generation."

Energy Assurance involves an array of activities that fall into three main categories:

- <u>Planning and preparation</u> involve identifying key assets and personnel, designing resiliency into critical infrastructure, and creating and updating energy emergency response plans.
- <u>Training & education</u> entails the training of Government and Energy Assurance Stakeholders' personnel, as well as conducting exercises that test the effectiveness of the energy assurance response plan(s).
- <u>Response</u> activities include monitoring events that may affect energy supplies, assessing the severity of disruptions, providing situational awareness, coordinating restoration efforts, and tracking recoveries.

Energy Assurance includes the consideration of all hazards in the development and implementation of programs and initiatives that address education, training, planning, and execution over short, medium, & long term time horizons, for all relevant energy supplies, and interdependent systems such as transportation and telecommunications. This EAP addresses energy supplies including, but not necessarily limited to the following:

- Natural Gas
- Liquid Petroleum Fuels
- Electricity
- Renewable Energy

The goals of the Energy Assurance Plan include:

- Avoiding or reducing costly energy disruptions;
- Mitigating the number and severity of impacts; and,
- Reducing the time required to return to 'normal' energy supply conditions.

Many elements of the EAP are already in existence and are contained within the state government documents intended for use in disasters and emergency management, while some are housed with the utilities. Some of these existing elements, such as the State Emergency Operations Plan and State Support Function 12 (Energy), were revised or updated as part of the process of creating this EAP. Other aspects of the EAP and the Energy Supply Disruption Tracking Process (ESDTP) are new and were created specifically as a result of this process, such as the ESDTP in its entirety, the enhancements to Vermont electric outage web site, the long list of recommendations from the Energy Assurance In-state Exercise, and the Interdependency Matrix, to name a few. The purpose of this document is to put everything in one place, in an easy-to-use format. The EAP and ESDTP will be the responsibility of the Vermont Department of Public Service to implement and periodically update.

As part of the process of updating this EAP, the EAP will be exercised, either as a stand-alone Energy Assurance Exercise or in conjunction with the regularly-scheduled exercises by the Vermont Department of Public Safety, Division of Emergency Management & Homeland Security. The exercise process will help with the identification of areas where the EAP can be improved. An additional benefit to regularly exercising the most current version of the EAP is that it's also imperative to train, familiarize, and engage people who are new to their position(s) and either unaware, or unfamiliar with the content and functioning of the EAP.

This document is designed for use as a reference tool by decision makers, and energy supply stakeholders. A conscious effort has been made to make this plan as useable as possible. To that end, great care has been taken to format the plan in a logical way, and for the plan to be as concise as possible while still providing the information necessary for the plan to be effective. Hyperlinks are included to relevant reference documents where available, in order to facilitate effective and efficient document navigation and use.

Brief Background

The Vermont State Emergency Operations Plan (SEOP) includes the following:

> "Disasters that have previously occurred within the state give us information about what Vermont can reasonably expect, and the damages that may result. Looking at the disasters that have occurred in other states and the nation as a whole also provides useful information for planning purposes. Such potential hazards have been separated and assigned likelihood and severity levels."

The types of events that have occurred previously, have been almost exclusively weather related. Some have resulted in disruption of energy supplies of one or more types. The potential for similar events occurring in the future is highly likely. Table 1 (next page) lists the federal Major Disaster Declarations and Emergency Declarations in Vermont since 1963.

Today, in addition to weather-related hazards, other potential threats to the energy supplies in Vermont include natural disasters, political unrest, equipment failure, and various scenarios of terrorist attacks, both physical and cyber. As mentioned in the introduction, the purpose of this EAP is to avoid or minimize the effects of these types of events.

Vermont Energy Policy

By statute, 30 V.S.A. § 202a, it is the general policy of the state of Vermont:

(1) To assure, to the greatest extent practicable, that Vermont can meet its energy service needs in a manner that is adequate, reliable, secure and sustainable; that assures affordability and encourages the state's economic vitality, the efficient use of energy resources and cost effective demand side management; and that is environmentally sound.

(2) To identify and evaluate on an ongoing basis, resources that will meet Vermont's energy service needs in accordance with the principles of least cost integrated planning; including efficiency, conservation and load management alternatives, wise use of renewable resources and environmentally sound energy supply.

The Department of Public Service is tasked by statute to produce both a Comprehensive Energy Plan and a 20-year Electric Plan. Both of these plans, the utility Integrated Resource Plans, and this Energy Assurance Plan are prepared in accordance with the above-mentioned policy. See Appendix H for legal authorities for these plans and Vermont renewable energy policy.

Table 1. Major Disaster Declarations and Emergency Declarations (EM-) in Vermont.

Number	Incident Period	Declared	State	Description
4140	6/25 - 7/11/2013	8/2/2013	Vermont	Severe Storms and Flooding
4120	5/22-26/2013	6/13/2013	Vermont	Severe Storms and Flooding
4066	5/29/2012	6/22/2012	Vermont	Severe Storms, a Tornado, and Flooding
4043	5/20/2011	11/8/2011	Vermont	Severe Storms and Flooding
4022	8/27 - 9/2/2011	9/1/2011	Vermont	Tropical Storm Irene
EM-3338	8/26 - 9/2/2011	8/29/2011	Vermont	Hurricane Irene
4001	5/26-27/2011	7/8/2011	Vermont	Severe Storms and Flooding
1995	4/23 - 5/9/2011	6/15/2011	Vermont	Severe Storms and Flooding
1951	12/1-5/2010	12/22/2010	Vermont	Severed Storm
1816	12/11-18/2008	1/14/2009	Vermont	Severe Winter Storm
1790	7/21 - 8/12/2008	9/12/2008	Vermont	Severe Storms and Flooding
1784	7/18/2008	8/15/2008	Vermont	Severe Storms, a Tornado, and Flooding
1778	6/14-17/2008	7/15/2008	Vermont	Severe Storms and Flooding
1715	7/9-11/2008	8/3/2007	Vermont	Severe Storms and Flooding
1698	4/15-21/2007	5/4/2007	Vermont	Severe Storms and Flooding
1559	8/12 - 9/12/2004	9/23/2004	Vermont	Severe Storms and Flooding
1488	7/21 - 8/18/2003	9/12/2003	Vermont	Severe Storms and Flooding
1428	6/5-13/2002	7/12/2002	Vermont	Severe Storms and Flooding
EM-3167	3/5-7/2001	4/10/2001	Vermont	Snowstorm
1358	12/16-18/2000	1/18/2001	Vermont	Severe Winter Storm
1336	7/14-18/2000	7/27/2000	Vermont	Severe Storms And Flooding
1307	9/16-21/1999	11/10/1999	Vermont	Tropical Storm Floyd
1228	6/17 - 8/17/1998	6/30/1998	Vermont	Severe Storms and Flooding
1201	1/6-16/1998	1/15/1998	Vermont	Ice Storms
1184	7/15-17/1997	7/25/1997	Vermont	Excessive Rainfall, High Winds, Flooding
1124	6/12-14/1996	6/27/1996	Vermont	Flooding
1101	1/19 - 2/2/1996	2/13/1996	Vermont	Storms and Flooding
1063	8/4-6/1995	8/16/1995	Vermont	Heavy Rain, Flooding
990	4/24 - 5/26/1993	5/12/1993	Vermont	Flooding, Heavy Rain, Snowmelt
938	3/11/1992	3/18/1992	Vermont	Flooding, Heavy Rain, Ice Jams
875	7/4-23/1990	7/25/1990	Vermont	Flooding, Severe Storm
840	8/4-5/1989	9/11/1989	Vermont	SEVERE STORMS, FLOODING
712	6/6-8/1984	6/18/1984	Vermont	SEVERE STORMS, FLOODING
EM-3053	9/6/1977	9/6/1977	Vermont	Drought
518	8/5/1976	8/5/1976	Vermont	Severe Storms, High Winds, Flooding
397	7/6/1973	7/6/1973	Vermont	SEVERE STORMS, FLOODING, LANDSLIDES
277	8/30/1969	8/30/1969	Vermont	SEVERE STORMS, FLOODING
164	3/17/1964	3/17/1964	Vermont	FLOODING
160	11/27/1963	11/27/1963	Vermont	Drought, Impending Freeze

Vermont Energy Supply, Infrastructure, and Consumption

Electricity

Vermont's electricity sector remains vertically integrated, and there are also a large number of merchant generation units with the state. Vermont electric customers are served by 17 distribution electric utilities, including one investor-owned utility (IOU), two electric cooperatives, and 14 municipal electric utilities. The electric service territory map is included in Appendix A. The distribution utilities own and operate the subtransmission system (34.5 kV and 46 kV) and the distribution system. The bulk power system (115 kV and up) in Vermont is owned and operated by the transmission-only company Vermont Electric Power Company (VELCO), which is in turn owned by the Vermont distribution utilities. Table 2 summarizes the attributes of the electric distribution utilities.

Table 2. Summary of Vermont electric utilities.

Electric Companies	Type	Customers				Miles of Distribution Line	Customer Density (per line mile)	Annual kWh Sales
		Residential	Commercial	Industrial	Total			
Barton	Municipal	1,958	198	0	2,156	175	12	14,107,112
Burlington Electric Dept	Municipal	16,502	3,811	2	20,315	190	107	343,522,256
Enosburg Falls	Municipal	1,467	131	24	1,622	176	9	26,957,935
Green Mountain Power	IOU	253,163	43,642	76	296,881	11,109	27	4,186,418,000
Hardwick	Municipal	3,973	403	25	4,401	333	13	31,762,438
Hyde Park	Municipal	1,167	123	0	1,290	62	21	10,937,848
Jacksonville	Municipal	649	48	5	702	50	14	4,934,075
Johnson	Municipal	763	98	13	874	28	31	13,108,226
Ludlow	Municipal	2,968	639	4	3,611	63	57	45,715,678
Lyndonville	Municipal	4,796	784	41	5,621	398	14	66,179,808
Morrisville	Municipal	3,335	580	0	3,915	194	20	44,199,011
Northfield	Municipal	1,628	171	17	1,816	40	45	29,357,949
Orleans	Municipal	582	65	1	648	39	17	12,999,432
Stowe	Municipal	3,248	740	1	3,989	120	33	70,531,670
Swanton	Municipal	3,194	432	0	3,626	122	30	53,870,711
Vermont Electric Coop	Cooperative	33,852	3,581	11	37,444	2,685	14	437,336,990
Washington Electric Coop	Cooperative	10,222	421	11	10,654	1,285	8	68,992,272
Totals		**343,467**	**55,867**	**231**	**399,565**	**17,070**		**5,460,931,411**

Sources

Vermont has both in-state sources and out-of-state resources. Some out-of-state resources are obtained through long-term contracts partly to ensure price stability. Vermont's in-state generation is a mix of sources but largely from renewable energy sources, with hydroelectric power being supplied from many small power stations that range from a few hundred kilowatts capacity to approximately 6 MW capacity. The in-state resources also include wind, solar PV, farm and landfill methane, and biomass (wood-fired) generation. Vermont has a Net Metering program that is designed to encourage small renewable energy generation projects which generate some or all of the electric needs for a home, business, farm, school, or any other electric utility customer (or group of customers) and sends their excess to the power grid..Most of the units act like negative load and do not get credited in regional generation calculations. The state also a program called "Sustainably Priced Energy for Economic Development (SPEED)". The first iteration of the program resulted in fixed-price contracts for 50 MW of in-state renewables projects (up to 2.2 MW each). A significant portion of the electricity consumed in the state is purchased from sources located outside the state. Table 3 indicates the generation resources that Vermont retail customers depend upon [percentages are in energy (MWh)].

Table 3. Vermont electricity consumption by generation source.

In-state Sources	**2012**	**Estimated 2013**
Diesel	1%	<1%
Natural Gas	0%	0%
Hydroelectric	8%	9%
Wind	3%	7%
Solar	<1%	<1%
Biomass	4%	4%
Nuclear	11%	0%
Landfill Gas + Farm Methane	3%	4%
Out-of-state Sources		
Nuclear	5%	5%
ISO-NE Market	15%	33%
New York Markets	1%	1%
Canadian Hydroelectric Markets	48%	33%
Wind		2%
Oil	<1%	<1%

There is a nuclear power station in Vermont – Vermont Yankee (VY), owned by Entergy Nuclear Operations, Inc. with a capacity of 620 MWe. This station sells its output to the New England grid through ISO-NE. As of 2013, no Vermont utility directly purchases the output of VY. Figure 1 indicates the electric energy consumption by end-use sector.

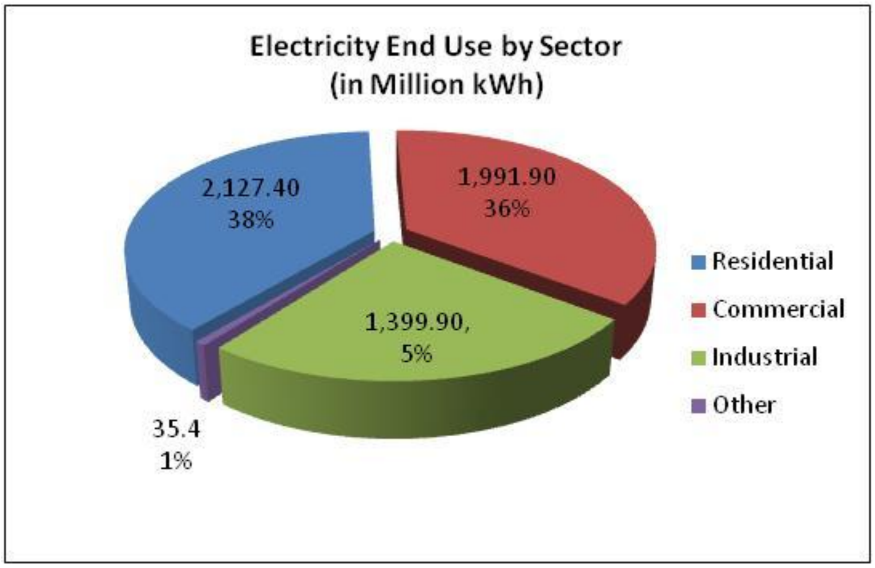


Figure 1. Electric energy (kWh) consumption in Vermont by sector.

Vermont's per capita residential electricity use is low compared with the rest of the Nation, in part because demand for air-conditioning is less during the mild summer months and only a small share of households use electricity for home heating. The overall electricity consumption in the state is actually decreasing in all sectors except the residential sector where the use is flat.

Electricity has become a necessity for almost everyone. Society as a whole expects that they can flip on a switch and electricity will be there for lights, entertainment, and charging all of their battery powered devices. In years gone by, most folks had gotten used to the idea that their phones would be usable even when the power went out, because the telephone companies powered their phones from the central switch points. Now we are in the era that even if the phone is still powered that way, most people have an answering machine or wireless extensions all powered from their own electric source and the phones will not function if the outside electric source is lost. Only a very few people have a way to keep perishable food if the electricity is interrupted. Nearly all of us use electricity for lights, many use it for cooking, hot water, clothes drying, and to operate various forms of entertainment. The only sources of space heating that do not require electricity are wood stoves and fireplaces. All other forms of heating require some electricity for pumps and circulators, ignition, and blowers. All forms of communication need either direct sources of electricity or electricity for charging batteries. In a largely rural state like Vermont, many people also need electricity for their water supplies as they rely on wells, not municipal sources.

Infrastructure

Vermont is served from a high voltage network that is operated by the Vermont Electric Power Company (VELCO) at voltages of ranging from 115kV to 345 kV. This network provides access to electric sources beyond VT borders from the rest of New England, New York, or Canada. GMP, and other utilities connect to VELCO and serve loads at sub-transmission and distribution voltages. There are 14 municipal electric utilities and two electric cooperatives in Vermont. See Appendix A for the distribution utility service territory map.

Vulnerability

The Vermont Public Service Board Rule 4.900 (Electric Outage Reporting) requires all electric utilities to annually report the number and duration of outages in the following categories:

Trees — Outages caused by the interaction of trees and tree branches (regardless of whether the tree originated inside or outside of the right-of-way) with the electric system, including Outages resulting from trees interacting with the electric system during severe weather. Tree-related Outages which result from operator error, accidents, or animals (e.g., beavers) should be listed under the respective cause-related category.

Weather — Outages caused by wind, snow, lightning, ice, and flooding. Outages from weather events which cause trees to interact with the electrical system should be listed in the trees category. Other weather events such as wind, heavy wet snow or ice build-up on power and communication lines can lead to lines being forced out-of-service or damaged. The only way to avoid weather events doing damage would be to bury the lines. Some outages can be caused by weather events such as lightning strikes.

Equipment Failure — Outages caused by specific equipment failures such as transformer or arrester failures. Operator Error — Outages caused by utility or utility contractor error, including contract tree trimmer error.

Accidents — Outages caused by accidents by other than utility employees or contractors, including the felling of trees into utility lines, as well as outages resulting from emergencies such as police or fire department requests for shutdowns.

Animals — Outages caused by the interaction of animals such as birds, squirrels, and raccoons with the electric system. Outages also caused by trees, in which the root cause is the action of an animal, should also be placed in this category.

Power Supplier — Outages caused by the loss of power supply from another utility or non-utility provider.

Vandals or Terrorists - vandals and terrorists can cause disruptions to the electric power systems by sabotage, or equipment destruction.

Contractors – many interruptions of service to customers are caused by contractors performing excavations and damaging buried electric, communication and gas lines.

Mitigation

Energy Conservation
When the power system appears to be headed for a shortage of capacity to handle the load, a general message is sent to the public asking for reduction in the use of electricity.

Load Management (Demand Response)
There are commercial customers who can manage their loads by shutting down a portion of their load or starting another source of power to perform the work that was previously done from the power supplied from the electric grid. This could be their own electric generation or in Vermont in the winter it might be diesels to operate snow-making in the ski resorts. There are also customers who can manage their loads by rotating what processes are on at any given time and shutting off those not immediately needed.

Vandal / Terrorist Protection
Physical protection is in part the securing of facilities from unauthorized access by utilizing various monitoring and surveillance techniques. and close working relations with law enforcement agencies and the Department of Homeland Security. to get rapid response to breaches in security. Part of the response is to also alert other utilities of possible threats.

Tree Trimming
Ascertain that the utilities have an appropriate tree trimming program which reflects the location of the lines, the type and species of vegetation under or around the lines, and the time intervals for performing the trimming.

Design and Construction
Require all transmission systems be built to reflect the appropriate North American Electric Reliability Corporation (NERC) standards as well as the National Electrical Safety Code (NESC).

Equipment Failure

Mitigation for equipment failure is to have appropriate testing and maintenance programs and procedures for all major wires and poles, substation equipment, and control and protection equipment. Part of this program includes monitoring of critical parameters and careful root cause analysis of any failures.

Planning

The state utilities report data on the reliability of their operations and the regulators work with them to make improvements. The tool used is called an Integrated Resource Plan (IRP) where steps are outlined to improve a utility's reliability.

Location

Through the IRP process, utilities are asked to review the location of all of their substations and other critical infrastructure with respect to the FEMA 100 year flood plain maps and to plan relocations where there is a possibility of infrastructure being inundated or washed away.

Underground Damage Prevention Program

Vermont has an active Underground Damage Prevention Program that investigates all damage for its root cause and determines ways to prevent re-occurrences. Part of the prevention is a fine structure for the entity responsible for the damage. On a voluntary basis, some electric, communications, and gas companies have written Underground Damage Prevention Plans for their organization.

Microgrids

Microgrids can increase reliability of electric supply to areas within the microgrid. A microgrid is a portion of an electric distribution circuit that can disconnect from the larger electric system and operate as an electrical island. A microgrid requires electric generation of sufficient quantity to meet all load within the microgrid, or at least generation sufficient to meet certain critical loads if there is a way to remove the other, less critical, loads. It may be desirable to disconnect from the distribution system and form a microgrid for a variety of reasons, including: 1) an outage on the larger distribution system, but the microgrid can disconnect and energize itself; and 2) in a dynamic pricing scenario, if the price of electricity from the distribution utility is higher than the cost for the microgrid to generate its own electricity. Figure 2 shows a schematic of a microgrid that has disconnected due to a permanent fault on the larger distribution circuit. In the scenario of Figure 2, the lights would be on in the microgrid, while the lights would be off between the switch and substation (assuming the next upstream protective device is the substation breaker) until the utility could make repairs and restore service. In the aftermath of Hurricane Sandy, several microgrids in New Jersey, New York, and New England were notably able to operate, some for several days until power was restored.

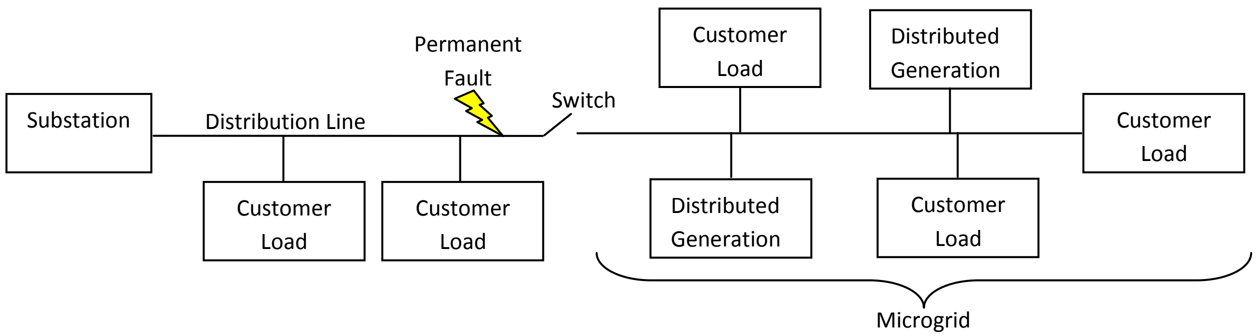


Figure 2. Schematic representation of one of many possible microgrid topologies.

In Vermont, as elsewhere, there are many instances of private entities having back-up generators, with the capability of disconnection from the grid and powering (all or a portion of) internal load(s). However, there are no known instances of a microgrid consisting of a portion of a utility-owned distribution circuit. Although the reliability and resiliency benefits of microgrids are well-known, there are three challenges to implementing microgrids:

1. Technical. This is considered to be the least of the three challenges, as some microgrids already exist today, and new technology will expand possibilities. Distributed generation project in Vermont above 150 kW follow the interconnection standards contained in Public Service Board Rule 5.500, which requires compliance with various codes and standards, including IEEE 1547 (Standard for Interconnecting Distributed Resources with Electric Power Systems). IEEE-1547, published in 2003, prohibits unintentional islanding (islands shall be detected and cease within two seconds) and intentional islands were implicitly prohibited because the section on intentional islanding indicated "This topic is under consideration for future revisions of this standard." In 2011, IEEE published IEEE 1547.4 (Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems) to address the need for a standard on intentional islanding – i.e., microgrids. IEEE believes that "implementation of this guide will expand the benefits of using DR by targeting improved electric power system reliability and build upon the interconnection requirements of IEEE 1547."

2. Economic. In many, but not all, cases, the cost of distribution system upgrades, installing, maintaining, and running distributed generation exceeds the cost of the purchasing electricity from the utility, while the reliability benefits of remaining in service during an outage on the larger distribution system may not be well quantified. From the utility perspective, microgrids, under

certain circumstances, can be viewed as a loss of kWh sales while the customers are still using the utility's assets (poles and wires). The business case for both the utility and customers depends in large part upon the policies and incentives at the regulatory level (see #3, below).

3. Regulatory/Policy. This last challenge is viewed to be the greatest. Regulatory policies (be they state or federal/regional) create the regulatory certainty and the incentives, if warranted, for microgrids. Topics include a clear definition of microgrids, permitting process, utility rate recovery, ratemaking, incentives for ancillary services, consideration in integrated resource planning or transmission planning processes, etc.

Vermont is in the process of researching microgrids, and will discuss this topic with distribution utilities during the integrated resource planning process for each utility. Private entities are also welcome to propose microgrids (one private microgrid was previously proposed, but subsequently withdrawn). Microgrids would likely require permitting subject to 30 V.S.A. § 248 if new generation is involved. An excellent resource on microgrids is the paper "Are Smart Microgrids in Your Future? Exploring Challenges and Opportunities for State Public Utility Regulators" by the National Regulatory Research Institute)

Energy Storage

Electricity (i.e., batteries) usually comes to mind when thinking about energy storage, but oil in tanks, natural gas in pipes, and hot water are also some other forms of energy storage. This discussion will be limited to the storage of electricity. In the absence of electricity storage, the electric system is operated under the principle that supply must equal demand at each instant. One of the main benefits of electricity storage is that electricity generated at one time may be used at some other (future) time. This might be useful for saving electric energy generated during a period of low demand for a time of high demand (for price or capacity reasons), and could be useful for smoothing out the sometimes rapidly-varying output of intermittent sources such as solar or wind. A recent, and thorough, report on energy storage is: "DOE/EPRI 2013 Electricity Storage Handbook in Collaboration with NRECA" by Sandia National Laboratories describes in detail the following services and benefits of electricity storage:

Bulk Energy Services
- Electric Energy Time-shift (Arbitrage)
- Electric Supply Capacity

Ancillary Services
- Regulation
- Spinning, Non-Spinning, and Supplemental Reserves
- Voltage Support
- Black Start

- Load Following/Ramping Support for Renewables
- Frequency Response

Transmission Infrastructure Services

- Transmission Upgrade Deferral
- Transmission Congestion Relief
- Transmission Stability Damping
- Sub-synchronous Resonance Damping

Distribution Infrastructure Services

- Distribution Upgrade Deferral and Voltage Support

Customer Energy Management Services

- Power Quality
- Power Reliability
- Retail Energy Time-Shift
- Demand Charge Management

Many of the services or benefits listed above assist with the stability or reliability of the electric transmission or distribution system, and can therefore help to avoid or minimize the duration of an outage (supply disruption). The details of the above-mentioned services and benefits will not be further described here, but can be found in the Sandia report mentioned above. The Federal Energy Regulatory Commission has issued three orders (755, 784, and 1000) which address the benefits of energy storage to the electric system.

There are four main categories of electricity storage: batteries, pumped hydro, flywheels, and compressed air (these are discussed in great detail in the Sandia report, and will not be discussed further here). In Vermont, there is presently a small amount of pumped storage, and none of the other three categories at utility scale. One of the main barriers to energy storage in Vermont is the high capital cost that does not result in a positive business case.

In June of 2013, Vermont held an all-day workshop at a private company with a battery storage demonstration project that is integrated with renewables (wind and solar). Participants in the workshop included representatives from private industry, electric utilities, the Department of Public Service, U.S. Department of Energy, and Sandia National Laboratories. The participants were educated on energy storage, and agreed on next steps in terms of investigating whether utility-scale energy storage is appropriate for Vermont. Of particular interest was the ability to quantify the benefits (value streams) of energy storage in order to create a business case.

The Department will discuss energy storage with the electric utilities during the integrated resource planning process, and assist, where possible, with quantifying the benefits. Another uncertainty at present is how to permit energy storage facilities. 30 V.S.A. § 248 requires a Certificate of Public Good from the Public Service Board before construction of an electric generation or transmission facility. Is storage generation, transmission, or something else? The current thinking is that storage should be permitted based upon the functions or services it provides relative to the next-best alternative. The Department will continue to attempt to provide clarity in the area of permitting.

Smart Grid

The term "smart grid" does not have a single accepted definition, but is generally considered to be a modern electric system with digital, two-way communications between sensors and operable devices such that the operator has real- or near-real-time information about the system characteristics and can operate devices remotely, either manually or automatically. The smart grid should be able to be operated at a higher efficiency, due to increased information, and reliability, due to increased control, than the grid of the past. For electric distribution systems, smart grid is generally considered in two categories: Advanced Metering Infrastructure (AMI) and Distribution Automation (DA).

AMI is the use of smart (i.e., digital) meters with two-way communication that record parameters such as usage (consumption in kWh), voltage, demand (kW), and power factor in intervals of one hour or less. AMI can also be used to enable dynamic pricing, due to the interval consumption data, in an attempt to reduce peak demand. AMI can also be used for other functions, such as remote disconnect tamper detection, and enabling the use of smart appliances. AMI can also be used to detect electrical outages in the first place, to determine the extent of the outages, and to increase the efficiency of restoration. DA is the use of smart devices on the utility-owned distribution system, and can include the increased use of SCADA, remotely controllable devices, sensors of various system parameters, and, possibly in the future, self-healing distribution networks in order to increase reliability.

During the 2007-2008 session the Vermont General Assembly ordered the Vermont Public Service Board (the "Board") to investigate the implementation of Smart Meters capable of sending two-way signals that would allow for innovative, dynamic rate designs for every rate class and to report back to the Legislature by December 31, 2008 on the plans of the Vermont electric distribution utilities for implementation of Advanced Metering Infrastructure ("AMI"). On April 18, 2007, Docket No. 7307 was opened by the Board to investigate the use of Smart Meters and Time-based rates. In November 2008, the Department of Public Service and the electric utilities reach agreement in a Core Memorandum of Understanding (the "Core MOU"), which described our collective understanding of AMI, specified minimal functional requirements for utility AMI systems, and provided a process for State review of each utility's AMI plan.

In 2009, the Vermont utilities applied for, and received, a DOE Smart Grid Investment Grant, which funded 50% of certain AMI and DA projects. As of the spring of 2013, five electric utilities [Burlington Electric, Green Mountain Power (including the former Central Vermont Public Service), Stowe Electric, Vermont Electric Cooperative, and Washington Electric Cooperative] finalized AMI installation in their service territories. These five utilities account for approximately 92% of Vermont electric customers and a similar percentage of the State's geographic area.

Although, as of the writing of this EAP, the AMI installation is only several months old, the utilities are reporting benefits to restoration activities due to outage detection during storms. Next steps are to gain more experience with AMI and DA in Vermont, and to determine how to best use the data and capabilities to avoid or reduce electric supply disruptions. The next update of the EAP will include an expanded section on the benefits of smart grid.

Energy Efficiency, Distributed Generation

Electrical efficiency and small-scale (net metered, or distributed) renewable electric generation can reduce load, and especially peak demand. Reducing peak demand can assist with electric reliability (i.e., energy assurance) by increasing the gap at the transmission level between actual load and the load at which one more contingency would result in an outage. In 1999, Vermont created an Energy Efficiency Utility (Efficiency Vermont) to provide State-wide (except the territory of Burlington Electric, which provides its own) efficiency measures. Efficiency Vermont is funded through a surcharge on electric bills. Vermont provides for net metering through statute (see Appendix H) and Public Service Board Rule 5.100.

Cyber Security

With the increase in smart grid technologies (including AMI and DA – see above), employee remote access via computer and mobile device, and customer account access and online payments, cyber security has correspondingly become increasingly important and necessary. Recent reports indicate that the number of cyber attacks across all sectors is increasing, and the number of attacks on the energy sector is also increasing. Consequences of a successful cyber attack range from the release of customer data, such as credit card and banking information, to shutting down the power grid by remotely controlling devices or causing damage to devices. While the increase of the number of digital and smart devices on the grid can increase reliability, it also increases the "attack surface" of the grid (i.e., increases the number of points through which the system can be accessed). Cyber security is not just a technical problem, however; it is also just as importantly both a business process problem and a personnel problem (people can often be the weakest link).

While the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards apply to the bulk electric system (100 kV and above, and certain other facilities), there are not clear standards for the distribution system. One of the requirements of the Smart Grid Investment Grant is that the utilities develop a cyber security plan, which was approved by DOE. In addition, in 2011, the utilities and the Department of Public Service reached agreement on three "Principles" for AMI: Opt-out, Privacy, and Cyber Security. Now that the requirements of the SGIG have concluded, the Department of Public Service intends to operate under the Cyber Security Principles, which are, at the time of this writing, pending approval by the Vermont Public Service Board. The Cyber Security Principles, as revised in 2013 to reflect the end of the SGIG, are as follows:

1. Vermont's electric utilities ("Utilities") acknowledge the importance of adhering to all cyber security requirements imposed by law, of being familiar with relevant industry standards and recommendations of best practices; and of working collaboratively to ensure appropriate and coordinated approaches to cyber security.
2. Cyber Security Plans developed by any Utility shall be tailored to that Utility's specific needs. Utilities shall comply with the terms of any cyber security requirements included in applicable law, regulation and industry standards, and those voluntarily adopted by the Utility. Any such plans should reflect consideration of the nature of the Utility's specific infrastructure.
3. Not less often than twice annually, representatives of the Utilities shall meet with the DPS to discuss:
    a. Any significant developments arising from the plans of each Utility under paragraph 2 above;
    b. The existence and impact of any new state or federal cyber security standards;
    c. Areas of prospective collaboration in the interest of ensuring the existence of effective and efficient cyber security protections for Vermont electric utilities and customers, including the adoption of voluntary plans pursuant to paragraph 2 above.
4. At least annually, the group described in paragraph 3 above shall offer a written report to the Vermont Public Service Board and the Vermont Department of Public Service relative to the activities of the group, including; 1) a list enumerating known attacks or attempts; 2) outcomes and steps taken to address such attacks/attempts; and, 3) a plan for future remediation.
5. In the event that utility safeguards are overcome by a cyber-security attack and customer information or grid reliability is compromised, Utilities will comply with applicable reporting and take necessary steps to mitigate future breaches.
6. Nothing in these principles shall be deemed to limit the responsibility or authority of utilities to take appropriate measures to implement and maintain appropriate cyber security measures.

In February 2013, the National Association of Regulatory Commissioners (NARUC) issued a whitepaper entitled "Cybersecurity for State Regulators 2.0 With Sample Questions for Regulators to Ask Utilities" This primer is an excellent resource for understanding the basics of cyber security, and for providing assistance for regulators to:

• Develop internal cybersecurity expertise;
• Ask good questions of their utilities;
• Engage in partnerships with the public and private sector to develop and implement cost-effective cybersecurity; and
• Begin to explore the integrity of their internal cybersecurity practices.

Attachment A to the NARUC primer includes 48 sample questions for regulators to ask utilities when discussing cyber security. The Department of Public Service will ask these questions (and others) when meeting with the utilities pursuant to the above-mentioned Cyber Security Principles. When regulators meet with utilities to discuss cyber security, it is important to ask questions in such a way that the answers by the utilities don't disclose details of vulnerabilities.

A strong need of regulatory commissions is internal expertise in cyber security. For this reason, in 2013, the New England Conference of Public Utilities Commissioners, Inc. (NECPUC) issued an RFP for a consultant to provide assistance on cyber security planning, coordination, and evaluation (for the time period September 15, 2013 through March 15, 2014). NECPUC is a non-profit 501(c)(3) corporation comprising the utility regulatory bodies of the six New England states (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont) and provides regional regulatory assistance on matters of common concern to the six New England states. NECPUC states have identified a need to bring on expertise to assist in creating cyber security plans, policies and standards. In conjunction with working with the six states on possible cyber security plans, NECPUC would look to the consultant for advice and analysis of cyber security policies and standards. NECPUC wants a consultant's expert advice on what the New England regulators need to do to make sure the New England utilities are ready to thwart cyber attacks and able to recover quickly and effectively when a cyber attack is successful.

The consultant will support NECPUC member states with the following tasks:

1. Assist states in conducting on-site visits of regulated utilities to evaluate protection and recovery measures from cyber security breaches;
2. Recommend cyber security and resiliency-related areas of improvement as well as best practices to be shared with other utilities;
3. Work with state commissions in developing recommended reporting requirements regarding cyber attacks and breaches;

4. Recommend future work areas to ensure continued cyber security and resiliency of utility control systems; and
5. Recommend measures for state commissions to ensure cyber security and resiliency of their regulated utilities.

The Department of Public service should continue to build expertise in cyber security through interaction with the consultant, remaining up-to-date on various cyber security standards and guidance that are issued, participating in cyber security training sessions, and while visiting utilities. The Department of Public Service also participates in the NARUC Critical Infrastructure subcommittee, which holds regular conference calls to share information and stay abreast of current topics. To date, the Department has attended cyber security training conducted by Sandia National Laboratory, NARUC, and the Vermont Department of Public Safety.

ISO-New England Emergency Operating Procedures

The Independent System Operator of New England (ISO-NE) has several emergency operating procedures, including the three listed below. These measures are designed to maintain the high voltage system grid as reliably as possible.

ISO New England Operating Procedure No. 4 - Action During A Capacity Deficiency (OP-4)
This procedure establishes criteria and guidelines for actions during capacity deficiencies of the ISO-NE electrical grid. There are 11 Actions that ISO-NE can implement to remedy the capacity deficiencies. The first two actions are internal to ISO-NE except that a public Power Caution is issued, and Action 3 asks Local Control Centers (LCC) to reduce their own load. Actions 4 through 8 get all reserve generation on line and implement a 5% voltage reduction and issue a Power Alert at Action 4 that loads are getting high.. Action 9 requests all non-contracted generation to be put online and request large industrial and commercial facilities to voluntarily reduce load. Action 10 is to initiate radio and television appeals for voluntary load curtailment and issue a Power Warning. Action 11 is a request to each New England Governor to reinforce the Power Warning appeals, as initiated in Action 10. Depending on the situation, some actions may be initiated simultaneously.

ISO New England Operating Procedure No. 7 - Action in an Emergency (OP-7)
The OP-7 procedure is designed to handle situations where the time required to implement OP-4 is too long. The procedure is to be used in the event of an operating emergency involving unusually low frequency, equipment overload, capacity or energy deficiency, unacceptable voltage levels, or any other emergency that ISO New England (ISO) deems appropriate in an isolated or widespread area of New England.

If the Local Control Center cannot reach ISO-NE in a reasonable time, then they can initiate procedures on their own. Normal procedure is for ISO-NE to consult all parties and reach a consensus decision and if they cannot, then either party can act on its own.
The typical process is for utilities to shed load to stabilize the system. Consumers would have no say in the matter.

ISO New England Operating Procedure No. 21 - Action During an Energy Emergency (OP-21)

This Procedure establishes criteria and guides for actions in anticipation of and during energy emergencies as directed by the ISO and as implemented by the ISO and the Local Control Centers. Energy emergencies may occur as a result of sustained national or regional shortages in fuel availability or deliverability to the New England region's generation resources. Such shortages of fuel may come in many forms, including, but not limited to; severe drought, interruption to availability or transportation of natural gas, liquefied natural gas (LNG), oil, or coal.
Energy Emergencies are envisioned to last longer than capacity deficiencies, which are managed through ISO Operating Procedure No. 4 – Actions during a Capacity Deficiency (OP 4) and, under extreme circumstances, through ISO Operating Procedure No. 7 – Actions in an Emergency (OP 7).

The events contemplated here may last days or weeks at a time. The ISO will initiate fuel surveys whenever information received from the media, fuel suppliers, or generators warrants that the ISO conduct a fuel survey, e.g., based on reports of fuel shortages or fuel deliverability issues. The fuel survey will use the fuel survey form in Appendix A of this procedure. In conjunction with the fuel surveys, the ISO will perform an assessment of system generation requirement by fuel type to estimate the amount of generation required to serve expected New England system load requirements. This assessment will be used to better quantify fuel inventory impacts and highlight potential supplemental fuel needs.

Natural Gas

Natural gas is not widely available in Vermont except for the counties of Franklin and Chittenden in the Northwest portion of the state. Natural gas in Vermont is used in approximately 15 per cent of the homes for heating. There is some commercial use of natural gas for thermal processes which in increasing rapidly as the cost of natural gas is, at this time, extremely competitive with other fuel sources such as oil or propane.

Vermont commercial and industrial facilities are creating a new demand for natural gas by converting their present fuel systems to natural gas which is leading to expansion of the current gas transmission / distribution system. This expansion will add miles of transmission pipe and create new distribution systems as the gas service territory expands. Vermont has one company that operates the natural gas system which gets its all of its gas supply by way of a transmission pipeline connected to sources in Canada. The gas is transmitted in a pipeline to a distribution system of underground pipes in several cities and towns (see service territory map in Appendix B).

Vermont also has another company which purchases natural gas from the existing gas transmission system and compresses it (CNG) for delivery to commercial users around the state via special tractor trailers. One large industrial institution is building facilities to utilize liquid natural gas (LNG) which will also be trucked to their location. Vermont has one generation station that can use natural gas as fuel for its large generator.

Vermont's natural gas distribution and the local inventories depend on the supply being available from Canada. The availability of natural gas truck delivered depends on the state transportation system conditions, primarily flooding and wash-outs, and snow and ice

Liquid Petroleum-based Fuels

Gasoline

Vermont does not have any internally-derived sources of gasoline such as refineries, so all of its supplies of gasoline must be imported from neighboring states or Canada by way of tank trucks or rail tank cars. These shipments are then deposited in bulk storage facilities where it is then distributed around the state.

The state has multiple gasoline wholesalers, and approximately 500 retail gasoline dispensing stations. Gasoline is the primary fuel for cars and light trucks, with a small quantity used in small engines such as lawn mowers and home generators.

Vermont's gasoline distribution system has two components: bulk storage facilities which receive the supplies coming into the state, and dispensing facilities with local tank storage. Critical in the supply chain is the availability of electricity to move the fuel from bulk supplies to truck and again from underground distribution tanks to consumer vehicles.

The movement of bulk gasoline depends on the availability of diesel fuel for the trucks which move it. The availability of gasoline also depends on the usability of the state transportation system under adverse conditions such as flooding and wash-outs, conditions of bridges, and snow and ice. Vermont's gasoline distribution system and the state of local inventories depend on the petroleum industry's ability to re-supply the Northeast.

The price and supply here is driven not only by the market forces of supply and demand that influence other commodities, but also by U.S. domestic and foreign policy decisions in combination with the policies of oil producing nations. Other market forces have a large impact on the petroleum industry, including product seasonality, curtailments (such as refinery outages), and acts of nature. World oil and gas markets are complex and so energy emergencies that involve petroleum products are complex, requiring states to work with multiple organizations to develop effective responses.

Diesel

Vermont does not have any internally-derived sources of diesel such as refineries, so all of its supplies of diesel must be imported from neighboring states or Canada by way of tank trucks or rail tank cars. These shipments are then deposited in bulk storage facilities where it is then distributed around the state.

The state has many diesel dispensing stations, most of which are co-located at retail gasoline dispensing stations. Diesel is the primary fuel for heavy trucks, farm and construction equipment, and standby generators, with lesser amounts used in some light trucks and cars.

Vermont's diesel distribution system has two components: bulk storage facilities which receive the supplies coming into the state, and dispensing facilities with local tank storage. Critical in the supply chain is the availability of electricity to move the fuel from bulk supplies to truck and again from underground distribution tanks to consumer vehicles.

The movement of bulk diesel depends on the availability of diesel fuel for the trucks which move it. The availability of diesel also depends on the usability of the state transportation system under adverse conditions such as flooding and wash-outs, conditions of bridges, and snow and ice. Vermont's diesel distribution system and the state of local inventories depend on the petroleum industry's ability to re-supply the Northeast.

The price and supply here is driven not only by the market forces of supply and demand that influence other commodities, but also by U.S. domestic and foreign policy decisions in combination with the policies of oil producing nations. Other market forces have a large impact on the petroleum industry, including product seasonality, curtailments (such as refinery outages), and acts of nature. World oil and gas markets are complex and so energy emergencies that involve petroleum products are complex, requiring states to work with multiple organizations to develop effective responses.

Kerosene

Kerosene is a light petroleum distillate that is used in space heaters, cook stoves, and water heaters and is suitable for use as a light source when burned in wick-fed lamps. It can also be used in diesel engines and as an additive to diesel fuel to enhance its cold weather usability. The availability of kerosene is through fuel dealers or fueling stations for large quantities and hardware stores for small quantities.

Vermont's kerosene distribution system has two components: bulk storage facilities which receive the supplies coming into the state, and dispensing facilities with local tank storage. Critical in the supply chain is the availability of electricity to move the fuel from bulk supplies to truck and again from underground distribution tanks to consumer vehicles.

The movement of bulk kerosene depends on the availability of diesel fuel for the trucks which move it. The availability of kerosene also depends on the usability of the state transportation system under adverse conditions such as flooding and wash-outs, conditions of bridges, and snow and ice. Vermont's kerosene distribution system and the state of local inventories depend on the petroleum industry's ability to re-supply the Northeast.

The price and supply here is driven not only by the market forces of supply and demand that influence other commodities, but also by U.S. domestic and foreign policy decisions in combination with the policies of oil producing nations. Other market forces have a large impact on the petroleum industry, including product seasonality, curtailments (such as refinery outages), and acts of nature. World oil and gas markets are complex and so energy emergencies that involve petroleum products are complex, requiring states to work with multiple organizations to develop effective responses.

Jet Fuel

Vermont does not have any internally-derived sources of jet fuel such as refineries, so all of its supplies of jet fuel must be imported from neighboring states or Canada by way of tank trucks or rail tank cars. These shipments are then deposited in bulk storage facilities where it is then distributed around the state.

Vermont has 6 airports that make jet fuel available for jet planes, two of which handle commercial air traffic. Jet fuel must be transported into the state from other states by way of tank trucks. Vermont's jet fuel distribution system and the state of local inventories depend on the petroleum industry's ability to re-supply the Northeast.

The price and supply here is driven not only by the market forces of supply and demand that influence other commodities, but also by U.S. domestic and foreign policy decisions in combination with the policies of oil producing nations. Other market forces have a large impact on the petroleum industry, including product seasonality, curtailments (such as refinery outages), and acts of nature. World oil and gas markets are complex and so energy emergencies that involve petroleum products are complex, requiring states to work with multiple organizations to develop effective responses.

Heating Oil

In Vermont approximately half of all homes are heated with oil as are many commercial and industrial facilities. Vermont does not have any internally derived sources of heating oil such as refineries, so all of its supplies must be imported from neighboring states or Canada by way of tank trucks or rail tank cars. These shipments are then deposited in bulk storage facilities where it is then distributed around the state.

Vermont’s heating oil distribution system has two components, bulk storage facilities which receive the supplies coming into the state, and dispensing facilities with local tank storage. Critical in the supply chain is the availability of electricity to move the fuel from bulk supplies to trucks for delivery. The movement of heating oil depends on the availability of diesel fuel for the trucks and railroad locomotives which move it. The availability of heating oil also depends on the usability of the state transportation system under adverse conditions such as flooding and wash-outs, conditions of bridges, and snow and ice. Vermont’s heating oil distribution system and the status of local inventories depend on the petroleum industry’s ability to re-supply the Northeast.

The price and supply is driven not only by the market forces of supply and demand that influence other commodities, but also by U.S. domestic and foreign policy decisions in combination with the policies of the oil producing nations. Other market forces have a large impact on the petroleum industry, including product seasonality, curtailments (such as refinery outages), and acts of nature. World oil and gas markets are complex and so energy emergencies that involve petroleum products are complex, requiring states to work with multiple organizations to develop effective responses.

The northeast region has the Northeast Home Heating Oil Reserve which is a 1 million barrel Reserve and the fuel is ultra low sulfur distillate (diesel).In 2012, the Reserve was used for the first time after Hurricane Sandy caused severe damage to the Northeast energy infrastructure.

Propane

Approximately 15 percent of the homes in Vermont use propane as their heating source and many residential users cook with propane and even a few remote homes and camps use propane as a sole source of energy for everything from heat to cooking to lights and refrigeration. Vermont also has several large industrial and commercial consumers who use propane for heat and hot water in their industrial processes.

The usage outside Vermont affects the state by creating shortages of the resource that is available for Vermonters use. Much of the propane used in the Northeast is used for power generation and this use often takes precedence over commercial or residential uses. Critical in the supply chain is the availability of electricity to move the fuel to bulk trucks for delivery to fixed large tanks where it is re-distributed to consumer use in portable tanks.

Vermont does not have any internally derived sources of propane such as refineries, so all of its supplies must be imported from neighboring states or Canada by way of tank trucks or rail tank cars. These shipments are then distributed around the state to consumer tanks which vary from a few gallons to many thousand gallons. The price and supply is driven not only by the market forces of supply and demand that influence other commodities, but also by U.S. domestic and foreign policy decisions in combination with the policies of oil producing nations. Other market forces have a large impact on the petroleum industry, including product seasonality, curtailments (such as refinery outages), and acts of nature. World oil and gas markets are complex and so energy emergencies that involve petroleum products are complex, requiring states to work with multiple organizations to develop effective responses.

The movement of propane depends on the availability of diesel fuel for the trucks and railroad locomotives which move it. The availability of propane also depends on the usability of the state transportation system under adverse conditions such as flooding and wash-outs, conditions of bridges, and snow and ice. Vermont's propane distribution system and the state of local inventories depend on the petroleum industry's ability to re-supply the Northeast.

Other Sectors

The Role of Telecommunications in Energy Assurance

As utilities and telecommunications providers upgrade their infrastructure, and electric utilities incorporate more advanced telecom technology into their operations, the importance of interdependencies between those networks have increased greatly. Telecom supports energy assurance by enhancing utilities' knowledge of outages and enabling communication between service restoration crews. In turn, telecom providers rely upon the electric grid as a primary power source for facilities such as Central Offices, remote terminals or antenna towers. When that service is unavailable, telecom providers rely on a number of backup power sources. Ensuring that those backup energy sources are routed to their most needed locations is the duty of the Emergency Operations Center, and it relies upon telecom networks to assess needs and coordinate timely deliveries to prevent unnecessarily prolonged or avoidable outages. State Support Function 2 (Communications) is responsible for maintaining and sustaining existing radio, internet and telecommunications, and additionally coordinates with the appropriate agencies to restore those capabilities in the event a short or long term disruption. The State of Vermont Statewide Interoperable Communications Plan is appended to SSF 2. The telecommunications service territory map is included in Appendix C.

Telecom networks serve an integral role in energy assurance, yet as the interdependencies increase with communication capabilities pushed further to the ends of the electric grid, there will be increased risks to energy assurance as well. Regulators and emergency response coordinators must face the challenges of cyber attacks, and make sure that the advances in using telecom networks to support energy assurance are not outweighed by cyber security vulnerabilities.

Telecom networks enable outage notification for utilities and are used for communication between service restoration crews. When customers lose power, they can call their electric utility to notify it of the outage. Now, with the extensive deployment of smart meters in Vermont, utilities can also proactively assess outages across their service territory by pinging individual meters to identify outages. Smart grid technology not only helps utilities assess outages for restoration, but also enables them to stage service restoration crews and target areas for hardening against future outages.

In Vermont, Green Mountain Power's (GMP) smart grid operates over Vermont Telephone's (VTel's) 700 MHz wireless and wired communications network. Unlike major commercial telecom providers, VTel committed to a Service Level Agreement to ensure GMP's communications have priority over the network. The reason for this agreement, which underscores the interdependencies between telecom and electric utilities, is that VTel's fiber and wireless networks depend on energy assurance from GMP electric lines and poles. As similar-sized utilities, VTel and GMP have closely-bound recovery priorities.

Utilities also need data and voice networks for typical communications between crews and dispatchers, and those networks are the key to speedy restoration following disasters. Unlike the case of GMP using VTel for smart grid communications, utility crew communications usually rely on some combination of commercial and private telecom networks. That is in part for redundancy and in part because utilities don't have dedicated spectrum for private networks. Commercial telecom carriers are hardening their infrastructure and increasing capacity to accommodate emergency utility communications, especially in light of Hurricane Sandy. However, many utilities would prefer their own dedicated spectrum to design and maintain private networks rather than relying on commercial carriers.

A possible communications solution for electric utilities is the FirstNet Public Safety Broadband Network (PSBN). FirstNet is an independent authority within the National Telecommunications & Information Administration, created by the Middle Class Tax Relief and Job Creation Act of 2012. The FirstNet PSBN is still in the state planning stages, and is intended for use by first responders. However, it may also serve as a solution for utilities, whereby they could use interoperable equipment to communicate over a dedicated spectrum block for first responders and other utilities. That would enable not just communications between workers within one utility, but also communications between that utility and crews of different utilities or from other localities. Such interoperability would ensure that extra resources available during emergencies are put to good use.

When electric power is interrupted, other energy resources are needed to keep the telecom networks operational. Backup generators to power telecom facilities may run on propane, gasoline or diesel fuel. Central Offices might require natural gas or #2 fuel oil for heating. In addition to fueling backup generators for facilities, propane, gasoline and diesel fuel are variously used to power tools or fleet vehicles used in typical operation or during service restoration. As telecom providers restore service, they need access to transportation so they can make repairs to infrastructure, deliver backup energy supplies facilities. Providers rely upon emergency responders to secure hazardous sites while working to restore services. Many providers have emergency preparedness plans and some providers even have their own Emergency Response Centers to interface with the State Emergency Operations Center. Like any other Vermonters affected by electric service outages, telecom provider office personnel and service restoration crews depend on food, water, shelter, and medical care in order to continue their work to restore service or remain operational.

All those resources also depend on telecom networks so emergency coordinators can know where to target the resources for effective and efficient recovery efforts. Natural gas utilities and their crews depend on telecom networks similar to how electric utilities depend on those networks. Delivery of propane, #2 fuel oil, gasoline, and diesel fuel requires communication of needs and coordination of how to get those resources where they need to be. Road crews repairing transportation routes need to access telecom networks to update 511 data for the public and emergency coordinators. Public access to water, food, and shelter depends on their getting information about the availability of those important resources through telecom networks. Medical care requires telecom networks in order to learn of health emergencies, respond, and access medical records. With all those services depending upon telecom infrastructure, a top priority for emergency coordinators should be restoring electric service to those facilities and ensuring there is adequate backup energy supplies in the interim.

While US is well-prepared for 3-4 day outage, energy assurance will require adequate battery backup for possible prolonged outages and fuel delivery for the telecom networks to function while electric utility networks are restored.

The Role of Transportation in Energy Assurance

Vermont does not have any native sources of petroleum products and therefore must import it from other states and Canada. The state's road and rail systems play a major role in the supply of all types of fuel including gasoline, heating oil, propane, and diesel fuel. Energy supply and restoration is very dependent on the state transportation systems. Washed out roads and bridges prevent the restoration of the power lines, telecommunication lines, fuel deliveries, and other essential material. A map of the state transportation system is attached as Appendix D.

Interdependencies

Energy sources and supplies and suppliers do not exist as stand-alone entities, but are dependent on each other and other resources such as communications, transportation – infrastructure and vehicles, food and water, and medical services. The concept of infrastructure interdependency is based on connectivity between the various elements of an infrastructure. It means that a disruption in one element can affect the functioning of numerous systems that depend on that element, possibly causing a cycle of infrastructure disruption.

Hundreds of electricity, oil, natural gas, nuclear, and renewable energy assets are interconnected by vast systems and networks. This energy network is a fundamental driver for personal activities, economic development, government, and essential services. Other critical infrastructures, such as transportation and communications systems, depend on a reliable supply of energy to maintain functionality. Interdependency derives from the fact that the energy supplies, in turn, depend on other critical infrastructures including transportation and communications systems, to deliver a reliable source of energy. Without the reliable energy sources such as electricity and fuels even the financial institutions become inoperable, safe drinking water gets limited and water for firefighting or cooling of generators will hamper these facilities from performing their vital functions.

In an attempt to capture some of these interdependencies, Vermont has developed a cross-reference matrix to get a feel for the complexity of these relationships (see Appendix E).

Roles and Responsibilities

The Vermont Department of Public Safety, Division of Emergency Management and Homeland Security (DEMHS) [formerly Vermont Emergency Management (VEM)], of the Department of Public Safety, is the State entity responsible for emergency planning and for coordinating emergency response. The State Emergency Operations Plan (SEOP), prepared by DEMHS, provides the framework for emergency planning and response. The SEOP divides the various roles of emergency response into 14 State Support Functions (SSFs) as indicated in Table 4. Not shown in Table 4 is that each SSF also has a number of supporting State agencies. State Support Function 12 is Energy, and the Lead Agency is the Department of Public Service. The Department is also a Supporting Agency of SSF 2 (Communications).

Table 4. Listing of State Support Functions in the State Emergency Operations Plan.

State Support Function (SSF)		Lead Agency
SSF #1	Transportation	Agency of Transportation
SSF #2	Communications	Department of Information and Innovation; Department of Public Safety, Criminal Justice Services
SSF #3	Public Works and Engineering	Agency of Transportation; Department of Public Safety, Fire Safety Division
SSF #4	Firefighting	Agency of Natural Resources, Department of Forests, Parks & Recreation; Department of Public Safety, Fire Safety Division
SSF #5	Emergency Management, Recovery & Mitigation	Department of Public Safety, Division of Emergency Management & Homeland Security
SSF #6	Mass Care, Food & Water	Agency of Human Services
SSF #7	Resource Support	Department of Buildings & General Services; Agency of Human Services, VT Commission on National & Community Service
SSF #8	Health and Medical Services	Department of Health
SSF #9	Search and Rescue	Department of Public Safety, Vermont State Police
SSF #10	Hazardous Materials	Department of Public Safety, Division of Fire Safety
SSF #11	Agriculture & Natural Resources	Agency of Agriculture, Food and Markets; Agency of Natural Resources
SSF #12	Energy	Department of Public Service
SSF #13	Law Enforcement	Department of Public Safety, State Police
SSF #14	Public Information	All State Support Functions and other agencies

The primary responsibility of the Department of Public Service in its role as SSF 12 lead is to provide information relating to energy supplies when the State Emergency Operations Center (SEOC) is activated by DEMHS during an emergency (*if* SSF 12 is activated, which it typically is).

Table 5 indicates the types of incidents that result in activation of the SEOC. SSF 12 is not activated during a Local incident, as there would not be widespread effects on energy supply. SSF 12 may be activated during a Minor incident, and is always activated during a Major incident.

Table 5. Types of incidents that result in activation of the SEOC.

TYPE OF INCIDENT	DIR & CONTROL and SUPPORT	WHO RESPONDS	PLANNING
Local Single or Multiple Jurisdictions or incident sites. Response within capabilities of the town and/or routine Mutual Aid Partners.	Incident Command (IC), Unified Command (UC) Incident Command Post (ICP), Local Emergency Operations Center (EOC), if necessary. SEOC Operating at Level 1 – VEM Duty Officer	Local Fire, Emergency Medical Services (EMS), Law Enforcement and/or Mutual Aid Partners.	Agency Standing Operating Procedures (SOP's) or Local Emergency Operations Plan (EOP) Regional All-Hazards Resource Plan.
Minor Single or Multiple Jurisdictions - Regional within the State. Beyond the capabilities of Local Responders & routine Mutual Aid Partners. Local Emergencies may be Requested & Declared, State Request for Federal Assistance Considered & Requested, if needed.	IC, UC ICP, Regional Coordination Center (RCC), State Emergency Operations Center (EOC). SEOC may be Activated at Level 2 (VEM Duty Officer + DPS Staff) or Level 3 [Incident Coordination Team (ICT) Support Staff + Designated State Support Functions (SSF's)].	Same as above with response from the State [State-Rapid Assessment & Assistance Team (S-RAAT), Hazardous Materials Response Team (HMRT), Other Special Teams and SSF's] Other regional agencies (hosp, etc.) Federal Agencies (DHS, FEMA, SBA)	Local EOP Regional All-Hazards Resource Plan State EOP/Radiological Emergency Response Plan (RERP). National Response Framework (NRF)
Major/Catastrophic State/Multi-State/Federal. State Declaration of Emergency and/or Request for Federal Assistance likely.	IC, UC Regional CC, State EOC. SEOC Activated at Level 3 or Level 4 (Full Activation with All SSF's).	Same as above with the likely involvement of additional State Resources Emergency Management Assistance Compact (EMAC) & International Emergency Management Group (IEMG) Resources Other Federal Agencies	Local EOP Regional All-Hazards Resource Plan State EOP/RERP NRF

Tables 6 and 7 (next page) define the activation levels of the SEOC, and the SEOC staffing at each activation level, respectively. As mentioned above, SSF 12 is not activated during a Local incident, which corresponds to a Level 1 SEOC activation (DEMHS Duty Officer only). SSF 12 may be activated during a Minor incident (if at SEOC Level 3 activation), and is always activated during a Major incident (SEOC Level 3 or 4 activation). When the SEOC is activated, it typically operates on two 12-hour shifts per day, 7:00 am to 7:00 pm and 7:00 pm to 7:00 am (although shift times may be different, depending on the particular situation). For a shift change, the new person arriving should arrive a half hour early (i.e., at 6:30) to be briefed on the previous shift and to be ready when the new shift starts at 7:00.

Table 6. Definition of activation levels of the SEOC.

LEVEL	DEFINITION
I - Monitoring	The VEM duty officer (DO) receives and acts upon calls from the public and/or other branches of state government or local agencies notifying the State of emergent situations such as flooding, ice storms, hazardous materials incidents, etc.
II – Limited Activation	When the DO encounters situations outlined below, operations shift to Level II with the activation of a second DO and supervisor: • Multiple or simultaneous events/situations; • Events anticipated require protracted coordination or response by the State; • Events/situations affect large geographic areas; • An event at the Vermont Yankee Power Plant; or • When local officials activate an incident command post. • When another state agency activates an operations center.
III – Partial Activation	The State will activate the EOC at either the primary site in Waterbury or a secondary location shifting to Level III when: • More than two (2) operational periods are anticipated; • There is an escalation of event(s); • State resources are activated and deployed; • There is a need for resources outside the affected area(s); • Directed by the Governor, Commissioner of Public Safety or Director of VEM; • There is an Unusual Event at Vermont Yankee; • Preliminary damage assessments (PDA) may lead to a Presidential declaration; or • Warning or anticipation of WMD or Terrorism incident, • Federal representation is likely.
IV - Full Activation	The State will fully activate the EOC and call in all assigned personnel if any of the threshold outlined for Level III exceed the capability of the ICT to coordinate resources during a Major or Catastrophic incident. Federal representation is anticipated.

When the SEOC is activated at Level 2 or 3, but SSF 12 is not required to staff the SEOC, DEMHS may request that someone from SSF 12 be available for contact (i.e., on call) during each shift in case a situation arises that may require information from SSF 12. In that case, during the overnight shift, SSF 12 and DEMHS should establish a protocol on a case-by-case basis that

DEHMS will contact SSF 12 via the method of choice for SSF 12 (i.e., by phone or text message, so that non-emergency emails do not unnecessarily wake up SSF 12 in the middle of the night).

Table 7. Staffing at the SEOC and other emergency centers.

LEVEL	EOC	RCC* (IF ACTIVATED)	ICP/LOCAL EOC
I Monitoring	1 - Duty Officer (DO)		Local Responder Staffing as needed
II Limited Activation	2 or more – Duty Officers or support staff 1 – Supervisor		Local Responder Staffing as needed
III Partial Activation	S-RAAT* – deployable to towns or the RCC, as needed ICT* Personnel activated, as needed SEOC Director SSF Lead agency representatives as the situation dictates Federal representation is likely		Incident Commander EM Director Police/fire/ambulance representatives School officials Public works representatives Town officials Mutual Aid representatives
IV Full Activation	S-RAAT – deployable to RCC or towns, as needed SEOC Director All SSF Leads and designated agency representatives Federal representation is anticipated	AOT district personnel (SSF 1&3) VDH district personnel (SSF 8) VSP troopers (SSF 13) Hazmat Team representative (SSF 10)	Same as Level III activation

The Incident Command System (ICS) is the model for command, control and coordination of an emergency response. Vermont has adopted ICS as the operational system to handle disaster/emergency situations. Figure 3 (next page) indicates the ICS structure of the SEOC. SSF 12 is in the Infrastructure Branch of the Operations Section, and provides the following functions (the full text of SSF 12 is included as Appendix F):

1. Identify, train, and assign PSD personnel to staff SSF-12 in the SEOC.
2. Maintain communications with electric utilities in responding to and recovering from emergencies regarding electric generating capacity shortages, electric generating fuel shortages, transmission and distribution line outages, and electrical service outages affecting the public. Report electric outages by county and expected restorations times.

3. Maintain communications with the natural gas utility regarding system conditions and supply of gas, and report gas system conditions.
4. Maintain communications with the Vermont Yankee nuclear power plant, and report plant conditions.
5. Maintain communications with representatives of the petroleum fuel dealers, and report the status of liquid petroleum fuel supplies.

Another role of SSF 12 is to act as a liaison between the utilities and the SEOC, and to assist the utilities in procuring assistance or resources that they might need, such as assistance with border crossing for Canadian crews, and points of contact at other state agencies (such as the Agency of Transportation). In addition, the Department assists DEMHS in obtaining electric utility damage estimates by county for the purposes of disaster declarations and federal assistance.

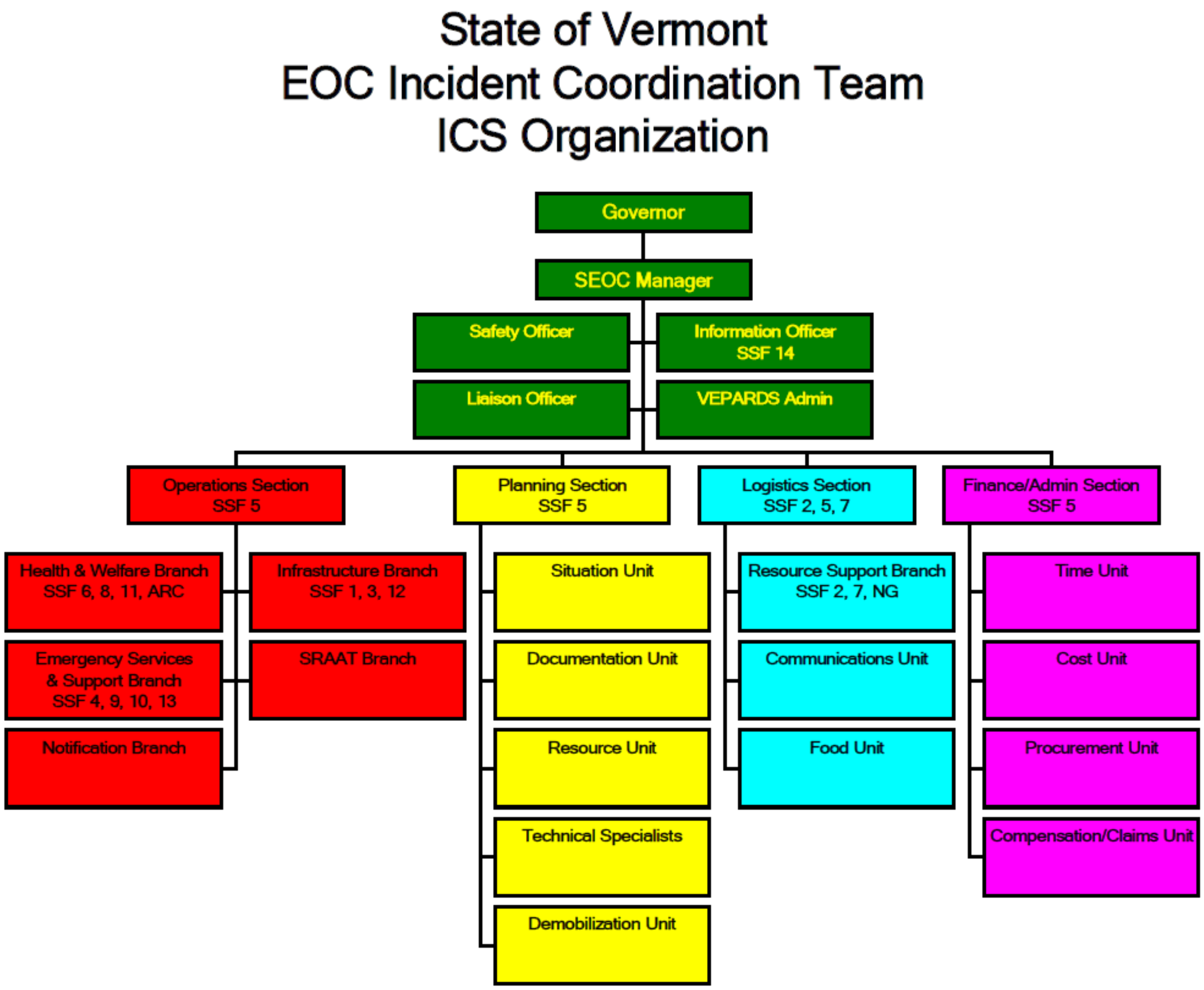


Figure 3. Incident Command System organization for the Vermont State Emergency Operations Center.

With respect to the first of the five functions/responsibilities of SSF 12 listed above, the Director of Engineering at the Department of Public Service is responsible for ensuring that there are four individuals who are trained and capable of staffing SSF 12 in the SEOC. The Director of Engineering works with the Commissioner, Deputy Commissioner, and the other Division Directors at the Department of Public Service to identify and assign those individuals to staff SSF 12. Requirements for staffing SSF 12 in the SEOC are: 1) familiarity with the SSF 12 annex to the SEOP; 2) familiarity with the SEOC itself (location of the SEOC, location of the SSF 12 station within the SEOC, and SEOC processes and procedures); 3) familiarity with the DisasterLAN information-sharing software; 4) familiarity with the energy suppliers in Vermont (electric utilities, gas utility, liquid petroleum representatives), their infrastructure, and how to contact them; and 5) ability to staff the SEOC when needed, which can be outside of normal work hours.

For the specific case of an incident at the Vermont Yankee nuclear power station, an additional set of skills is needed, which includes: 1) familiarity with the major components of the nuclear power plant, 2) familiarity with the Emergency Action Levels of the plant, 3) familiarity with the process of communicating with the Emergency Operations Facility (EOF) in Brattleboro, and 4) familiarity with the ERDS software, which provides plant data. At least two individuals should be trained to staff the SEOC for an incident at Vermont Yankee, and at least two individuals should be trained to staff the EOF (the State Nuclear Engineer is trained to staff the EOF).

With respect to the second function/responsibility of SSF 12, information regarding electrical outages is obtained by: 1) monitoring the website www.vtouages.com, which shows current electric outages by utility and by county, and current and historical (up to two weeks) state-wide outages; 2) participating in State/utility emergency conference calls, and 3) through direct contact with individual utilities, as needed. Information regarding the New England transmission system is obtained by monitoring ISO-NE's web site, or through direct contact with ISO-NE.

With respect to the third function/responsibility of SSF 12, the Gas Engineer (who is not trained to staff the SEOC), maintains contact with Vermont Gas Systems, and reports information (via email or phone) to those staffing SSF 12 in the SEOC.

With respect to the fourth function/responsibility of SSF 12, the Nuclear Engineer (who does not staff the SEOC during a non-nuclear emergency, and would staff the EOF during a nuclear emergency), maintains contact with Vermont Yankee, and reports information (via email or phone) to those staffing SSF 12 in the SEOC.

With respect to the fifth function/responsibility of SSF 12, those staffing the SSF 12 in the SEOC (and/or the Gas Engineer) maintain contact with representatives of Vermont's liquid petroleum fuel dealers associations. Although liquid petroleum fuels are not regulated by the Department of Public Service, the Department has established the following voluntary agreement with representatives of the Vermont Fuel Dealers Association and the Vermont Petroleum Association:

1. If the State Emergency Operations Center (SEOC) is activated, the Public Service Department (PSD) will contact the Vermont Petroleum Association (VPA) and the Vermont Fuel Dealers Association (VFDA) via e-mail informing them that the SEOC has been activated. The PSD will advise VPA & VFDA of the schedule which has been established for SSF-12 to provide briefings on energy supplies to Vermont Emergency Management (VEM). The VPA and VFDA will provide fuel status updates, via e-mail, to the PSD with consideration given to the schedule for briefing VEM.

2. If the SEOC has not been activated, and the VPA and/or VFDA become aware of information pertinent to an imminent or potential petroleum supply disruption that may affect Vermont, the VPA and/or VFDA are requested and encouraged to inform the PSD via e-mail.

The Department should consider creating a single e-mail address (to be determined, but something to the effect of ssf12fuelupdate@state.vt.us) for the VPA and VFDA to use to provide the above information. This way, the email address will always be the same, regardless of Department staff turnover. The PSD will maintain the e-mail address distribution list, which will include those PSD employees who staff the SEOC, and likely others such as the Gas Engineer and the Deputy Commissioner. Although e-mail is the preferred method of communication, one or more phone numbers will also be provided for the event that e-mail is not available. The full text of SEOP Annex M, which describes the responsibilities of the Department of Public Service, is included in Appendix G. SEOP Annexes L (SSF 12) and M were revised during the preparation of this EAP.

Other Emergency Planning and Preparedness Activities

Emergency Preparedness Conference Calls

If a weather event that may result in widespread utility outages is anticipated, the electric utilities, natural gas utility, telecommunications providers, and relevant State agencies (PSD, DEMHS, DII; and AOT if transportation is expected to be an issue) conduct conference calls to be briefed on the weather forecast by a meteorologist, and to discuss preparation for the storm, including the availability of resources and crews. The calls are conducted as needed (typically once or twice daily) before, during, and after the weather event, as needed. For Tropical Storm Irene, these calls started a week in advance and were held daily through the storm and one week after the storm during the restoration period. VELCO coordinates the calls, but any entity can request a call be held. VELCO maintains the emergency contact list, which is updated quarterly.

Annual Preparedness Meeting

Every September, the electric utilities, natural gas utility, telecommunications providers, and relevant State agencies meet for a full day to discuss lessons learned from emergency response over the past year, and to discuss ways to improve in the future. This is an excellent forum for utilities and state agencies to learn from each other in terms of what worked, what didn't work, and to brainstorm ideas regarding how to reduce the incidence and duration of outages in the future. One of the recommendations from the 2011 meeting was to upgrade the electric outage reporting web site www.vtoutages.com in several ways (including show a graph of historical state-wide outages rather than just an instantaneous view, show a matrix of outages by utility by county, and making the site compatible with mobile devices for both purposes of logging in to update outage numbers and viewing the site for situational awareness). These upgrades were completed in 2012, and the new features of this site are used in the Energy Supply Disruption Tracking Process described elsewhere in this document.

Northeast Mutual Assistance Group (NEMAG)

Vermont's investor-owned electric utility, GMP, belongs to the Northeast Mutual Assistance Group, which is a forum for coordinating electric utility mutual assistance in the northeast United States and neighboring Canada. GMP periodically invites state agencies to participate in NEMAG meetings, and GMP reports NEMAG activities to all utilities and state agencies in attendance at the Annual Preparedness Meeting (see above).

Other Non-Emergency Planning Activities

Integrated Resource Planning (IRP) Process

Each distribution electric and natural gas utility in Vermont is required by statute to file an IRP with the Public Service Board. The Department of Public Service works with the utility during the development of the IRP, and files a recommendation regarding whether it should be approved by the Board. This process typically takes place every three years. During this process, the Department works with the utility on a variety of topics, including supply resources, vegetation management, capital improvements, and business processes aimed at improving the reliability of the utility system.

Electric Outage Reporting (PSB Rule 4.900 and Service Quality and Reliability Plans)

On an annual (calendar-year) basis, each electric utility must file its annual values for Customer Average Interruption Duration Index (CAIDI) and System Average Interruption Frequency Index

(SAIFI). CAIDI is a measure of the average outage duration for those customers who experiences outages, and SAIFI is a measure of the average number of times a customer experienced an outage. Each utility has a target values for CAIDI and SAIFI, and may be subject to a financial penalty if those targets are exceeded. This provides a regulatory incentive for utilities to operate their system in a reliable fashion, in addition to the incentive the utilities have to keep their customers happy). The utility's performance relative to its CAIDI and SAIFI targets is discussed during the IRP process.

Emergency Permitting

Pursuant to 30 V.S.A. § 248, except for the replacement of existing facilities with equivalent facilities in the usual course of business, and except for electric generation facilities that are operated solely for on-site electricity consumption by the owner of those facilities, no company may begin site preparation for or construction of an electric generation facility, an electric transmission facility, or a natural gas facility within the state unless the Public Service Board first finds that the same will promote the general good of the state and issues a certificate to that effect. There are two exceptions during emergency situations to the above requirements. Subsection 248(k) allows the Board to waive, for a specified and limited time, the prohibitions contained in Section 248 upon site preparation for or construction of an electric transmission facility or a generation facility necessary in an emergency situation to assure the stability or reliability of the electric system or a natural gas facility. Subsection 248(l) provides that, when the Governor has proclaimed a state of emergency, the Governor, in consultation with the Public Service Board and the Department of Public Service may waive the prohibitions contained in Section 248 upon site preparation for or construction of an electric transmission facility or a generation facility necessary to assure the stability or reliability of the electric system or a natural gas facility, subject to such conditions required by the Governor. The Department of Public Service works with the utilities and makes recommendations to the Board or Governor, as appropriate, during these two emergency processes.

Emergency Exercises

Energy Assurance Regional Exercises

Representatives from the Department of Public Service and DEMHS attended the regional exercises in Boston and National Harbor, MD in 2011 and 2012, respectively. The Vermont delegation took the following three main points home from these exercises:

1. The need to anticipate and mitigate the incredibly interdependent nature of our energy

supply ("a true 'System of Systems'") both in terms of other energy supplies, as well as other sectors (e.g. communications, transportation, food, water, and waste disposal, etc.).

2. Communications between responders at various levels of government (local, State, Federal), with utilities and other energy suppliers and stakeholders, as well as communications with the public in the event of disruption of energy supplies are both critically important to response and recovery efforts.
3. It is imperative to train, familiarize, and engage people who are new to their position(s) and either unaware, or unfamiliar with the content and functioning of the EAP, and a regular periodic schedule for plan review and revisions should be conducted in the context of an Energy Assurance Exercise.

Energy Assurance In-State Exercise

The Vermont Energy Assurance Exercise (VT-EAE) was conducted on May 10, 2012. The table-top exercise was attended by twenty-one participants representing 12 different organizations as stake-holders in Vermont's energy supplies. Participating organizations included State agencies, representatives of the suppliers of liquid petroleum fuels, telecommunications providers, a natural gas provider, and electrical distribution and transmission companies. In this exercise, disruptions to multiple energy supplies were included to illustrate interdependencies among different types of energy supplies, as well as interdependencies between energy supplies and other response and restoration support activities, such as communications and transportation. The VT-EAE scenario was set in late winter, with several severe ice/snow/wind storms following in short succession and resulting in widespread electrical and communications outages, as well as transportation issues. Coincident to the storms were mechanical failure of a major natural gas compressor station, and geo-political events resulting in a shortage of propane. The following recommendations were developed during the VT-EAE:

1. Facilitate passage of restoration crews from out-of-area over the roads through states where the drivers may not already have the requisite state-specific certification(s).

2. Facilitate the passage of response crews and equipment over the roads through surrounding states without being required to stop at weigh stations in route.

3. Educate and facilitate local traffic and access control authorities (e.g. local Police, Fire, and Sherriff's departments) on the response organizations that are allowed access over and through affected transportation routes and facilities (e.g. Comcast provides communications services and needs to be allowed to access affected areas in concert with responders).

4. Develop and use an intermediate descriptive category (or categories) for the status of various transportation routes would provide more detailed information for responders (e.g. in addition to "Road Closed", and & "Road Open", other descriptive categories to be considered for use might include examples such as: "Emergency Access Only" which would indicate that the access was controlled (Local and/or State control entities – State

Police, VAOT, Local PD, Local FD, Sheriff, etc.), and allowed for Emergency Response & Restoration only. Additionally, the appropriate contact information should be provided in order to coordinate access. This information would greatly facilitate the movement of crews, equipment, supplies, and materials and improve both the response time and the time to restore various functions and services.

5. Educate responders on what various potentially affected facilities and appurtenances look like, are located, what they do, the potential impact(s) should they be compromised, and suitable contact information for use in coordination and additional inquiry (e.g. educate about the impact of "Cut & Run" practices. Cutting a "wire or cable" that may be on the ground due to a downed tree or pole may seem like the prudent course of action to restore a transportation route, for example. The wire, cable, pipe, etc., may look innocuous, however cutting a fiber optic cable, for example, may inhibit communications for response and restoration efforts.

6. Encourage pre-fill of fuel storage (e.g. back-up generation, space heating, commercial dispensing facilities, response vehicles, and equipment, etc.) in preparation for emergency events. Facilitate coordination specifically between responding organizations and suppliers on advance planning to enable suppliers to adequately prepare for pre-filling of fuel supplies before an event. In addition, encourage responders to pre-fill all vehicles and equipment.

7. Allow for and provide secure (password-protected) access for Responders (e.g. utilities, fuel suppliers, communications providers, etc.) to more detailed information on DisasterLAN (Vermont's secure disaster communications network) that is currently only accessible by government officials.

8. Establishing the means and facility to gather and disseminate current information on a variety of subjects was a recurring theme during the VT-EAE. There is currently adequate system capacity within the existing data management systems used by Vermont Emergency Management (VEM) and/or the Vermont Agency of Transportation (VAOT) to accommodate the additional data volume involved in these types of efforts, according to the VT-EAE participants. The human resources, however, are not available within state government that would be required to receive local information and keep it current. There is also a need to assure that local personnel keep AOT updated of status changes to local roads in a timely fashion so the map is as up-to-date as possible.

9. The ability to gather and make available relevant, current, & detailed information including (but not limited to) the status of: transportation infrastructure, energy supply availability, operability of communications, availability of food & lodging, etc., and to provide that information on both state wide and at a local level, would facilitate planning, coordination, and execution of response activities, and thereby improve both the response and restoration times, in addition to providing more relevant and useful information to affected population(s).

10. Following are the specific information gathering and dissemination-related

recommendations discussed and developed during the VT-EAE. The data would be maintained in list and/or map format.

a. Available food and lodging accommodations – A means to collect and access information on available facilities that are able to provide food and lodging accommodations would facilitate response and restoration efforts. Providing food and lodging for repair crews, is a logistical challenge for responders. The general public also seeks operational facilities, and providing the means for the information and availability of such accommodations would improve response and restoration efforts, and provide the public with a useful and relevant resource.

b. Operational fuel dispensing facilities (primarily commercial facilities) - The static elements of this list would include: locations and identification of facilities where diesel fuel is sold, whether a facility has back-up generation sufficient for fuel dispensation located on-site in the event of a loss in electric power; etc.

c. An inventory of available auxiliary generation (e.g. municipal water and wastewater treatment facilities, various utility installations, hospitals, commercial facilities, etc.) including status (on-line, stand-by, off-line, cold start, etc.), type of fuel utilized, capacity, operational duration (based on available fuel supply), etc.

d. Current information on the status of local transportation facilities - Road closures, bridge closures, repair work, etc. This information is critical to the coordination of other response efforts including the planning and deployment of restoration assets as well as facilitating the transportation of necessary equipment, and materials. This is currently available for State roads (http://www.511vt.com/), however, the challenge is to add local roads.

e. Local Emergency Operations Centers - A list of local municipal emergency response facilities, their locations, and emergency contact information should be developed and made available for use by responders during an event. This list of facilities and contacts would improve the ability of communications providers to maintain communications at those locations, and assist in the prioritization of restoration efforts. In addition, this would also be a tool that would improve the response time to establish new communications add alternate emergency operations facilities at the local level, in the event that those operations must be relocated during a response.

f. Emergency Shelters – including, their locations, emergency contact information, capacity, availability of heat, water, electrical power, communications, etc.

g. Planned Schedule and Current Status of restoration efforts (e.g. transportation, electric power, communications, etc.). The means to access the current status and the planned schedule for restoration efforts of various types would facilitate planning and execution by responding organizations, and allow for timely sharing of current information state-wide.

h. Responding Organizations Emergency Contact Information – This list of contact information may include, but would not be limited to the contacts already on the coordinating conference call list maintained by VELCO. Contact Information listed would include regulated and non-regulated energy suppliers, communications providers, local officials, etc., and serve as a resource for the responder community in order to facilitate restoration and recovery efforts.

i. Suitable parking locations for use by tractor trailers in the event that their movement over the roads is restricted during an emergency to prevent these types of vehicles from blocking transportation corridors, particularly during inclement winter weather.

11. Add Vermont Gas to the Emergency Preparedness contact list maintained by VELCO (completed).

12. Facilitation of the participation of cellular communications providers (e.g. AT&T, and Verizon, for examples) to participate in emergency planning, preparedness, and response coordination efforts is underway.

Future Vermont energy assurance exercises will be planned and conducted in coordination with the exercises conducted by DEMHS, described below.

Emergency Table-top Exercises and Training

DEMHS has periodically conducted emergency table-top exercises that include a energy supply disruption as a major component. Participants include representatives from the State Support Functions as well as local responders. DEMHS also conducts the State Improvement Planning Workshop and the State Training and Exercise Plan Workshop. Attendees included local, state and federal government in an effort to consolidate training and exercising that occurs within Vermont.

Full-scale Exercises

DEMHS periodically conducts full-scale exercises, referred to as "catastrophic exercises", or "CATEX". These exercises involve over a year of planning. In September of 2010, DEMHS conducted a CATEX that involved 750 emergency responders including local, state, and federal employees; private businesses; and community volunteers at 25 locations throughout Vermont. The CATEX was played out continuously for 30 straight hours, and simulated a massive natural disaster that devastated Vermont, causing mass casualties, tens of thousands of power outages, extensive damage including thousands of downed trees, flooding, and the aftermath of these events. Some events were played out, including the removal of downed trees by chainsaw crews, search & rescue missions, medical surge/mass care facility activation, communications activities, as well as other actions. Volunteer actors played the parts of victims in some of these scenarios. The Federal Emergency Management Agency (FEMA) sent an assistance team to Vermont to simulate the process of receiving federal assistance for the mock disaster. The 2010 CATEX scenario was intended to be a realistic, yet rare, event for Vermont with similar destruction to the 1938 hurricane that hit the state. On August 28, 2011, Tropical Storm Irene struck Vermont and caused similar damage as contemplated in the 2010 CATEX scenario. The 2010 CATEX helped Vermont to prepare for some aspects of the damage caused by Tropical Storm Irene, while Vermont did not anticipate the extensive damage to State and local roads caused by Irene (see discussion of Tropical Storm Irene, below).

DEMHS is currently in the process of planning a CATEX to be conducted in the spring of 2014 (at the time of this writing, the 2014 CATEX scenario has not been released). Several New England states have expressed an interest in observing the 2014 CATEX.

Emergency Communications

State Support Function 14 (Public Information) disseminates information on emergencies to the general public through the news media. All State Support Functions and other agencies play a supporting role.

Real-world Experience: Tropical Storm Irene

The State of Vermont received the extraordinary impact of Tropical Storm (TS) Irene beginning on August 28, 2011. The storm caused power outages statewide for approximately 50,000 households and widespread flooding that resulted on six deaths. Record amounts of rain fell in a short amount of time resulting is catastrophic flooding across the state. Rainfall totals were between 4 and 7 inches with some locally higher amounts up to 10 inches concentrated during a 6-8 hour period. The Otter Creek reached an historic crest (nearly 4 feet over the previous record in 1938) and the Mad, Winooski and White Rivers were very close to records established in 1927. Those main stem rivers were fed by many smaller tributaries that caused damaging flash flooding throughout the central and southern parts of the state. Sustained winds of 50 miles per hour with higher gusts were recorded as the storm crossed Vermont's southern border. More than 1500 Vermont families were displaced and the transportation and public infrastructure was decimated. Of Vermont's 251 towns and cities, 223 towns were impacted by Irene causing household damage, infrastructure damage or both. Forty-five (45) municipalities were considered severely impacted. Hundreds of state and local roads were closed for an extended period of time completely isolating numerous towns and limiting access to many others. This resulted in state and the Emergency

Management Assistance Compact (EMAC) National Guard missions to deliver emergency supplies by ground and air. The flooding also caused the first-ever evacuation of the State Emergency Operations Center (SEOC) due to access challenges and the impact to the buildings and support mechanism in the state office complex in Waterbury.

Prior to 2011 it had been over ten years since Vermont had experienced a declared disaster that required Individual Assistance program support. Tropical Storm Irene established an historic mark in this area for number of applicants, individual assistance provided and number of homes sustaining major damage or being destroyed. Fifteen mobile parks and more than 561 mobile homes (both in parks and on private land) were damaged and destroyed with 161 maximum grants awarded under the Individuals and Households Program. When considered against the average amount of assistance per disaster as noted in 44 Code of Federal Regulations (CFR), the impact on Vermont is consistent with large states and a population of more than 20 times the size of Vermont. The federal and state assistance provided as a result of the storm was unprecedented. During the response to TS Irene, 71 Action Request Forms were executed to receive federal support in the form of technical assistance and resources. Twenty interstate resource requests in the form of EMAC missions were carried out to bring National Guard assets, medical help, transportation resources, and emergency operations center personnel from other states. On September 1, 2011 President Obama issued a Major Disaster Declaration for the state for Public Assistance in all counties and Individual Assistance in all counties except Grand Isle and Essex counties. This declaration enabled homeowners and public officials to apply for reimbursement for damage to homes and public infrastructure. The Federal Emergency Management Agency (FEMA) opened 14 Disaster Recovery Centers to assist individuals applying for aid. The Disaster Recovery Centers remained open until November 3, 2011.

Impacts to Infrastructure:

Governmental Services

The State Emergency Operations Center (SEOC) was activated on a 24 hour basis for five weeks and operated for extended hours for an additional three weeks. At the height of Tropical Storm Irene, the SEOC was flooded, necessitating its relocation to the FEMA Joint Field Office in Burlington, VT. There were two state agency and one non-governmental operations center open for several weeks. There were 63 local emergency operations centers open in the early days of the incident. Additionally nearly 1500 state workers were displaced and relocated to multiple locations throughout the state as a result of the impact on the Waterbury Office Complex. Those displaced included employees of the State Hospital and the Agencies of Human Services and Natural Resources.

Roads and Bridges

More than 500 miles of state highway was damaged or closed, 200 bridges sustained damage, 34 bridges were completely closed, more than 200 miles of state-owned rail was impassible and six rail bridges were badly damaged. The privately run New England Central Railroad also received heavy damage, requiring repairs at 66 separate locations and Hartness Airport in Springfield and the Newport Airport sustained damage. Additional estimated damage to the state system that qualifies for Federal Highway Administration assistance is $175-250 million. The local transportation network had 211 segments of local road closed, 90 bridges closed, and 335 culverts damaged. The Agency of Transportation opened regional incident coordination centers to address the restoration of the transportation infrastructure.

Water/waste waters systems

The water/waste water support systems in 15 towns had varying degrees of damage ranging from major system restoration to multiple "boil water" orders for surrounding jurisdictions. The reservoir supporting the city of Rutland sustained significant damage to the primary and secondary supply systems that required water-rationing measures in the city, with a population of 18000, for weeks.

Emergency Supplies

The destruction referred to above resulted in 28 emergency supply deliveries by air and 64 deliveries by ground utilizing off-road type vehicles in the beginning days of the incident totaling 107 pallets of MREs, 401 pallets of water, 19 pallets of cots, 19 pallets of blankets, 19 pallets of tarps.

Communications

Telephone, 911 and cellular service was interrupted for thousands of customers in Pittsfield, Jacksonville, Readsboro, Dover, Marlboro, Newfane, and from Rochester to Bethel. Providers had equipment and fiber under water and had to relocate vehicles in anticipation of restoration efforts. Additionally critical public safety primary connectivity between the Department of Public Safety headquarters in Waterbury and law enforcement communications centers in the field was lost for a number of hours. Despite innovative telecommunications efforts and focused access restoration activities, some Vermonters did not have service restored for weeks.

Long Term Economic Impacts:

The long term economic impact on the state, business and agricultural communities is yet to be fully determined. However, more than 300 businesses have reported damage and have applied for Small Business Administration and Vermont Economic Development Association loans amounting to almost $35million. Vermont farmers face hardships similar to other business owners. All told, statewide agricultural losses due to Irene are estimated at $10 million. Most of potential value of feed damage was to an estimated 120,580 tons of corn silage, as the crop was almost ready for harvest.. Vegetable and fruit farmers lost direct income from the loss of product inundated with floodwaters. Statewide, flooding damaged over 400 acres of land producing fruit and vegetables. Estimates from the USDA Agriculture Census from 2007 show value for fruits and vegetables at $4,500 per acre. Using this metric, the estimated economic loss related to fruit and vegetable farming from Irene is about $2.24 million. This income loss decreases the reserves that fruit and vegetable farms use for spring-planting needs. Considering the $2.24 million that will not be recovered, some farms that were adversely affected could experience viability issues.

Energy Supply Disruption Tracking Process

An Energy Supply Disruption Tracking Process (ESDTP) is a process for monitoring and collecting data on Energy Supply Disruption Events (ESDE). The purposes of the ESDTP are to create situational awareness during the disruption event and, through later analysis of the information gathered, to either avoid a similar disruption from occurring in the future, or to minimize the extent or duration of a future occurrence. Vermont's ESDTP collects data on disruptions to the following energy sources: electricity, natural gas, and liquid petroleum fuels. The Vermont Department of Public Service will be responsible for all aspects of the ESDTP.

There are many instances of minor, localized, energy disruption events, such as localized power or natural gas outages on the distribution system, or a single gasoline station that has pumps out of service or is waiting for a fuel delivery. Figure 4 indicates Vermont state-wide (all electric utilities) power outages during a quiet two-week period. It can be seen in this figure that, even during a quiet period, there are constantly small, local, disruptions to electric service due to a variety of factors (see discussion above in the Electricity section).

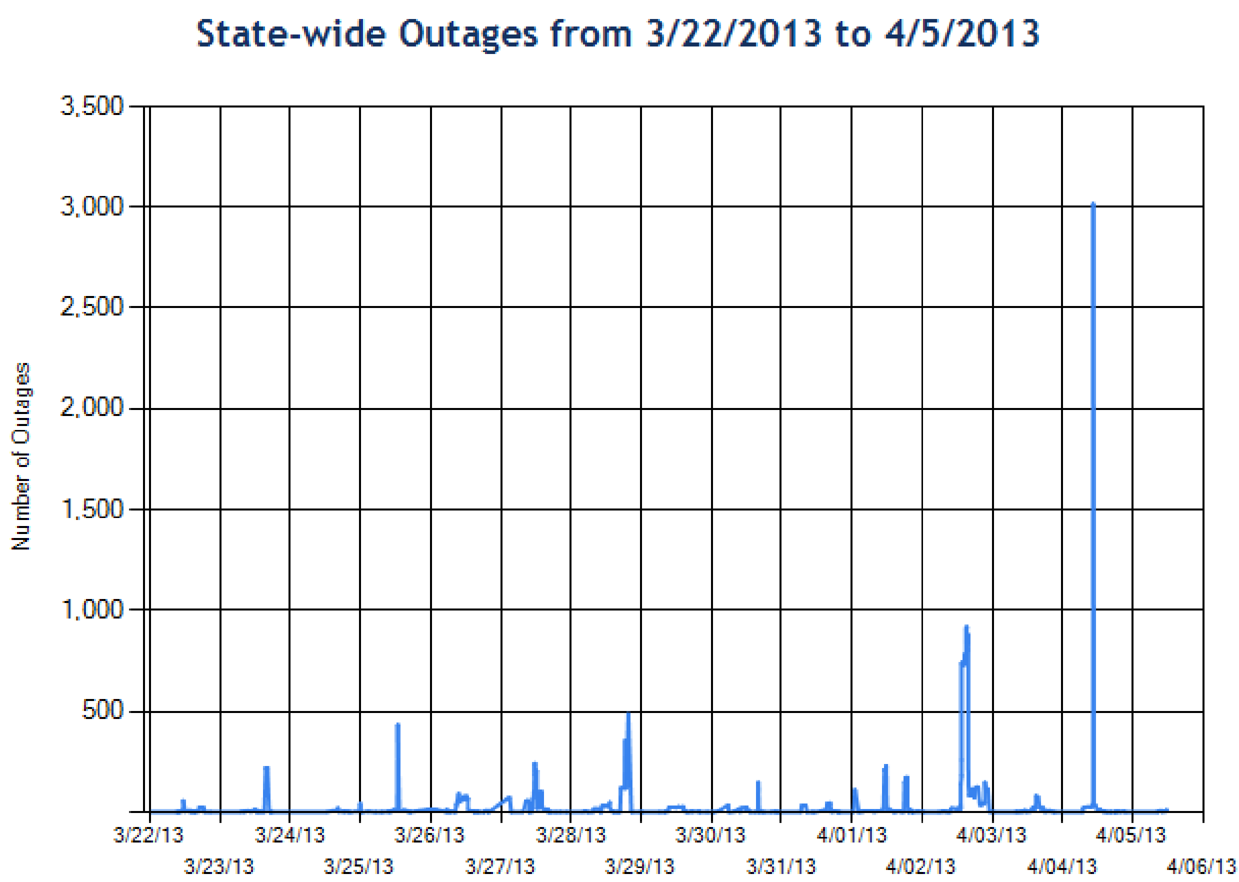


Figure 4. Vermont State-wide electricity outages during a quiet two-week period.

After deciding for which energy sources data will be collected, the second step of the ESDTP is to define an ESDE (i.e., for which events data will be collected). It would be overly burdensome and not result in useful information to collect data on all energy supply disruptions, not matter how small, such as the minor, local, electrical outages shown in Figure 4. Therefore, Vermont defines an ESDE as any of the following:

1. A federal major disaster declaration for an event that affects energy supplies.

2. A federal emergency declaration for an event that affects energy supplies.

3. Vermont declares a state of emergency for an event that affects energy supplies.

4. An outage on a natural gas transmission line that is not looped.

5. A supply disruption to bulk liquid petroleum fuel supplies either in Vermont or that may affect supply to Vermont.

6. Other disruption to electricity, natural gas, or liquid petroleum fuels that, in the discretion of the Vermont Department of Public Service, should be monitored and/or analyzed.

The following data will be collected during and/or after an ESDE

1. The type(s) of energy supply(ies) disrupted, or imminently threatened with disruption;

2. When the threat of a potential, or probable, energy supply disruption first became known;

3. When the actual disruption(s) began, if applicable;

4. The geographic extent of the disruption;

5. The Specific Energy Infrastructure component(s) affected;

6. The probable duration of disruption or emergency, including:
    i. a The number of days of supply remaining;
    ii. b The forecasted re-supply schedule;
    iii. c The forecasted re-supply volume(s) & rate(s); and,
    iv. d The estimated completion time for the re-supply efforts.

7. The cause(s) of Energy Supply Disruption Event, if known:
    i. a Natural
    ii. b Human error
    iii. c Infrastructure &/or Equipment Failure &/or Malfunction

8. Other conditions that might worsen the situation or prolong recovery.

9. Interdependencies with other energy supplies or other critical infrastructure (i.e., telecommunications, transportation).

The PSD has primary responsibility for identification and assessment of ESDEs in Vermont, and will request assistance from other State agencies and utilities as necessary.

During the development of this Energy Assurance Plan and the ESDTP, the Department of Public Service worked with the electric utilities to upgrade Vermont's electric outage reporting web site www.vtoutages.com. The web site previously only showed instantaneous values for electric outages by utility (and a total for State-wide outages), with no way of knowing the historical outages. One of the major enhancements of the web site was to create a graph of historical State-wide outages going back up to two weeks (time period selected by the user). Figures 4 through 7 in this section are obtained from the enhanced web site, and show the graph of historical outages for several different weather situations. The list of enhancements to the web site included:

- A line graph to view Statewide (all utilities) outage history going back up to two weeks was created.
- A matrix was created to allow viewing on one screen the number of outages by utility by county.
- Created the ability for utilities to update the site remotely via mobile device (i.e., from the field).
- A version of the web site compatible with viewing on mobile devices was created. This allows users to remotely monitor utility outages via mobile device.
- Other changes to aesthetics (to enhance usability) and to make compatible with different web browsers.

The enhancements to the outage web site are critical to the ESDTP for electricity by allowing State-wide electrical outages to be monitored and archived. Previously, only an instantaneous value was available, with no way to know what happened in the past. With the enhanced web site, a user can view historical outages, and is now able to view a major outage that may have happened overnight when the web site is not normally monitored. In addition, the user can view a graph of statewide outages for a whole event that may last several days (see Figures 5 through 7). The Vermont Department of Public Service archives the graphs of historical outages and maintains a database of the complete history of State-wide electrical outages going back to August 2012, when the enhanced web site went live. These graphs comprise one component of data collection for electrical ESDEs, and indicate the time period (onset, duration, and end) of the disruption, the peak number of customers affected, the rates (with respect to time) of outages that occurred and of restoration after the event causing the damage has ended. The web site also indicates the geographic extent of the outages (only in instantaneous form) by indicating number of outages by county, which can either be viewed on one screen in matrix format or graphically on a map of the state with counties color-shaded according number of outages.

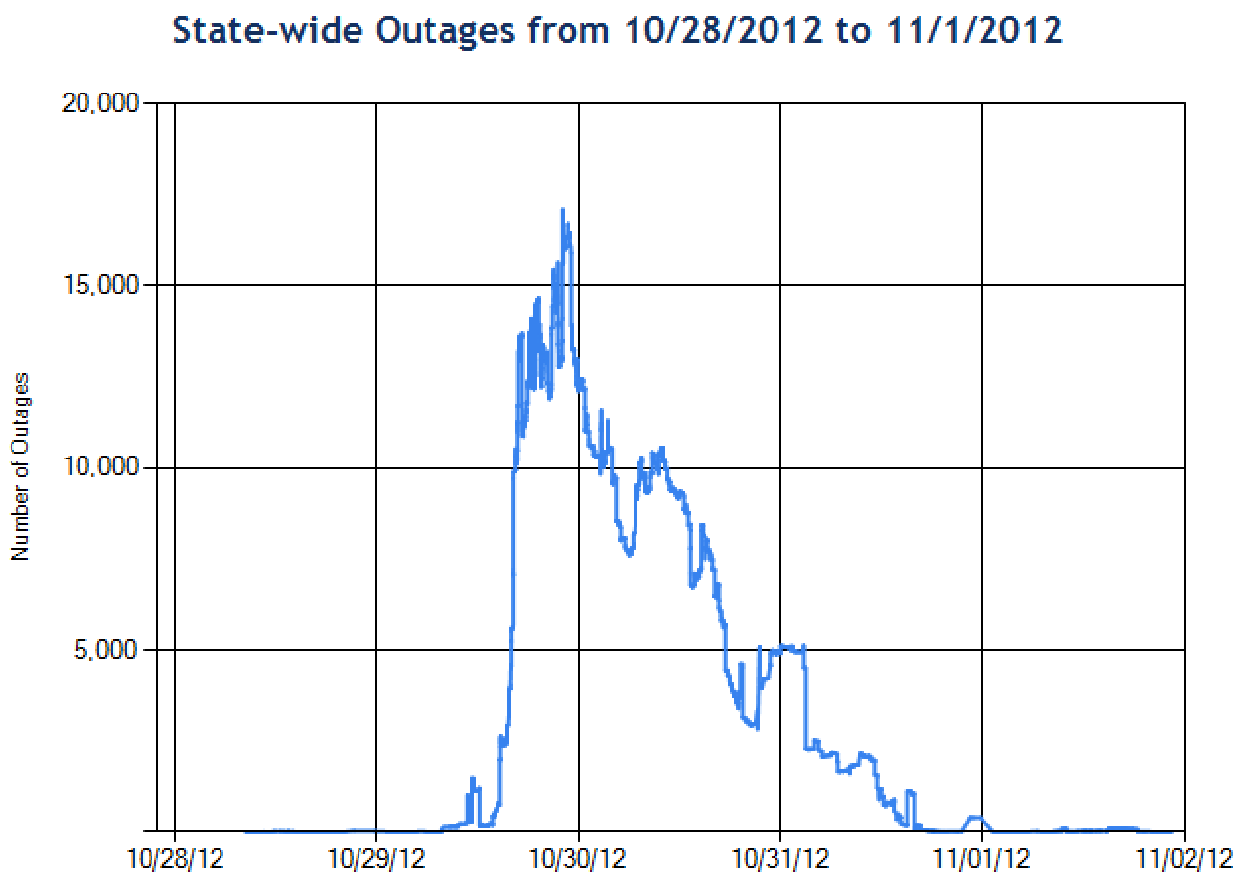


Figure 5. Electrical outages in Vermont due to the remnants of Super Storm Sandy.

The Department has a fair amount of experience with this process for electricity. Next steps are to gain more experience with natural gas and liquid petroleum fuels (if disruption events occur), and to refine the process, as needed, for these fuels.

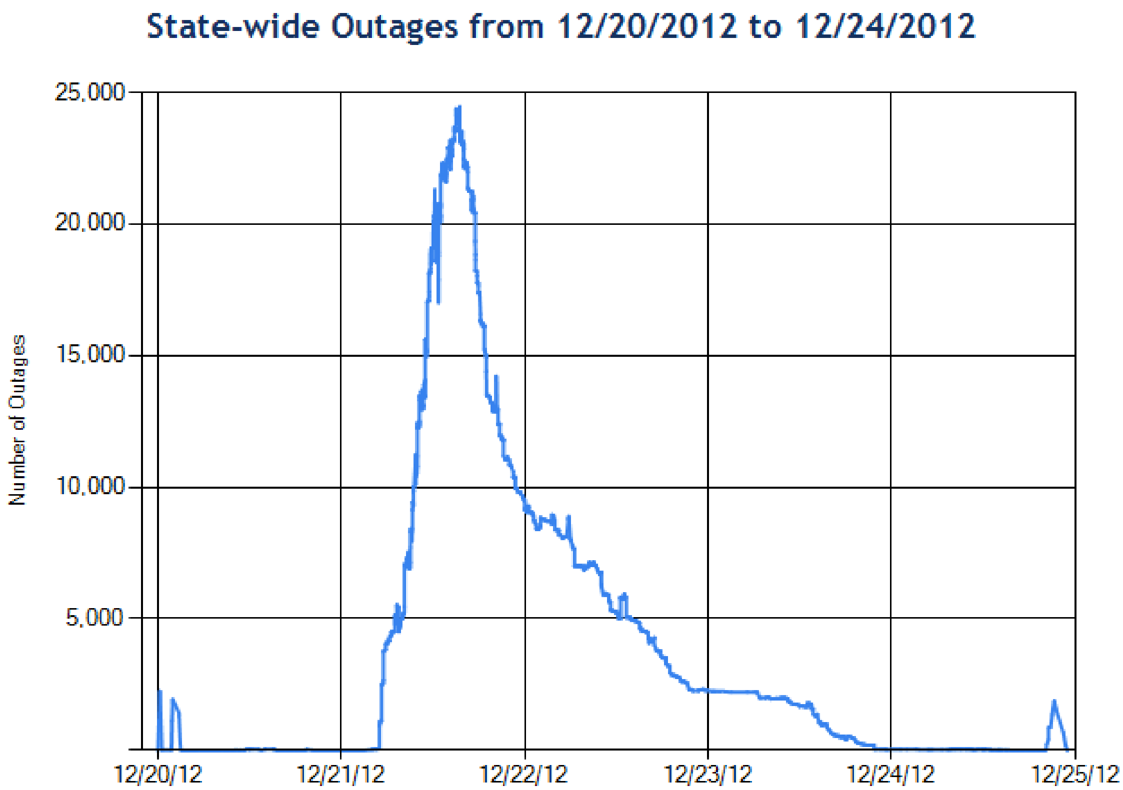


Figure 6. Electrical outages in Vermont due to strong winds with snow/wintery mix.

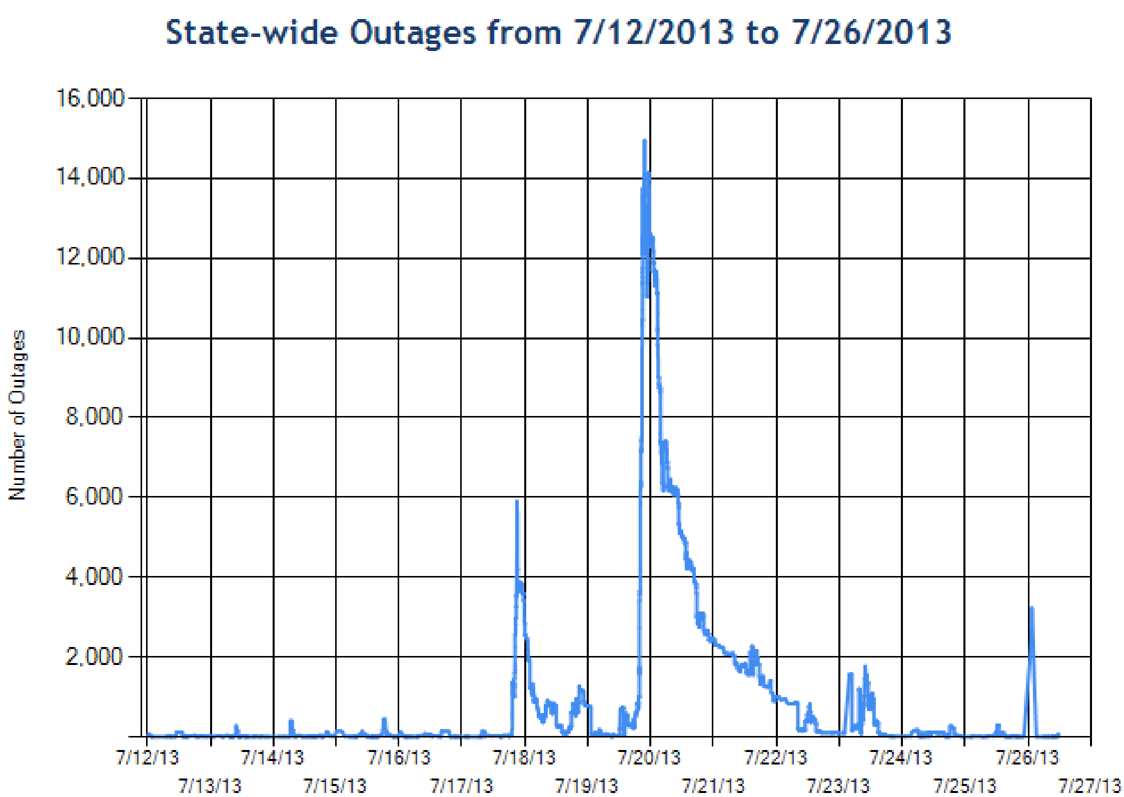
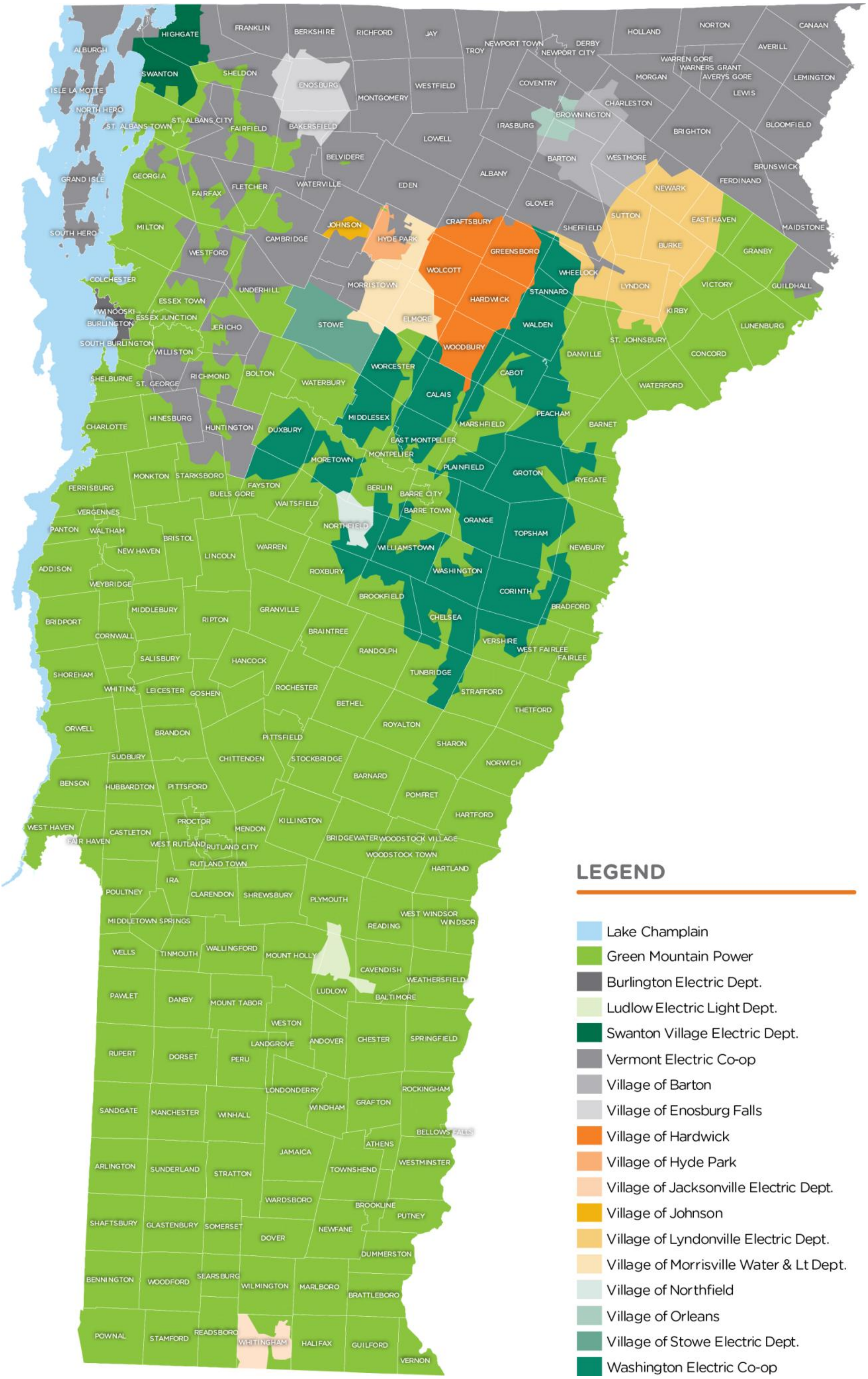


Figure 7. Electrical outages in Vermont due to thunderstorms with wind and lightning.

Vermont Energy Assurance Plan

Appendix A

Vermont Electric Utility Service Territory Map

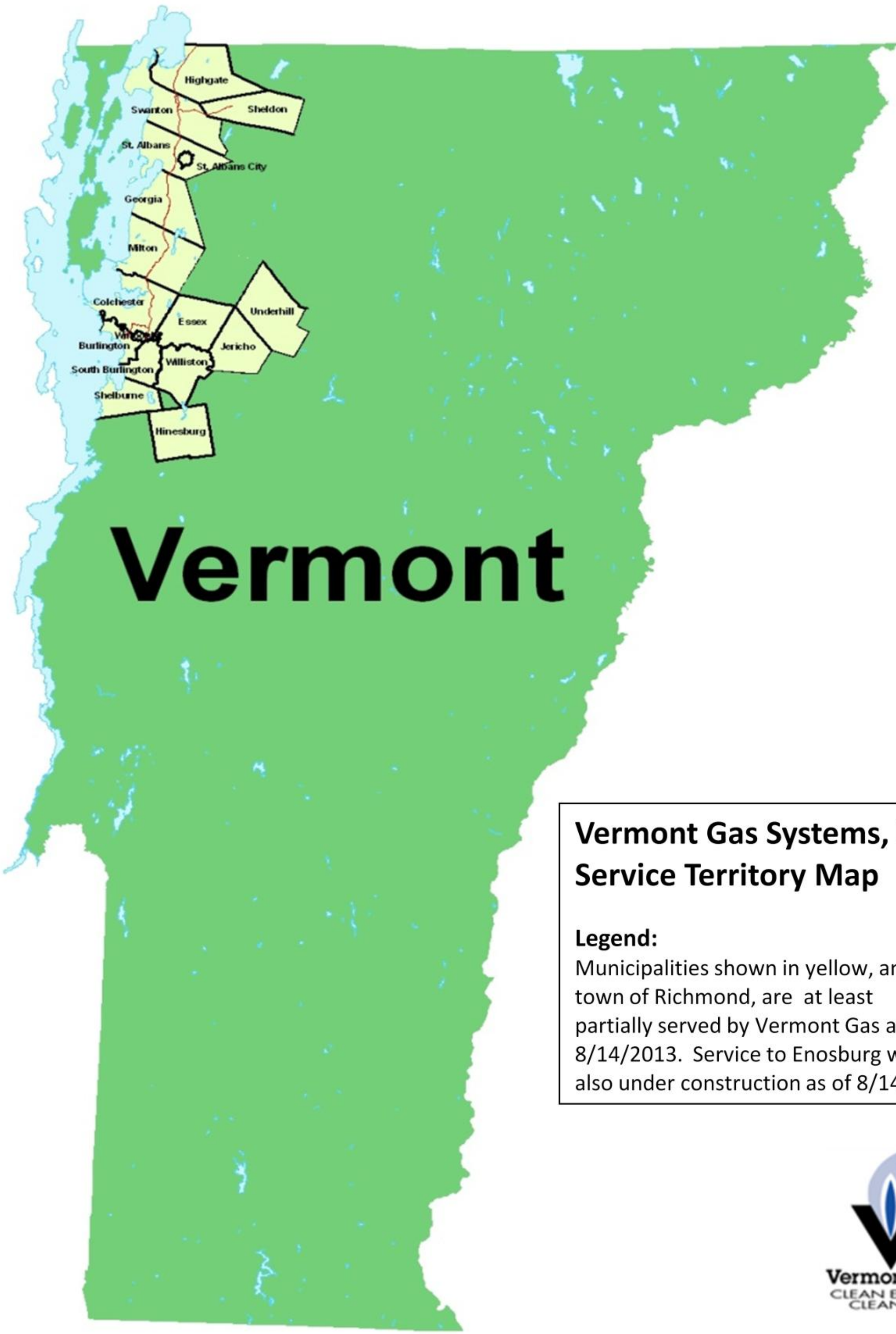


LEGEND
Lake Champlain
Green Mountain Power
Burlington Electric Dept.
Ludlow Electric Light Dept.
Swanton Village Electric Dept.
Vermont Electric Co-op
Village of Barton
Village of Enosburg Falls
Village of Hardwick
Village of Hyde Park
Village of Jacksonville Electric Dept.
Village of Johnson
Village of Lyndonville Electric Dept.
Village of Morrisville Water & Lt Dept.
Village of Northfield
Village of Orleans
Village of Stowe Electric Dept.
Washington Electric Co-op
HIGHGATE
FRANKLIN
BERKSHIRE
RICHFORD
JAY
NORTON
CANAAN
HOLLAND
ALBURGH
TROY
NEWPORT TOWN
DERBY
NEWPORT CITY
AVERILL
SWANTON
SHELDON
ENOSBURG
WARREN GORE
WARNERS GRANT
AVERYS GORE
MORGAN
LEMINGTON
ISLE LA MOTTE
MONTGOMERY
WESTFIELD
COVENTRY
LEWIS
CHARLESTON
NORTH HERO
BROWNINGTON
ST. ALBANS TOWN
ST. ALBANS CITY
FAIRFIELD
BAKERSFIELD
IRASBURG
BRIGHTON
BLOOMFIELD
LOWELL
BELVIDERE
BARTON
WESTMORE
GRAND ISLE
GEORGIA
FAIRFAX
FLETCHER
WATERVILLE
EDEN
ALBANY
BRUNSWICK
FERDINAND
NEWARK
GLOVER
SUTTON
EAST HAVEN
MAIDSTONE
MILTON
JOHNSON
CRAFTSBURY
SHEFFIELD
SOUTH HERO
CAMBRIDGE
HYDE PARK
WESTFORD
GREENSBORO
BURKE
GRANBY
WOLCOTT
WHEELOCK
COLCHESTER
UNDERHILL
MORRISTOWN
HARDWICK
STANNARD
LYNDON
VICTORY
GUILDHALL
ESSEX TOWN
KIRBY
WINOOSKI
ESSEX JUNCTION
BURLINGTON
JERICHO
STOWE
ELMORE
WALDEN
LUNENBURG
SOUTH BURLINGTON
WOODBURY
ST. JOHNSBURY
WILLISTON
DANVILLE
CONCORD
SHELBURNE
ST. GEORGE
RICHMOND
BOLTON
WORCESTER
CABOT
WATERBURY
CALAIS
WATERFORD
HINESBURG
MIDDLESEX
PEACHAM
CHARLOTTE
HUNTINGTON
DUXBURY
MARSHFIELD
BARNET
EAST MONTPELIER
MONTPELIER
MORETOWN
PLAINFIELD
MONKTON
STARKSBORO
GROTON
RYEGATE
FERRISBURG
FAYSTON
BERLIN
BUELS GORE
BARRE CITY
VERGENNES
WAITSFIELD
BARRE TOWN
PANTON
WALTHAM
NORTHFIELD
ORANGE
TOPSHAM
BRISTOL
NEW HAVEN
WARREN
WILLIAMSTOWN
NEWBURY
LINCOLN
ADDISON
ROXBURY
WASHINGTON
WEYBRIDGE
CORINTH
BROOKFIELD
MIDDLEBURY
GRANVILLE
BRADFORD
BRIDPORT
RIPTON
CHELSEA
BRAINTREE
CORNWALL
VERSHIRE
WEST FAIRLEE
RANDOLPH
FAIRLEE
SALISBURY
HANCOCK
TUNBRIDGE
SHOREHAM
ROCHESTER
WHITING
LEICESTER
GOSHEN
STRAFFORD
BETHEL
THETFORD
ORWELL
ROYALTON
BRANDON
PITTSFIELD
SHARON
SUDBURY
CHITTENDEN
STOCKBRIDGE
NORWICH
BARNARD
BENSON
HUBBARDTON
PITTSFORD
POMFRET
HARTFORD
PROCTOR
KILLINGTON
WEST HAVEN
MENDON
CASTLETON
BRIDGEWATER
WOODSTOCK VILLAGE
FAIR HAVEN
WEST RUTLAND
RUTLAND CITY
WOODSTOCK TOWN
RUTLAND TOWN
HARTLAND
IRA
POULTNEY
CLARENDON
SHREWSBURY
PLYMOUTH
WEST WINDSOR
MIDDLETOWN SPRINGS
WINDSOR
READING
WELLS
TINMOUTH
WALLINGFORD
MOUNT HOLLY
CAVENDISH
WEATHERSFIELD
LUDLOW
PAWLET
DANBY
MOUNT TABOR
BALTIMORE
WESTON
LANDGROVE
ANDOVER
CHESTER
SPRINGFIELD
RUPERT
DORSET
PERU
LONDONDERRY
ROCKINGHAM
GRAFTON
SANDGATE
MANCHESTER
WINHALL
WINDHAM
BELLOWS FALLS
ATHENS
JAMAICA
ARLINGTON
SUNDERLAND
STRATTON
TOWNSHEND
WESTMINSTER
WARDSBORO
BROOKLINE
SHAFTSBURY
GLASTENBURY
SOMERSET
PUTNEY
DOVER
NEWFANE
DUMMERSTON
BENNINGTON
WOODFORD
SEARSBURG
WILMINGTON
MARLBORO
BRATTLEBORO
READSBORO
POWNAL
STAMFORD
WHITINGHAM
HALIFAX
GUILFORD
VERNON

Vermont Energy Assurance Plan

Appendix B

Vermont Natural Gas Service Territory Map



Vermont Gas Systems, Inc.
Service Territory Map

Legend:
Municipalities shown in yellow, and the town of Richmond, are at least partially served by Vermont Gas as of 8/14/2013. Service to Enosburg was also under construction as of 8/14/13

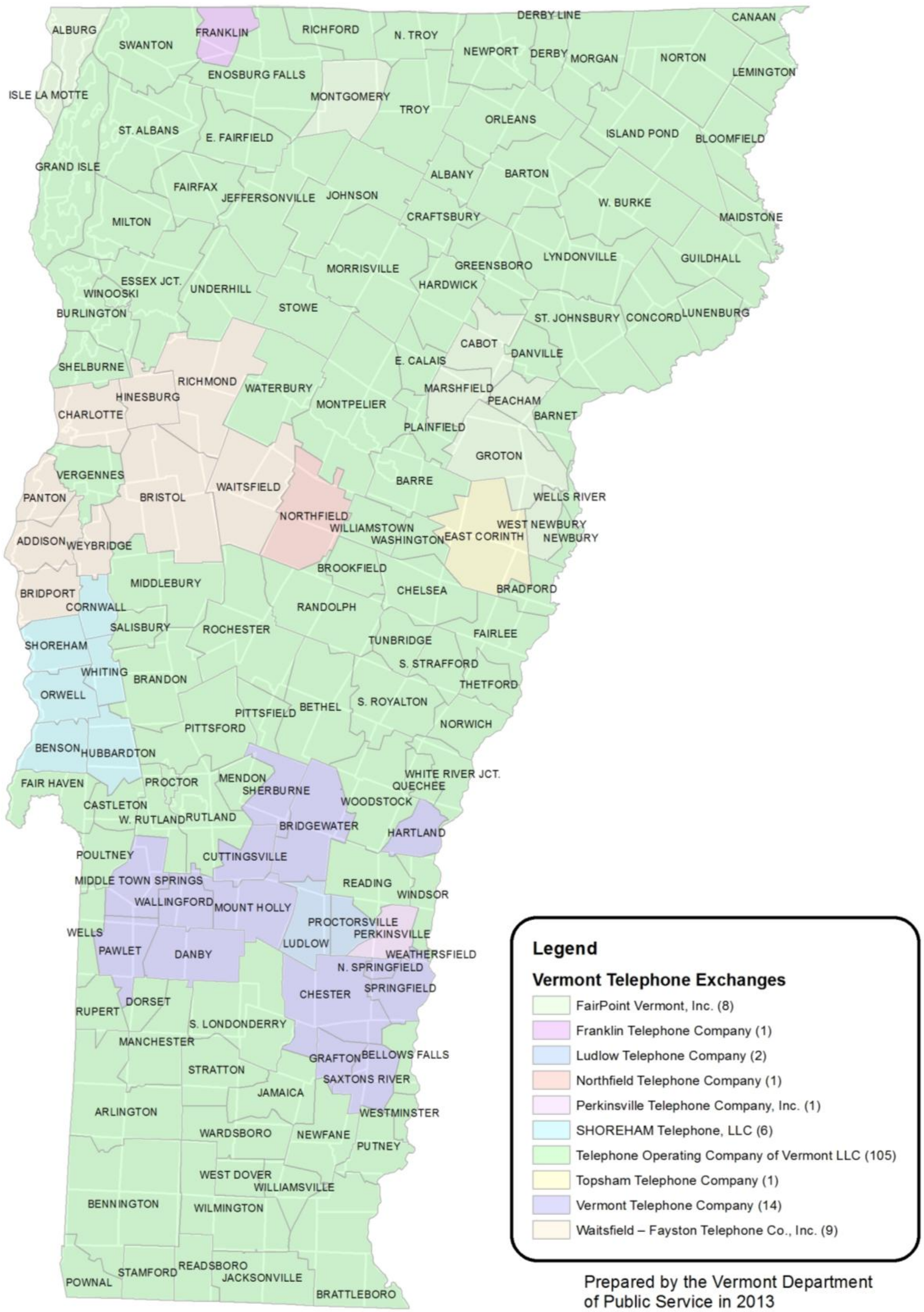
Vermont Gas
CLEAN ENERGY.
CLEAN AIR.

Vermont Energy Assurance Plan

Appendix C

Vermont Telecommunications Service Territory Map

Territories of Vermont Incubment Telephone Companies



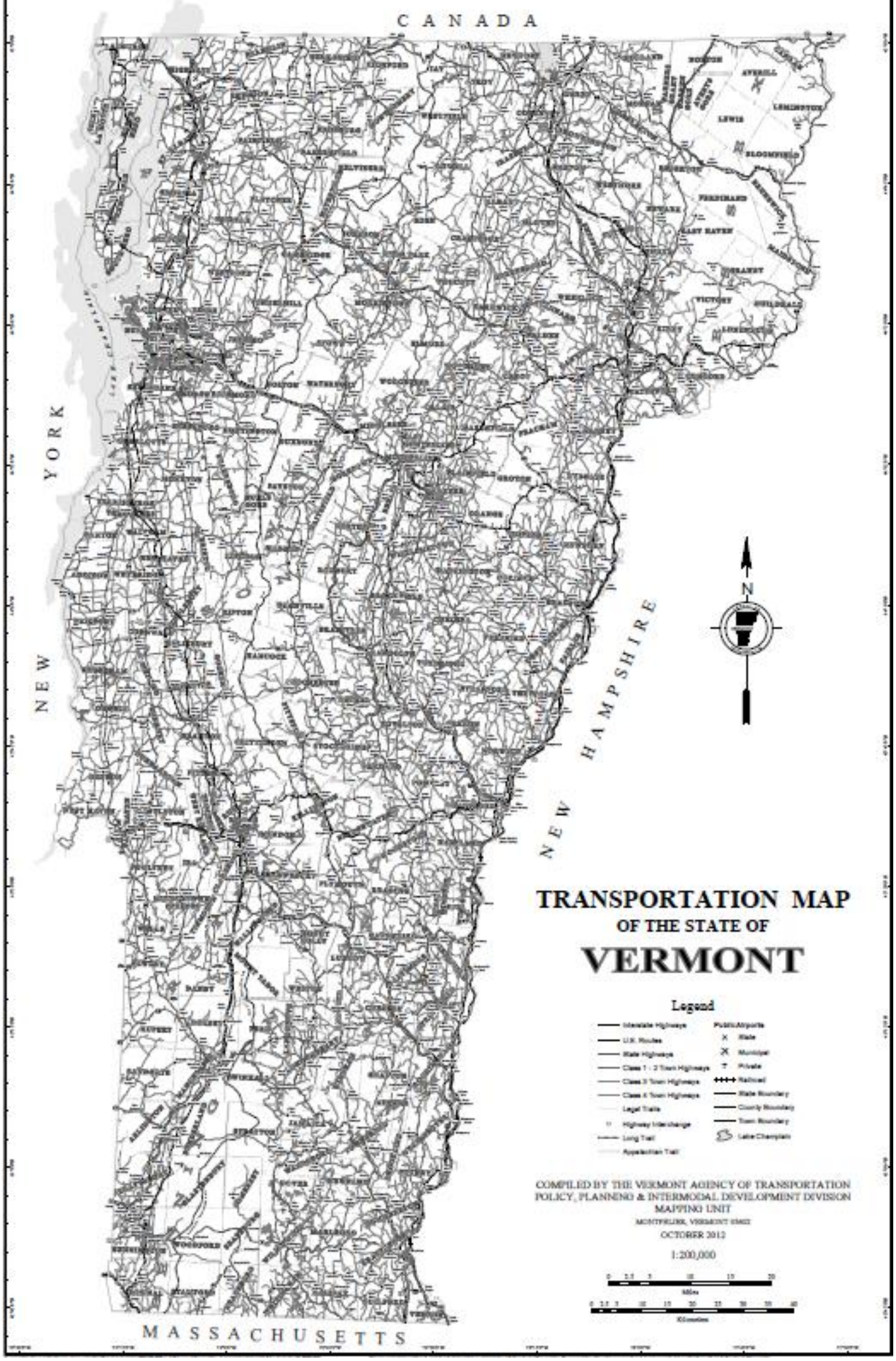
Prepared by the Vermont Department
of Public Service in 2013

Vermont Energy Assurance Plan

Appendix D

Vermont Transportation Map

(high resolution electronic file is available at
ftp://vtransmaps.vermont.gov/Maps/VermontMaps/MAP1_2012.pdf)



CANADA
NEW YORK
NEW HAMPSHIRE
MASSACHUSETTS
N
TRANSPORTATION MAP
OF THE STATE OF
VERMONT
Legend
Interstate Highways
U.S. Routes
State Highways
Class 1 - 2 Town Highways
Class 3 Town Highways
Class 4 Town Highways
Legal Trails
Highway Interchange
Long Trail
Appalachian Trail
Public Airports
State
Municipal
Private
Railroad
State Boundary
County Boundary
Town Boundary
Lake Champlain
COMPILED BY THE VERMONT AGENCY OF TRANSPORTATION
POLICY, PLANNING & INTERMODAL DEVELOPMENT DIVISION
MAPPING UNIT
MONTPELIER, VERMONT
OCTOBER 2012
1:200,000
0 2.5 5 10 15 20
Miles
0 2.5 5 10 15 20 25 30 35 40
Kilometers

Vermont Energy Assurance Plan

Appendix E

Vermont Interdependency Matrix

Vermont Interdependency Matrix

Vermont Interdependency Matrix	The Items in Columns Depend Upon the Items in Rows in the Following Ways:												
Inputs	**Electricity**	**Natural Gas**	**Propane**	**#2 Fuel Oil**	**Gasoline**	**Diesel Fuel**	**Telecom**	**Transportation**	**Water**	**Food**	**Emergency Response**	**Shelter**	**Medical Care**
Electricity		Compressor stations, valves	Pumping from Bulk Storage to trucks	Pumping from Bulk Storage to trucks	Pumping from Bulk Storage to trucks	Pumping from Bulk Storage to trucks	Primary power source for facilities (Central Offices, remote terminals, towers, etc.)	Fuel pumps	power supply for pumping and filtration	refridgeration	primary source of power for base and dispatch centers	primary for lights, refridgeration	primary source of power for all healthcare facilties
Natural Gas	Some disrict offices use NG for heat and one 50 MW generator can use NG for fuel									cooking	primary method for some sites' water & facility heating	heating, cooking	primary method for some sites' water & facility heating
Propane	District Office heat	Used for peaking mixed with air as a substitute for NG					Fuel for Generators fixed and portable and Technicians' heaters (buckets and manhole)		Fuels for back-up generators	cooking	primary method for some sites' water & facility heating	heating, cooking	primary method for some sites' water & facility heating
#2 Fuel Oil	District Office heat						Facility heating		Heat at control and chlorination facilities		primary method for some sites' water & facility heating	heat	primary method for some sites' water & facility heating
Gasoline	Larger districts have their own gas supplies; rely on 3rd party gas providers for fuel for smaller pickups.	Repair Vehicles					Primary fuel source for vehicles, generators, chain saws, etc.	Repair Vehicles	Maintenance and Repair Vehicles	Delivery Vehicles	primary emergency response vehcile fuel for many agencies	some generators, food delivery vehicles	back-up generator fuel for some hospitals and EMS
Diesel Fuel	Larger districts have their own diesel supplies; rely on 3rd party diesel providers for fuel for smaller pickups.	Repair Vehicles	Delivery Trucks	Delivery Trucks	Delivery Trucks		Fuel for Generators, vehicles.	Truck Fuel	Generator and Truck Fuel	Delivery Vehicles	primary emergency response vehcile fuel for many agencies	Fuel for Generators	back-up generator fuel for many hospitals and EMS
Telecom	Utilties rely on telecom providers for land lines and cell phones.	Communications	Communications for coordination of delivery and supply	Communications for coordination of delivery and supply	Communications for coordination of delivery and supply	Communications between service restoration crews and outage notification calls		Communications between road crews and 511 notification	Communication of status of repair,notifications to public	Communications for coordination of delivery supply	Communications between emergency responders	Notification to public of emergency shelter location	Health and safety of personnel access to medical records
Transportation	Need the road system to gain access to facilities and have needed supplies are trucked in.	Roads open for repairs and monitoring	Roads Open for Deliveries	Roads Open for Deliveries	Roads Open for Deliveries	Roads Open for Deliveries	Access to damage locations		Internal Fleet	Roads Delivery Vehicles	critical resource for access to/movement of patients	deliveries (food supplies), moving people	critical resource for movement of patients
Potable Water	Water source or it could be supplied via bottled water.						Health and safety of personnel	For crews		Food Preparation	Drinking	Food Preparation, drinking	critical resource for access, treatment & movement of patients
Food	Needed to keep large numbers of workers fed 3-4 times a day.						Health and safety of personnel	For Crews			critical resource for responders/patients during long events	Food for Occupants	critical resource for all residential/inpatient care facilites
Emergency Response	Emergency responders (fire, police) play a key role in "making safe" downed lines until utility crews can respond.						Securing of hazardous sites to allow restoration of services						critical resource for all residential/inpatient care facilites
Shelter	Need to keep the armies of workers (at times, scores) housed in area hotels.						Health and safety of equipment and personnel				critical resource for responders/patients during long events		critical aspect of all residential/inpatient care facilites
Medical Care	Needs to be available						Health and safety of equipment and personnel				critical resource to treat/transport injured responders	mental health counselors	

Vermont Energy Assurance Plan

Appendix F

State Support Function 12 (Energy)

STATE SUPPORT FUNCTION (SSF) 12
ENERGY

VTEOP Annex L

PRIMARY: Department of Public Service

SUPPORT: Agency of Agriculture, Food and Markets; Agency of Natural Resources; Agency of Transportation; Department of Buildings & General Services; Department of Labor; Department of Public Safety, Division of Emergency Management, Division of Fire Safety, Homeland Security Unit and State Police; Office of The Adjutant General, VT National Guard;

I. INTRODUCTION

A. Energy includes producing, refining, transporting, generating, transmitting, conserving, building, and maintaining oil, electric and gas energy system components. Damage to a system can have a rippling effect on supplies, distribution, or other transmission systems.

B. SSF-12 will closely monitor the fuel oil and propane suppliers and electric and natural gas utilities operating in the state to ensure the integrity of power supply systems are maintained during emergency situations and any damages incurred are repaired and services restored in an efficient and expedient manner. SSF-12 will have primary responsibility to monitor the availability of electric utility generating capacity and reserves, the availability and supply of fuel oil, propane, and natural gas, supply and transportation of generation fuels, and emergency power. SSF-12 will also monitor and advise in the restoration of electric, fuel oil, propane, and natural gas services for normal community functioning.

II. MISSION

SSF-12 assists in the provision of emergency power and other energy sources to support emergency response and recovery efforts and normalize community functions in the restoration of non-telecommunications utility systems as well as fuel oil and propane supplies damaged as a result of disasters. Support includes, but is not limited to: assessing energy and utility system damages, supply and requirements to restore such systems; offering advice to local governments in assessing emergency power needs and priorities. and providing emergency information, education, and conservation guidance to the general public concerning energy and utility services.

III. CONCEPT OF OPERATIONS

A. The Department of Public Service is responsible for the coordination of all SSF-12 administrative, management, planning, training, preparedness, and mitigation, response, and recovery activities to include developing, coordinating, and maintaining the SSF-12 SOP. All SSF-12 supporting agencies will assist the Department of Public Service in the planning and execution of the above.

B. Coordination with all supporting and other appropriate departments/agencies, organizations and utilities will be performed to ensure operational readiness.

C. Owners and operators of investor-owned (private), and public utilities systems shall be responsible for the activation of plans for appropriate allocation of resources of personnel, equipment and services to maintain or restore utility service under their control.

D. In coordination with, and in support of, the State-Rapid Assessment & Assistance Team (S-RAAT), assess the situation (both pre- and post-event), and in coordination with local emergency management officials, assist in developing strategies to respond to the emergency.

E. Considerations for allocation of energy resources will include but are not limited to:

1. Coordinating with state agencies and emergency response organizations to monitor fuel supply availability.

2. Providing technical support of emergency activities being conducted by local EOCs or state SSFs as requested through the SEOC.

3. Coordinating with utility representatives to determine emergency response and recovery needs.

4. Assist SSF-6 and local EOCs to identify emergency shelter power needs and provide SSF-12 support agencies and other SSFs with assistance in assessing resources for emergency power generation.

V. SSF ACTIONS

The emergency operations necessary for the performance of this function include but are not limited to:

A. Preparedness

1. Develop and maintain current directories of suppliers of services and products associated with this function.

2. Establish liaison with support agencies and energy-related organizations.

3. Promote and assist in developing mutual assistance compacts with the suppliers of all power resources.

B. Response

1. Provide status of energy resources to the SEOC Operations Section at least daily and, when possible, provide data by county.

2. Provide energy emergency information, education and conservation guidance to the public in coordination with the SEOC Public Information Officer.

3. Assist with security for vital energy supplies with SSF-13.

4. Continual monitor the status of energy systems and the progress of utility repair and restoration activities.

5. Recommend energy conservation measures.

6. Collect and provide energy damage assessment data to SSF-3.

C. Recovery

1. Maintain coordination with all supporting agencies and organizations on operational priorities and emergency repair and restoration.

2. Continue to provide energy emergency information, education and conservation guidance to the public in coordination with the SSF 13 (Public Information).

3. Anticipate and plan for arrival of, and coordination with, ESF-12 and Department of Energy personnel in the SEOC and the Joint Field Office (JFO).

4. Continue to conduct restoration operations until all services have been restored.

5. Ensure that SSF-12 team members maintain appropriate records of costs incurred during the event.

D. Mitigation

1. Anticipate and plan for mitigation measures.

2. Support requests and directives resulting from the Governor and/or FEMA concerning mitigation and/or re-development activities.

3. Document matters that may be needed for inclusion in agency or state/federal briefings, situation reports and action plans.

VI. RESPONSIBILITIES

A. Department of Public Service

1. Identify, train, and assign PSD personnel to staff SSF-12 in the SEOC.

2. Maintain communications with electric utilities in responding to and recovering from emergencies regarding electric generating capacity shortages, electric generating fuel shortages, transmission and distribution line outages, and electrical service outages affecting the public.

3. Monitor the provision of temporary, alternate, or interim sources of natural gas supply and electric power.

4. Develop protocols to monitor the following:

a. State electric generating capacity.

b. State electric demand.

c. Outages by county and other jurisdictions, number of customers impacted, and estimated restoration time.

d. Status of major generating unit outages.

e. Expected duration of outages.

f. Explanation of utility planned actions and recommendations of agency actions in support of utilities.

g. Status of natural gas pipelines.

B. Agency of Agriculture, Food and Markets

1. Identify, train, and assign personnel to maintain contact with and prepare to execute missions in support of SSF-12 during periods of activation.

2. When requested, the Agency will provide information and recommendations concerning the impact of loss or shortage of energy resources on the agricultural community. The Agency will be provided the geographical extent of the outage, and then will let the EOC know if there are any farms in need of assistance.

C. Agency of Natural Resources

1. Identify, train, and assign personnel to maintain contact with and prepare to execute missions in support of SSF-12 during periods of activation.

2. Coordinate with and support all parties in debris management decisions and actions.

3. Develop and maintain a debris management plan as a component of the state emergency operations plan, and apply it as appropriate in responding to and recovering from emergencies that generate debris, both natural and man-made.

4. Provide expertise and human resources in forest resource damage assessment and management as an element in emergency response and recovery.

D. Agency of Transportation

1. Identify, train, and assign personnel to maintain contact with and prepare to execute missions in support of SSF-12 during periods of activation.

2. Apply necessary state resources, to include debris removal, in accordance with established priorities in response to an emergency. (An SSF 3 Function)

3. Be prepared to assist in providing and/or coordinating transportation for critical energy resources. (An SSF 1 Function)

E. Department of Buildings and General Services

1. Identify, train, and assign personnel to maintain contact with and prepare to execute missions in support of SSF-12 during periods of activation.

2. Maintain and report the status of critical state facilities to SSF 12.

3. Be prepared identify and acquire supplemental energy resources to support State facilities.

F. Department of Labor

1. Identify, train, and assign personnel to maintain contact with and prepare to execute missions in support of SSF-12 during periods of activation.

2. Be prepared to provide technical assistance for worker health and safety during periods of disaster in accordance with the SEOP, Annex XI, Worker Safety and Health.

G. Department of Public Safety

1. Emergency Management Division

   a. Make notifications of supporting agencies as requested by the lead agency.

   b. Provide communications and equipment to support operations in the SEOC.

2. Fire Safety Division

   a, Identify, train, and assign personnel to maintain contact with and prepare to execute missions in support of SSF-12 during periods of activation.

   b. Be prepared to provide or coordinate household or facility safety inspections, as needed, prior to use or reoccupation.

3. Homeland Security Unit

   a. Provide information to SSF-12 concerning general and sector-specific Threat Condition Levels.

b. Provide coordination for the implementation of protective actions or measures related to any change in Threat Condition level.

c. Provide assistance and coordination for Critical Infrastructure/Key Resources (CI/KR) preparedness, protection, response, recovery, restoration, and continuity of operations relative to the Vermont Critical Infrastructure Protection Program (VCIPP), National Response Framework (NRF) coordinating structures, National Incident Management System (NIMS) guiding principles and all Homeland Security Presidential directives.

d. Provide assistance and coordination to expedite information sharing and analysis of actual or potential impacts to CI/KR.

e. Facilitate requests for assistance and information from public- and private-sector partners in accordance with Protected Critical Infrastructure Information (PCII).

f. Provide for any necessary communication with US Department of Homeland Security.

g. Support and facilitate the operations of the Multi Agency Coordination group if activated.

4. State Police

a. Identify, train, and assign personnel to maintain contact with and prepare to execute missions in support of SSF-12 during periods of activation.

b. Plan for and coordinate security for vital energy supplies and facilities as a task of SSF-15.

H Office of the Adjutant General, VT National Guard

1. Identify, train, and assign personnel to maintain contact with and prepare to execute missions in support of SSF-7 during periods of activation.
2. Be prepared to assist in providing security to designated utility, power and energy facilities.
3. Be prepared to provide emergency power generation capability, as requested and available.

TAB A TO SSF ANNEX L (SSF - 12)
ENERGY

Contact List (Redacted).

TAB B TO SSF ANNEX 12
INCIDENT COORDINATION TEAM (ICT)
ACTIVATION & IMPLEMENTING PROCEDURES – SSF-12

The attached procedure provides general guidance to the State Support Function (SSF) Lead or other Agency Representative who is designated to staff the appropriate position as a member of the Incident Coordination Team (ICT) in the Vermont State Emergency Operations Center (SEOC), when activated in response a minor, major or catastrophic incident affecting Vermont.

The SSF Lead or Agency Representative is the Secretary/Commissioner/Director or Senior Executive or is acting on their behalf when a member of the ICT in coordinating and providing agency support during an emergency requiring a state level response.

UNUSUAL EVENT (Applies to a Vermont Yankee (VY) Event Only) or SITUATIONAL AWARENESS UPDATE

- Receive notification of VY plant status **or** expected/occurring incident not related to VY.
- Confirm notification by calling the designated 800#.
- Make any internal agency notifications, as appropriate.
- Report to the SEOC, if requested.

ALERT, SITE AREA EMERGENCY, GENERAL EMERGENCY (Applies to Vermont Yankee Event) or ICT ACTIVATION (notification for a non – Vermont Yankee incident)

- Receive notification of VY plant status **or** expected/occurring incident not related to VY.
- Confirm notification by calling the designated 800#.
- Make any internal agency notifications, as appropriate.
- Report to the SEOC as soon a possible.
- Sign in at security desk of Department of Public Safety and obtain an identification badge.
- Report to Liaison Officer or Operations Section Chief and obtain an initial situational awareness briefing.
- Open the DisasterLAN daily action log & make appropriate entries concerning information received and actions undertaken.
- Ensure adequate staffing for 24-hour coverage. Confirm names and hours of liaison staff with appropriate agencies.
- Establish filing system (may include, but not limited to, status reports, situation reports, briefing papers, assignments/mission tasking, telephone rosters, daily reports, etc).
- Establish contact with forward deployed teams or other agencies, as required. Establish reporting times for all elements.
- Identify necessary additional staffing requirements and make those notifications or contact the Resources Unit Leader of the Planning Section.
- Be prepared to coordinate or identify resources to meet support requests in your area of responsibility.
- Prepare for periodic incident coordination team situational updates.
- Conduct shift change briefings as needed.
- Retain all documentation developed in support of your activities.

DEMOBILIZATION (Applies to all incidents requiring the ICT Activation)

• Receive demobilization briefing from SEOC Director.
• Make any internal agency notifications, as appropriate.
• Retain all documentation developed in support of your activities and provide copies to the Planning Section Documentation Unit.
• Identify and update internal agency procedures, as needed.
• Make recommendations for changes to the ICT procedures or SSF Binders, as appropriate, and provide to the Planning Section Chief or SEOC Director.
• Provide additional after action comments to the VEM, Deputy Director, Preparedness & Planning as soon as possible or at a scheduled After Action Review.
• Document costs associated with the activation and provide to agency Financial Officer and the ICT Finance & Administrative Section Chief.

TAB C TO SSF ANNEX L (SSF-12)
ENERGY

UTILITIES OPERATING PROCEDURES

I. GENERAL

This appendix outlines the utilities, functions, and governmental responsibilities involved in assuring adequate utility services for the well-being and health of the citizens of Vermont and after emergency or disaster situations.

II. SITUATIONS

A. State – Utilities within Vermont are:

1. Electric Power: Much of the electricity used in Vermont is distributed over a transmission system operated by the Vermont Electric Power Company, Inc. usually referred to as VELCO. VELCO transports the electricity that various entities have purchased in the wholesale power market administered by ISO New England and other sources including generating facilities in Vermont, New England, New York and Canada. With the exception of a few, relatively small, hydroelectric facilities within the State, the major power used in Vermont is acquired from the Hydro-Quebec and ISO – New England. There are two sizable wood chip plants, one in Burlington and one in Ryegate.)

The retail power companies in Vermont are either municipal electric companies (public facilities), Rural Electric Authority (REA) cooperatives (private non-profit facilities), or investor-owned utilities (IOU). The first two groups could be eligible for Federal assistance in the event of a Major Disaster which damages their facilities. The IOU cannot receive such assistance except in extreme circumstances when the health and well being of the public is in imminent danger from power losses and the affected company could not restore service without government aid.

There are fourteen Municipal electric companies in Vermont, which could qualify for Federal disaster aid under Category “F”:

BARTON VILLAGE, INC. ELECTRIC DEPARTMENT
BURLINGTON ELECTRIC DEPARTMENT, CITY OF
ENOSBURG FALLS WATER & LIGHT DEPARTMENT, INC.,VILLAGE OF
HARDWICK ELECTRIC DEPARTMENT, TOWN OF
HYDE PARK ELECTRIC DEPARTMENT, VILLAGE OF
JACKSONVILLE ELECTRIC COMPANY, VILLAGE OF
JOHNSON WATER & LIGHT DEPARTMENT, VILLAGE OF
LUDLOW ELECTRIC LIGHT DEPARTMENT, VILLAGE OF
LYNDONVILLE ELECTRIC DEPARTMENT, VILLAGE OF
MORRISVILLE WATER & LIGHT DEPARTMENT, VILLAGE OF
NORTHFIELD ELECTRIC DEPARTMENT, VILLAGE OF
ORLEANS ELECTRIC DEPARTMENT, VILLAGE OF
STOWE ELECTRIC DEPARTMENT, TOWN OF

SWANTON VILLAGE, INC. ELECTRIC LIGHT DEPARTMENT

Damage to the system of the above organizations could be eligible for Federal disaster assistance in a Presidentially Declared Major Disaster. These utilities have associated themselves and are represented by their organization VPPSA located in Waterbury Center, Vermont.

There are only two REA Cooperatives operating within the State of Vermont which could qualify for federal aid in a Major Disaster under Category “H”:

VERMONT ELECTRIC COOPERATIVE, INC.
WASHINGTON ELECTRIC COOPERATIVE, INC.

Damage to the systems of these organizations could be eligible for Federal assistance following the Declaration of a Major Disaster by the President. Applications would be required to be made through the community which the damage occurred.

2. Natural Gas: There is one natural gas utility that supplies northwestern Vermont. The gas comes from Canada under contract with Trans-Canada Pipeline, Ltd. The delivery is made by:

VERMONT GAS SYSTEMS, INC.

Service is provided primarily in Burlington and St. Albans areas. Vermont Gas Systems, Inc. is a private company and therefore would not qualify for Federal assistance per public utility or private non-profit facility criteria.

3. Propane Gas: Propane gas in Vermont is sold by bottle or delivered to Bulk tanks on the customer’s properties.

NOTE: Federal statutes regulate propane gas installations which are administered by the Vermont Department of Public Service.

4. Telephone: The majority of telephone lines within Vermont are above ground and vulnerable to weather and other natural disasters, as well as acts of war or terrorism.

The companies operating telephone systems in Vermont are privately owned, and could not qualify for Federal disaster assistance as either public or private non-profit facilities.

5. Sewage Treatment Plants: All Vermont cities and many of the larger towns have sewage treatment plants. Damage to these facilities may qualify for Federal Disaster Assistance under Category “F” in a “Major Disaster.”

Private systems could possibly receive Small Business Administration (SBA) or Individual and Family Grand Program (IFGP) assistance.

6. Water Supply and Distribution: A number of communities in Vermont have public water systems, which typically serve a substantial segment of the population. Damage to any municipal water facility can qualify for aid as Public Utilities under Category “F.”

Almost all rural areas have individual water supply systems, with a few non-profit cooperatives and very small private companies delivering the remainder of water services. The Small

Business Administration (SBA) and/or the Farmer's Home Administration may provide loans to restore such systems, and the Individual and Family Grant Program (IFGP) may assist in restoring private wills and springs for qualified applicants.

B. Federal – FEMA Handbook D R & R 2, Chapter 7 (Categories F and H)

The President is authorized to make contributions to State and/or local governments to help repair, restore, reconstruct or replace public facilities owned by a governmental entity or a private non-profit organization which are damaged or destroyed by a Major Disaster. Public facilities include utilities, which are defined as "structures or systems of any electric power, water supply and distribution, sewage collection and treatment, telephone, gas distribution or similar public service."

III. RESPONSIBILITIES

A. Department of Public Service

The Department of Public Service is responsible for the regulation and general supervision of utility companies within the State of Vermont. The companies under this jurisdiction are engaged in:

1. Production, transmission, distribution and sale of natural gas or electric power for lighting, heating or power.

2. Collection, sale and distribution of water for domestic, industrial, business or fire protection services, other than municipalities and/or cooperative fire districts.

3. Construction and maintenance of some of the dams and storage reservoirs for the purpose of power to be developed, or for the benefit of waterpower development or undeveloped. (Includes in-state hydro-electric facilities)

4. Operating telephone lines, stations and exchanges.

5. Liaison with the nuclear power plant in Vernon regarding safety and operational matters.

The Public Service Board is empowered to order an electric company to transport electric energy over its lines to alleviate a power shortage within the State.

The Department of Public Service will act in an advisory or informational capacity relating to utilities within its jurisdiction providing coordination and assistance to Vermont Emergency Management and/or the State Coordinating Officer (SCO) during emergencies or disasters.

The Department may provide advice to support the Agency of Natural resources in the conduct of damage assessment and the preparation of Damage Survey Reports (DSRs) involving utilities.

B. Agency of Natural Resources

The Agency of Natural Resources is responsible for providing teams to conduct damage assessment and prepare Damage Survey Reports (DSRs) and Final Inspections of municipal water systems and sewage plants, and dams following a Presidential Declaration of a Major Disaster.

Vermont Energy Assurance Plan

Appendix G

SEOP Annex M
Department of Public Service

AGENCY ANNEX M
DEPARTMENT OF PUBLIC SERVICE

I. MISSION

To fulfill statutory obligations relating to public service corporations, firms and individuals engaged in such business.

II. AUTHORITY

Title 3 VSA - Section 212
Title 30 VSA

III. SITUATION AND ASSUMPTIONS

State agency and department heads and their staffs develop, plan and train to internal policies and procedures to meet preparedness, mitigation, response and recovery needs as identified in this plan including annexes, appendices, tabs and other supporting documents including the State Hazard Mitigation Plan. Training includes not only what may be accomplished within the agency but multi-level, interagency training and exercises to develop and maintain necessary capabilities.

Emergency or disaster situations within Vermont have the potential of incapacitating the delivery of utility services such as electric power, natural and propane gas and other energy resources, water and telecommunications. Emergency or disaster situations can also affect the supplies of non-utility petroleum fuels such as gasoline, diesel fuel, heating oil, and propane.

The situation and assumptions in section ii of the Base Plan also apply.

IV. ORGANIZATION AND RESPONSIBILITIES

The Department of Public Service is one of two[1] divisions of Vermont State government responsible for the regulation and supervision of companies engaged in: electricity generation, transmission, distribution and sale; natural gas transmission, distribution and sale; telecommunications provisioning and sales of facilities-based wire-line services; cable television provisioning and sale; and the financial aspects of privately-owned water companies. The Department is headed by a Commissioner, who is appointed by the Governor.

The Department will assist in the response and recovery of utility companies as provided in the annexes for State Support Functions 2 and 12 included as part of the Vermont State Emergency Operations Plan.

The Department has the capability of providing support engineering personnel to assist in reviewing incident reports involving electric, gas, and telecommunications utilities.

The Department's Electric Engineer is responsible for reviewing electric utility infrastructure

[1] The other division of State government involved in the regulation of public service companies is the Public Service Board, which is not involved in Emergency Management activities.

projects, and staffs the State Emergency Operations Center during emergencies.

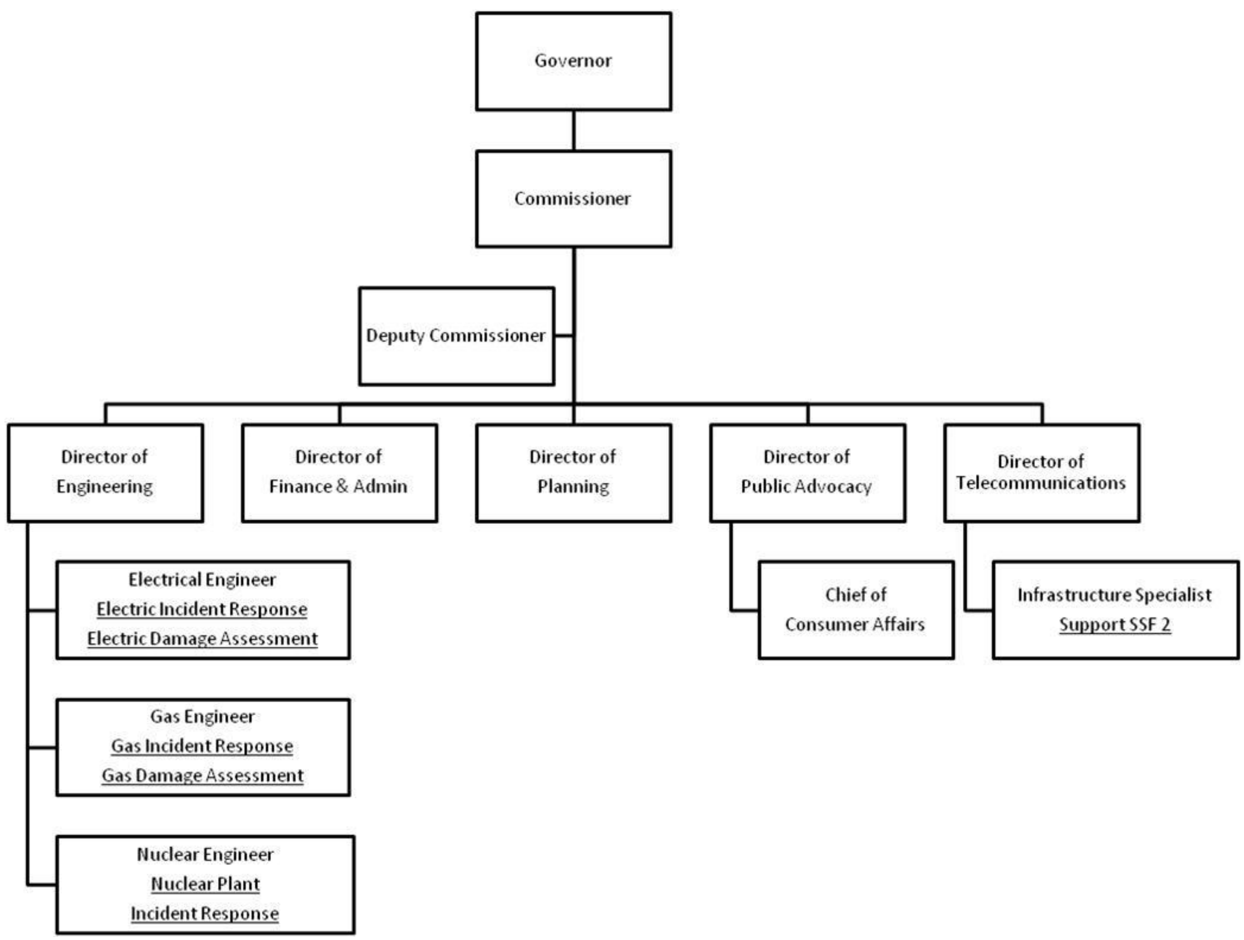
The Department's Gas Engineer is responsible for assessing the gas utility's emergency procedures and response performance for any gas leak events.

The Department's Nuclear Engineer examines the operation of Vermont Yankee and the effects of proposed actions and plant shutdowns upon the safety of plant personnel and, in conjunction with the Vermont Department of Health, the safety of the surrounding population.

The Department's Telecommunications Infrastructure Specialist provides support to State Support Function 2 (Telecommunications), as needed, with respect to the status of telecommunications infrastructure.

The following chart outlines the emergency response organization of the Agency:

DEPARTMENT OF PUBLIC SERVICE -EMERGENCY RESPONSE



The Department is the lead agency for State Support Function #12 (Energy) and is a support agency for State Support Function #2 (Communications), #5 (Emergency Management, Recovery & Mitigation), and State Support Function #14 (Public Information) and assumes the responsibilities as outlined in those annexes. The Department is also a participating agency in the Recovery and Restoration Multi-Agency Coordination Group as designated in the Disaster Recovery and Restoration Annex.

V. IMPLEMENTATION

This Annex will be implemented with the assigned responsibilities by means of direct coordination from the Commissioner, Department of Public Safety or Director, VEM with the Commissioner and/or upon the order of the Governor within the framework of the State Emergency Operations Plan (SEOP).

VI. ADMINISTRATION

The Commissioner is responsible for the overall emergency response of the Department.

VII. CONTINUITY OF GOVERNMENT

In accordance with the provisions of Title 20, "agency heads will in addition to any deputy authorized pursuant to law, designate by title three emergency interim successors and specify their order of succession. These designations shall, each year, be reviewed and revised, as necessary, to ensure their current status."

Line of succession for day-to-day operation of the Department of Public Service is as follows:

1) Deputy Commissioner, 2) Director of Engineering, 3) Director for Public Advocacy, 4) Director of Telecommunications.

Vermont Energy Assurance Plan

Appendix H

Legal Authorities

Legal authority for the Vermont Department of Public Service is codified in the Vermont Statutes Annotated (V.S.A.) Title 30. Chapter 1 (§§ 1 – 34) provides the appointment, general powers and duties of the Department of Public Service. Listed below are some additional relevant portions of the statute with respect to state policy and planning (note: the items below are a summary of the statute, and not necessarily the full or exact text of the statute).

§ 202. Electrical energy planning
The Department of Public Service shall be the responsible utility planning agency of the state for the purpose of obtaining for all consumers in the state proper utility service at minimum cost under efficient and economical management consistent with other public policy of the state. The director shall be responsible for the provision of plans for meeting emerging trends related to electrical energy demand, supply, safety and conservation. The Department shall prepare an electrical energy plan for the state. The plan shall be for a 20-year period and shall serve as a basis for state electrical energy policy. The electric energy plan shall be based on the principles of "least cost integrated planning" set out in and developed under section 218c of this title.

§ 202a State energy policy
The State energy policy is to assure that Vermont can meet its energy needs in a manner that is adequate, reliable, secure and sustainable; that assures affordability and encourages the state's economic vitality, the efficient use of energy resources and cost effective demand side management; and that is environmentally sound.

§ 202b. State comprehensive energy plan:
(a) The Department of Public Service, in conjunction with other state agencies designated by the governor, shall prepare a comprehensive state energy plan covering at least a 20-year period. The plan shall seek to implement the state energy policy set forth in section 202a of this title. The plan shall include:

(1) A comprehensive analysis and projections regarding the use, cost, supply and environmental effects of all forms of energy resources used within Vermont.
(2) Recommendations for state implementation actions, regulation, legislation, and other public and private action to carry out the comprehensive energy plan.

§ 202c. State telecommunications; policy and planning
The general assembly finds that advances in telecommunications technology and changes in federal regulatory policy are rapidly reshaping telecommunications services, thereby promising the people and businesses of the state improved communication and access to information, while creating new challenges for maintaining a robust, modern telecommunications network in Vermont. Therefore, to direct the benefits of improved telecommunications technology to all Vermonters, it is the purpose of this section and section 202d of this title to establish policies and a plan to accomplish the communication goals.

§ 202d. Telecommunications plan
The Department of Public Service shall prepare a telecommunications plan for the state. The Department of Innovation and Information and the Agency of Commerce and Community Development shall assist the DPS in preparing the plan. The plan shall be for a seven-year period and shall serve as a basis for state telecommunications policy.

§ 218c. Least cost integrated planning
A "least cost integrated plan" for a regulated electric or gas utility is a plan for meeting the public's need for energy services, after safety concerns are addressed, at the lowest present value life cycle cost, including environmental and economic costs, through a strategy combining investments and expenditures

on energy supply, transmission and distribution capacity, transmission and distribution efficiency, and comprehensive energy efficiency programs. Each regulated electric or gas company shall prepare and implement a least cost integrated plan for the provision of energy services to its Vermont customers.

§ 219a Self-generation and net metering

Net metering is a method of metering a facility for generation of electricity that is of no more than 500 kW capacity, operates in parallel with the electric distribution system, is intended primarily to offset the customer's own electricity requirements, is located on the customer's premises or, in the case of a group net metering system, on the premises of a customer who is a member of the group, and employs a renewable energy source as defined in subdivision 8002(17) of this title or is a qualified micro-combined heat and power system of 20 kW or fewer that meets the definition of combined heat and power in 10 V.S.A. § 6523(b) and may use any fuel source that meets air quality standards.

§ 8001. Renewable energy goals

This statute section lays out the goals that the state wishes to achieve for its renewable portfolio to enable the state to reduce its overall carbon footprint. The general assembly finds it in the interest of the people of the state to promote the state energy policy established in section 202a of this title and this section lays out the paths to reach the renewable energy goals through various incentives for developers and utilities to implement renewable energy generation projects.

§ 8005 Sustainably Priced Energy Enterprise Development (SPEED) program; total renewables targets

One function of this section is to issue standard offers for SPEED resources in accordance with section 8005a of this title One goal of this program is to maximize the benefit to rate payers from the sale of tradable renewable energy credits. This section, in accordance with section 8005a of this section, requires all Vermont retail electricity providers to purchase from the SPEED facilitator the power generated by the plants that accept the standard offer required to be issued under section 8005a.

§ 8005a SPEED; standard offer program

Section 8005a establishes a standard offer program within the SPEED program to achieve the goals of section 8001 of this title, the Public Service Board (PSB) shall issue standard offers for renewable energy plants that meet the eligibility requirements of this section. The board shall implement these standard offers through the SPEED facilitator. To be eligible for a standard offer under this section, a plant must constitute a qualifying small power production facility, must not be a net metering system, and must be a new standard offer plant. For the purpose of this section, "new standard offer plant" means a renewable energy plant that is located in Vermont, that has a plant capacity of 2.2 MW or less, and that is commissioned on or after September 30, 2009.