

VERMONT ENERGY GLOSSARY
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Terms in italics are defined in this glossary

British thermal unit (Btu):

A Btu is the standard measurement used to state the amount of energy a fuel could generate and the amount of output of any heat generating device. One Btu is the amount of energy needed to raise one pound of water one degree Fahrenheit (F) at 39°F. For example, propane has about 15,000 Btus per pound, and charcoal has about 9,000 Btus per pound.

Capacity:

The capacity of an electrical system refers to the amount of energy the system can manage at peak performance, rather than the amount of energy it will actually manage at any given point in time. For example, the capacity of a particular wire would measure the electricity that can safely flow through the wire without overheating the wire.

Capacity also refers to the amount of energy a particular generator is capable of generating, when operated according to manufacturer specifications. Installed generator capacity is commonly expressed in *megawatts*.

Capacity factor:

The ratio of electrical energy actually produced by a generating unit over a specific period of time compared to the electrical energy that could have been produced at continuous full power operation during the same period.

Carbon accounting:

Carbon accounting refers to the act of measuring and reporting on the *greenhouse gas* emissions of an organization or activity. Organizations may purchase “carbon credits” to offset the emissions resulting from an activity or operation. A common goal is “carbon neutrality,” meaning that the amount of emissions released by a particular activity has been eliminated or offset by the reduction of emissions elsewhere.

Certificate of public good (CPG):

Any person, partnership, or association which desires to own or operate a business over which the *Public Utility Commission* (PUC) has jurisdiction must petition the board for a CPG, which is a determination that the operation of a particular business will promote the general good of the state. Businesses requiring a CPG include companies that are engaged in: (1) the manufacture, distribution, transmission, or sale of gas or electricity; (2) the collection, sale, or distribution of nonmunicipal water resources; (3) the collection or disposal of nonmunicipal wastewater or domestic sewage for 750 households or more; and (4) telecommunications services.

In addition, a CPG is required under 30 V.S.A. § 248 (Section 248) prior to certain electric and natural gas purchases, investments, or facilities. Section 248 CPGs are required for long-term utility purchases of electric capacity or energy from outside the state. They are also required for utility investments in out-of-state electric generation and

transmission facilities. Section 248 CPGs also must be obtained prior to construction of or site preparation for in-state electric generation and transmission facilities and for natural gas transmission lines, storage facilities, manufactured gas facilities, and any structure incidental to such a natural gas facility.

In making its determination under Section 248, the *PUC* considers factors such as the project's economic benefit to the state, consistency with the utility's least cost integrated plan, necessity to meet present and future need for services, and any issue relevant to the general good of the state. For an in-state facility, the PUC also considers environmental and land use siting criteria such as whether the proposal would have an adverse effect on aesthetics, historic sites, air and water purity, the natural environment, or public health and safety.

Climate change:

Climate change refers to any significant change in measures of the global climate lasting for an extended period. Climate change may result from natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun, and from human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.). See: *Greenhouse gases*.

Combined heat and power plant (CHP):

A plant designed to produce both heat and electricity from a single source.

Comprehensive Energy Plan (CEP):

By statute, the Comprehensive Energy Plan is prepared by the *DPS*, in coordination with other state agencies and through a process that includes opportunity for public comment. It sets forth recommendations on how to implement the State's energy policy. The CEP is to be updated every six years. It includes: (a) analyses and projections regarding Vermont's energy resources, (2) recommendations for implementation actions by the State and others, and (3) recommendations for regional and municipal planning and standards for issuing a *determination of energy compliance*. *DPS* also prepares an *Electric Energy Plan* that, by statute, forms the electric energy portion of the CEP.

Demand:

Demand refers to the amount of electricity being used at any given moment by a single customer or by a group of customers. Demand is synonymous with load. Demand is often measured over time, in *megawatt hours*.

System demand is measured in *megawatts* and represents the sum of all of the individual demands on the system occurring at the same moment. The peak demand is the highest demand occurring within a given span of time, usually a season or a year. The peak demand that a *transmission or distribution* system must carry sets the minimum requirement for its *capacity*.

Demand-side management:

Deliberate intervention in the marketplace by a utility or other entity acting to influence *demand* for electric power or natural gas or to shift the *demand* to different times to capture cost savings. Examples of demand-side management include: insulating buildings to increase efficiency, using efficient home appliances, transitioning from incandescent light bulbs to compact fluorescents or LEDs, and encouraging customers to shift non-critical usage of electricity from high-use to low-use periods.

Department of Public Service (DPS):

The DPS is an agency within the executive branch of Vermont state government. Its charge is to represent the interests of the people of the state in cases before the *PUC*. In rate proceedings before the *PUC*, the DPS is charged with representing the interests of the consuming public and, in doing so, is required to give heightened consideration to ratepayer groups not independently represented, such as residential, low-income, and small business consumers. The DPS also issues long-term energy, electric, and telecommunications plans.

Determination of energy compliance:

As part of electric generation siting, regional planning commissions and municipalities have the option to seek an affirmative determination of energy compliance in order to obtain greater weight in the siting proceeding. To receive the determination, the plan must meet various requirements, including statutory goals for greenhouse gas reductions, renewable energy, and building efficiency, the *RES*, state energy plans, and statutory energy policy. Regional planning commissions may obtain an affirmative determination from the Commissioner of Public Service. A municipality may receive an affirmative determination from the regional planning commission if the regional plan has obtained one. An affirmative determination of energy compliance entitles the specific policies and land conservation measures of a regional or municipal plan to *substantial deference* when the *PUC* is deciding whether to issue a *certificate of public good* for an in-state electric generation facility.

Distributed generation (DG):

Generally, DG refers to the concept of spreading sources of electrical *generation* throughout a service area, rather than relying solely on large, centralized generation such as traditional power plants. Distributed generation may support the reliability of the State's electric system; reduce line losses; contribute to avoiding or deferring improvements to that system necessitated by transmission or distribution constraints; and diversify the size and type of resources connected to that system. Typically, DG consists of small-scale electric power generation units connected directly to the distribution network or connected to the network on the customer side of the meter. See, e.g., *Net metering*.

Distribution line or pipe:

In an electric grid, distribution lines and distribution substations carry electricity from the transmission system to local customers. These lines operate at lower voltage than the transmission systems that feed them. When compared to *transmission lines*,

distribution lines generally use shorter poles, have shorter wire spans between poles, and are often found near streets and roads or buried beneath them. However, in Vermont, many distribution lines originally were built off-road across farm fields or other areas due to the state's rural nature.

In a natural gas system, distribution lines, also known as “mains,” are pipes that carry natural gas from local distribution centers to customers. They range in size from two to more than 24 inches in diameter and are operated at differing pressures, but generally, the closer the gas gets to the customer, the lower the pressure is. Compared to *transmission lines*, distribution lines are much smaller.

Distributed renewable generation category (a/k/a Tier 2):

The distributed renewable generation category of the *RES* generally refers to a *renewable energy* plant that is “new” renewable energy (in service after June 30, 2015) and that is either: (a) five *megawatts* or less and directly connected to the Vermont grid or (b) an approved *net metering* system. The *RES* requires that this category represent one percent of each electric *distribution utility's* annual retail sales during 2017, rising an additional three-fifths of a percent to 10 percent on and after January 1, 2032.

Distribution utility:

A distribution utility is the regulated owner and operator of the distribution system serving retail customers. In the State of Vermont, an electric distribution utility is responsible for owning, operating, and maintaining the distribution portion of the electric system within a specified area. Seventeen electric distribution companies serve Vermonters, ranging in size from the Village of Orleans Electric Department with approximately 670 customers to Green Mountain Power Corp. with approximately 255,000 customers. In addition, Vermont Gas Systems is Vermont's single natural gas distribution utility.

District heating:

A system for distributing heat generated in a centralized location to meet community residential and commercial heating requirements. Such systems replace the need for individual, building-based boilers and furnaces. In a district heating system, pipelines from the source of energy distribute thermal energy in the form of hot water or steam. Heat is then extracted at the buildings and the water is brought back to the energy source, through return pipes, to be heated again. District heating systems may be powered by various means, including biomass, heat-only boiler stations, geothermal energy, and fossil fuels.

Electric cooperative:

Electric cooperatives (co-ops) are run by a board of directors elected by co-op member-owners. Members purchase electricity, energy savings products, and other goods and services from the co-op. Vermont has two electric cooperatives: Washington Electric Cooperative (WEC) and Vermont Electric Cooperative (VEC).

Electric Energy Plan:

Also known as the Twenty Year Electric Plan, the Electric Energy Plan is prepared by the *DPS* pursuant to statute. The Plan is to be for a 20-year period and serve as the basis for state electrical energy policy. The statute requires that the Plan include various items, including an overview of state energy needs, looking ahead 20 years; an assessment of electric energy resources available; and recommendations for regional and municipal planning and standards for issuing a *determination of energy compliance*. It is issued after a public process that includes opportunity for comment. It is updated on the same schedule as the *CEP* and forms the electric energy portion of the *CEP*.

Energy (electric):

Electric energy refers to the generation or use of electric power over a period, usually expressed in *megawatt-hours* or *kilowatt-hours*, as opposed to electric *capacity*, which is measured in *megawatts* or *kilowatts*.

Energy efficiency:

Energy efficiency refers to the relative thrift or extravagance with which energy inputs are used to provide the same goods or services (e.g., powering a light bulb). Increases in energy efficiency take place when either energy inputs are reduced for a given level of service or levels of service are increased for a given amount of energy inputs (e.g., purchase more efficient bulb). Energy conservation, on the other hand, refers to efforts made to reduce total energy consumption (e.g., turn out the lights).

Energy efficiency charge:

A charge to Vermont's electric or natural gas ratepayers, based on the amount of electricity or natural gas they consume, that is included on their regular utility bills. Customers pay based on consumption. For example, electric customers pay based on the number of kWh and, for customers served under a demand rate, the number of kW for which they are billed each month. Such a charge is used to fund energy efficiency programs for a *regulated fuel*, with the programs being delivered by an *energy efficiency utility*. The *Public Utility Commission* sets the rate of such a charge.

Energy efficiency utility (EEU):

In 1999, the Public Service Board (now *Public Utility Commission*), based on recommendations of the *Department of Public Service* and a settlement with Vermont utilities and other parties, created a statewide energy efficiency utility (EEU). The EEU's purpose is to support targeted *energy efficiency* programs that reduce the electricity usage of businesses and individuals. The Vermont Energy Investment Corporation operates Vermont's EEU under the name *Efficiency Vermont*. However, the City of Burlington Electric Department is the EEU for its service territory.

From 2000 to 2009, *Efficiency Vermont* provided efficiency services on a series of three-year contracts. In 2009, pursuant to statutory authorization, the *PUC* modified this relationship, moving to the model of an "order of appointment" for a 12-year period.

Originally the activities of the EEU related solely to electric energy efficiency, funded by the *energy efficiency charge*. In 2007, the statutes were amended to allow the EEU to deliver energy efficiency services to heating and process-fuel consumers. These

services are funded by monies raised through the EEU's activities in the *forward capacity market* and the sale of carbon allowances under the *Regional Greenhouse Gas Initiative*. In 2015, the *Public Utility Commission* appointed Vermont Gas Systems as an EEU to deliver natural gas efficiency services.

Entergy Nuclear Operations:

Entergy Nuclear Operations, Inc. (ENO) operated the *Vermont Yankee Nuclear Power Station*. ENO is a subsidiary through an intermediate corporation of Entergy Corp. and operates five other nuclear plants, with one located in Massachusetts, three in New York, and one in Michigan.

Entergy Nuclear Vermont Yankee:

Entergy Nuclear Vermont Yankee, LLC (ENVY) is the owner of the *Vermont Yankee Nuclear Power Station*. ENVY is a subsidiary through intermediate corporations of Entergy Corp. and is a limited liability corporation with three primary assets: the VYNPS, any associated power contracts, and the ability to access, for the purpose of decommissioning, a trust fund established for the station. In 2016, ENVY announced a proposal to sell the VYNPS to NorthStar Group Services Inc.

Energy transformation category (a/k/a Tier 3):

A utility may meet the energy transformation category of the *RES* through distributed renewable generation that is in addition to the *distributed renewable generation category* of the *RES*, through the support of *energy transformation projects*, or through a combination of the two. The *RES* requires that this category represent two percent of retail electric sales in 2017, rising to 12 percent in 2032.

Energy transformation project:

In the context of the *RES*, an energy transformation project is an undertaking that delivers energy goods or services other than electric generation and results in a net reduction in fossil fuels consumed by the utility's customers and greenhouse gas emissions associated with that consumption. Examples include home weatherization projects, air source heat pumps, biomass heating systems, and infrastructure for the storage of renewable energy on the electric grid. To be eligible to meet the *RES*, an energy transformation project must commence on or after Jan. 1, 2015.

Environmental attributes:

Environmental attributes quantify the impact on the environment of various energy generation options. Often, *renewable energy* is generated in locations inconvenient to potential renewable energy purchasers. By separating the environmental benefits or attributes of renewable energy from the underlying electricity, energy purchasers can support the growth of renewable energy regardless of physical location. This separation of green attributes from power creates two tradable commodities, power and *renewable energy certificates* or RECs. RECs represent the environmental, social, and other benefits (environmental attributes) of renewable energy generation.

Federal Energy Regulatory Commission (FERC):

A federal agency created in 1977 to regulate, among other things, interstate wholesale sales and transportation of natural gas and electricity at “just and reasonable” rates. FERC has jurisdiction over wholesale electric rates and seeks to promote access to and wholesale competition on the interstate electric transmission system by requiring electric transmission utilities to have “open access transmission tariffs.” FERC also regulates the reliability of the interstate electric transmission system through mandatory federal reliability standards.

FERC’s jurisdiction over natural gas includes jurisdiction over the construction of interstate natural gas pipelines and storage facilities, including their siting and abandonment. FERC is also responsible for undertaking environmental reviews and approvals for interstate natural gas facilities, pursuant to the National Environmental Policy Act, and for issuing certificates of public convenience and necessity prior to facility construction. Once a natural gas pipeline is operational, pipeline safety is under the jurisdiction of the Department of Transportation.

Forward capacity market:

The forward capacity market is a regional market administered by *ISO-NE*. Its purpose is to provide electricity reliability at the lowest cost possible. *ISO-NE* develops forecasts for needed *demand* three years in advance and then conducts annual auctions to purchase sufficient capacity at the lowest cost possible from various entities to meet those projected needs.

Demand resources, including energy efficiency, load management, and distributed generation as well as real-time demand response can qualify as a capacity resource along with conventional supply-side resources and can be eligible to receive capacity payments.

Gate station:

A location on a natural gas system at which the pressure of natural gas to be transferred from a *transmission pipe* to a *distribution pipe* is lowered for transport through small diameter, low pressure pipelines.

Generation:

The process of producing electric energy by transforming other forms of energy. Also, the amount of electric energy produced, expressed in *kilowatt-hours*.

Greenhouse gases:

Those gases, such as water vapor, carbon dioxide, nitrous oxide, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride, that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth’s atmosphere. The net effect is a trapping of absorbed radiation and a tendency for the planet’s surface to become warmer. Greenhouse gases in the atmosphere have been linked to *climate change*.

Grid:

The layout and physical structure of systems to transport and deliver electricity. The grid includes a network of *transmission* and *distribution lines* and associated substations and equipment needed to move power from a *generation* site to the end user.

Hydro-Quebec:

Hydro-Quebec is a large producer of hydroelectric power, operating a system of generating facilities including 61 hydroelectric generating stations, eight wind farms, and several thermal generating stations capable of producing over 36,000 MW. This corporation, owned by the government of Quebec, provides electricity to Quebec, Canada, and the northeastern parts of the United States, including Vermont.

Independent System Operator of New England (ISO-NE):

ISO-NE is the *regional transmission organization* serving Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. It coordinates, controls, and monitors an electricity *transmission* grid that is larger and has much higher voltages than the typical power company's *distribution* grid. It also operates the regional wholesale market for electrical power. ISO-NE evaluates the transmission grid for reliability applying federally mandated standards. When transmission facilities must be upgraded, the upgrade costs are pooled and allocated across transmission facilities in the region according to their load share. Vermont's current load share is less than five percent of the region's total load.

Investor-owned utility (IOU):

An IOU is a commercial, for-profit utility owned by private investors, as opposed to one owned by a public trust, municipality, or cooperative membership. There are two major IOUs delivering energy products to Vermont customers: Green Mountain Power Corporation and Vermont Gas Systems, Inc. Both of these companies are owned by Gaz Metro, a Quebec company.

Kilowatt:

See: *Watt*.

Kilowatt-hour (kWh):

This is the basic unit for pricing electricity, measured as 1 kilowatt (1,000 *watts*) of power expended for one hour. One kilowatt-hour is equivalent to 3,412 *Btus* or 1,000 watt-hours.

Least-cost integrated resource plan:

For a regulated electric or gas utility in Vermont, this 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. A utility's plan is to combine investments in energy supply, *transmission* and *distribution* capacity; increases in *transmission* and *distribution* efficiency; and comprehensive *energy efficiency* programs. Economic costs are determined with due regard to the *greenhouse*

gas inventory, the state's progress in meeting its *greenhouse gas* reduction goals, and consistency with the state's renewable energy goals.

LIHEAP:

The Low Income Home Energy Assistance Program is a federal program that distributes funding to the states. States may supplement this funding with state appropriations. The states then distribute the money to low-income families to help off-set home heating and cooling costs. In Vermont, LIHEAP is implemented by the Economic Services Division in the Department of Children and Families.

Load:

See: *Demand*.

Load factor:

The ratio of the average load to peak load during a specified time interval.

Long-range transmission plan:

As part of *VELCO*'s duty to ensure reliability of Vermont's transmission system, *VELCO* is required to participate in long-term planning to identify potential *transmission* system problems early enough to fully consider solutions and incorporate public feedback. The long-range transmission plan identifies potential reliability problems and their transmission solutions and serves as the first step for additional work to analyze nontransmission alternatives (NTAs) such as local generation and *energy efficiency*. The planning process works according to the following broad steps: (1) *VELCO* performs a 20-year transmission analysis and creates a draft plan; (2) the *VSPC* reviews the draft, comments, and makes a preliminary determination of affected distribution utilities; (3) *VELCO* conducts an analysis of NTAs for bulk system problems; (4) *VELCO* releases the draft transmission plan and alternatives for public review and comment; (5) the plan is revised and analyzed based on public input, then published; and (6) solutions are selected and cost is allocated among affected utilities and *VELCO*.

Megawatt:

See: *Watt*.

Merchant generator:

A corporation, person, agency, or other legal entity or instrumentality that owns electric generating capacity and sells electricity in the competitive wholesale power market. This includes qualifying cogenerators and small power producers, and other power producers without a designated franchised service area.

Municipal electric utility:

A utility that is owned and operated by a city, town, or other municipality. The Burlington Electric Department is the largest municipal electric utility in Vermont. Other Vermont municipalities with their own utility include: Barton Village, Enosburg Falls, Hardwick, Hyde Park, Ludlow, Lyndonville, Morrisville, Northfield, Stowe, Swanton, Village of Jackson, Village of Johnson, and Village of Orleans.

Net metering:

Net metering systems permit a customer to own and operate a small generator, usually on the customer side of the meter. The amount of electricity generated by the customer serves to offset the amount of *generation* for which a customer is billed. Net metered systems are a form of *distributed generation*.

Nuclear Decommissioning Citizens Advisory Panel (NDCAP):

NDCAP is created by state law and has 19 members, including legislators, representatives of state agencies, affected municipalities, employees, the public, and the owner and operator of the *Vermont Yankee Nuclear Power Station*. The panel elects its chair and vice-chair. The Commissioner of the *Department of Public Service* provides administrative support to the panel, which meets periodically to consider issues relating to the decommissioning of the *Vermont Yankee Nuclear Power Station*. NDCAP submits an annual report to the Governor, the General Assembly, and agencies of the state.

Nuclear Regulatory Commission (NRC):

The U.S. Nuclear Regulatory Commission (NRC) was created as an independent agency by Congress in 1974 to promote the use of radioactive materials for civilian purposes and to oversee nuclear reactor safety and security, reactor licensing and renewal, radioactive material safety, and spent fuel management and disposal. The NRC regulates commercial *nuclear generating plants* and other uses of nuclear materials, such as nuclear medicine, through licensing, inspection, and enforcement.

On-bill tariffed financing:

This is a long-term financing mechanism that could be used for energy efficiency upgrades to buildings. It does not require any upfront payment or taking on personal debt; instead, improvements are paid for through charges on the utility bill for the property to which the improvements were made. Under this mechanism, the debt is connected to the property, not to an individual.

Public Utility Commission (PUC):

The PUC is a three-member board that supervises the *rates*, quality of service, and overall financial management of Vermont's public utilities: electric, gas, and telecommunications utilities; private water utilities; and large nonmunicipal wastewater companies. The PUC also supervises cable television companies, although federal law preempts most of its authority to regulate cable rates or programming. The Board reviews the environmental and economic impacts of proposals to purchase energy supply or build new energy facilities; monitors the safety of hydroelectric dams; and reviews rates paid to independent power producers. The PUC primarily operates as a quasi-judicial body, but it also has the authority to adopt rules applicable to utilities and provides administrative oversight over *Efficiency Vermont* and the *standard offer program*.

Public Utility Regulatory Policy Act (PURPA):

PURPA was passed in 1978 by the United States Congress as part of the National Energy Act. It is meant to promote greater use of domestic renewable energy. The law

requires regulated electric utilities to buy power from other more efficient producers if that cost is less than the utility's own "avoided cost" rate to the consumer. The avoided cost rate is the additional cost that the electric utility would incur if it generated the required power itself or purchased it from another source.

Rate schedule:

See: *Tariff*.

Ratemaking:

In Vermont, the *rates* charged by utility companies to end-customers are regulated. Under traditional electric utility ratemaking, electricity suppliers are paid largely according to the amount of electricity they sell or distribute. This method of ratemaking can be described as "cost plus" because under it the utility rates are set based on its cost to provide the regulated service plus a rate of return on its capital investments.

The conventional ratemaking method can be viewed as creating a disincentive to an electric utility to support *energy efficiency* and *net metering* or other forms of onsite customer generation because if customers purchase less electricity from the utility, the utility has less income to cover its fixed costs.

Some states, including Vermont, authorize alternative ratemaking strategies to provide a rate structure that balances appropriate cost recovery for utilities with other societal benefits including the promotion of *energy efficiency* and *renewable energy*. In addition, in Vermont, the *Public Utility Commission* may offer electric or natural gas companies incentives for innovation or improved performance or may design other means of alternative regulation such as those focused on managing variable fuel costs. Alternative regulation measures in Vermont have included periodic adjustment of rates for changes in fuel prices and sharing of earnings by a utility that exceed a threshold.

Rates:

The authorized charges per unit or level of consumption over a specified time period for any of the classes of utility services provided to a customer. For example, many customers are charged by their electric company based on the number of *kilowatt-hours* used per month.

Regional Greenhouse Gas Initiative (RGGI):

RGGI is a market-based regulatory program in the United States whose purpose is to reduce *greenhouse gas* emissions. Nine northeastern and mid-Atlantic states have agreed to reduce carbon dioxide (CO₂) emissions from the power sector 10 percent by 2018. The nine states are: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. New Jersey withdrew from the program in 2011. Each state's program limits emissions of CO₂ from electric power plants, issues CO₂ allowances, and establishes participation in regional CO₂ allowance auctions. Regulated power plants can use a CO₂ allowance issued by any of the nine participating states to demonstrate compliance with an individual state program. In this manner, the nine state programs, in aggregate, function as a single regional compliance market for CO₂ emissions.

Regional transmission organization (RTO):

An RTO is a regional service provider that meets certain criteria established by FERC order, including criteria related to independence and market size. An RTO is responsible for moving electricity over large interstate areas and helps to maintain an effective grid by managing three different but related sets of flows—the flow of energy across the grid; the exchange of information about power flows and the equipment it moves across; and the flow of money between producers, marketers, *transmission utilities*, buyers, and others. *ISO-NE* is the RTO for New England.

Regulated fuel:

Regulated fuels are those fuels delivered by a franchised utility under the regulation of a public service commission. In Vermont, those fuels are electricity and natural gas, and their price is set by the *Public Utility Commission*.

Unregulated fuels include heating oil, propane, and wood. The price of these fuels is market-based. However, these fuels may be regulated for other purposes, such as safety and environmental protection.

Renewable energy:

Energy produced using a technology that relies on a resource that is being consumed at a harvest rate at or below its natural regeneration rate.

Renewable energy certificate (REC):

A renewable energy certificate (or credit) is a tradable and salable right to claim the *environmental attributes* associated with one megawatt-hour of *renewable energy* from a specific generation facility. RECs are transferred and sold separately from the power generated by renewable energy facilities.

Renewable Energy Standard (RES):

Vermont's Renewable Energy Standard (RES) requires that retail electricity providers have ownership of sufficient renewable energy plants or sufficient tradable renewable energy credits from plants whose energy is capable of delivery in New England that reflect the required amounts of renewable energy in order to provide or offer to sell electricity. The RES includes three tiers: (1) the *total renewable energy category*, (2) the *distributed renewable energy category*, and (3) the *energy transformation category*. The RES requires that the *total renewable energy category* represent 55 percent of retail sales in 2017, rising to 75 percent in 2032. The *distributed renewable generation category* must represent one percent of electric sales in 2017, rising to 10 percent in 2032. The *energy transformation category* must represent two percent of retail electric sales in 2017, rising to 12 percent in 2032.

Renewable portfolio standard (RPS):

A renewable portfolio standard (RPS) requires retail electric providers to supply a specified minimum amount of customer *load* with electricity from eligible *renewable energy* sources. An RPS attempts to create market demand for renewable electric energy supplies. While RPS requirements differ across states, there are generally three ways that electricity suppliers can comply with the RPS: owning a renewable energy facility and

its output generation; purchasing *renewable energy certificates* (RECs); or purchasing electricity from a renewable facility inclusive of all *environmental attributes* (sometimes called “bundled renewable electricity”).

Retail electric service provider:

An electric *distribution utility*.

Standard offer facilitator:

The primary purpose of the Standard Offer facilitator is to promote the development of resources in Vermont by bringing together Standard Offer projects and Vermont utilities seeking to purchase power. The facilitator is instructed to make all reasonable attempts to find one or more Vermont utilities to purchase such *renewable energy* products. If no Vermont utility is available as a purchaser, the Standard Offer facilitator may promote the development of Standard offer projects by selling electricity products from such projects into the regional market, to an out-of-state utility, or to Vermont utilities on a pro-rata basis. The Standard offer facilitator also implements the *standard offer* program as an agent of the *PUC*.

Standard offer:

Under the standard offer program, eligible *renewable energy* plants located in Vermont, with a plant capacity of 2.2 MW or less, may enter into a long-term contract with the *standard offer facilitator*. Participants in this program receive a predetermined contractual rate for each *kilowatt-hour* produced by the qualifying project, and the rate varies by the type of technology employed. The *standard offer facilitator* allocates the power produced by standard offer plants and the costs of their electricity products among Vermont’s electric utilities, which are required to accept the power and pay its costs.

The General Assembly initially capped the standard offer program’s cumulative capacity at 50 MW. In 2012, the Legislature increased this cumulative cap to 127.5 MW, with the increase to be implemented in annual increments: five MW for three years, 7.5 MW for the next three years, and 10 MW for the next four years. The General Assembly excepted from the cumulative cap plants using methane derived from an agricultural operation and new standard offer plants that the *PUC* determines have sufficient benefits to the operation and management of the *grid*.

In 2012, the General Assembly also added a standard offer for existing hydroelectric plants that is outside the cumulative cap. To be eligible for this standard offer, a hydroelectric plant among other criteria must have a plant capacity of five MW or less, must be located in the state, and must have been in service as of January 1, 2009.

Substantial deference:

When the *PUC* is deciding whether to issue a *certificate of public good* for an in-state electric generation facility, it must give “substantial deference” to a regional or municipal plan’s specific policies and land conservation measures if the plan received an affirmative *determination of energy compliance*. The term is defined in the relevant statute and refers to the weight the *PUC* must give the policy or measure. Under the substantial deference standard, the policy or measure is applied by the *PUC* according to its terms unless clear and convincing evidence exists that factors concerning the good of the State outweigh such measure or policy. Substantial deference does not include

consideration of whether the municipal or regional plan should have received an affirmative *determination of energy compliance*.

Tariff:

A utility's tariffs state the *rates* the utility charges its customers as well as the terms and conditions under which the utility provides service. The term is interchangeable with *rate schedule*. Vermont law specifies the process a utility must follow to change its tariffs. The official version of a utility's current tariffs is available for review at the *Public Utility Commission*.

Texas Low-Level Radioactive Waste Disposal Compact:

This is an interstate compact between Texas and Vermont regarding the disposal of low-level radioactive waste at a designated Texas facility. The compact created the Texas Low-Level Radioactive Waste Disposal Compact Commission, which is responsible for ensuring the safe disposal of waste generated within member states, conducting research, establishing relevant regulations, and providing public information about the compact. The Commission comprises eight members: six from Texas and two from Vermont. As a compact member, Vermont is entitled to 20 percent of the projected capacity of the Texas waste facility.

Thermal efficiency:

Thermal efficiency refers to all of the components of building heating and cooling. Greater thermal efficiency can be achieved by siting a building to take advantage of solar energy, air sealing and insulating the building envelope, installing efficient doors and windows, and upgrading to energy efficient heating and cooling systems and appliances.

Total Renewable Energy Category (a/k/a Tier 1):

The total renewable energy category of the *RES* refers to bundled energy (power generated from *renewable energy* with *environmental attributes* attached) or *RECs* generated by a plant capable of delivering energy to New England. The *RES* requires that this category represent 55 percent of the retail electricity provider's retail sales in 2017, rising to 75 percent in 2032. Existing as well as new renewable energy may be used to meet this category. The amounts used to comply with the *distributed renewable generation category* count towards the requirements of this category as well. An *energy transformation project* does not count towards this category's requirements.

Transmission line or pipe:

In an electric system, transmission lines carry large quantities of energy from one point to another. The main characteristics that distinguish transmission lines from *distribution lines* are that transmission lines are operated at relatively high voltages, transmit large quantities of power in bulk, and transmit power over long distances.

In the context of natural gas, transmission lines or pipes carry large quantities of natural gas from production regions to local distribution and storage facilities. Their size and operating pressure distinguishes them from *distribution lines*. Transmission pipelines generally operate at 200 to 1,500 pounds per square inch. In the United States,

transmission pipelines typically range from 20 to 42 inches in diameter. However, in Vermont, transmission pipelines are of smaller diameters, such as 10 inches.

FERC uses a seven-factor test to distinguish transmission lines from distribution lines. As applied to electric facilities, the seven factors are: (1) local distribution facilities are normally in close proximity to retail customers; (2) local distribution facilities are primarily radial in character; (3) power flows into local distribution systems, and rarely, if ever, flows out; (4) when power enters a local distribution system, it is not reconsigned or transported on to some other market; (5) power entering a local distribution system is consumed in a comparatively restricted geographic area; (6) meters are based at the transmission/local distribution interface to measure flow into the local distribution system; and (7) local distribution systems will be of reduced voltage.

Transmission utility:

A transmission utility is the regulated owner-operator of the transmission system in a specified area. This utility maintains, plans, designs, and coordinates transmission of electricity over the portion of the grid it owns or manages. A transmission utility differs from a *distribution utility*, or the regulated owner/operator of the distribution system which serves retail customers. *FERC* requires transmission utilities to file open access transmission tariffs, which contain minimum terms of nondiscriminatory service.

Vermont Electric Power Company (VELCO):

VELCO was formed in 1956 as a statewide, “transmission only” company, which currently manages and operates Vermont’s transmission *grid*, a system that includes over 700 miles of transmission lines, 13,000 acres of rights-of-way, and 50 substations. VELCO is a regulated utility, 73 percent of which is owned by the state’s electric distribution utilities and 27 percent of which is owned by the *Vermont Low Income Trust for Electricity*. VELCO operates Vermont’s bulk transmission system and represents the utilities in power pool matters with the *ISO-NE*.

Vermont Low Income Trust for Electricity (VLITE):

The creation of VLITE was a condition of approving the purchase of Central Vermont Service Corp. (CVPS) by GazMetro and the merger of CVPS and Green Mountain Power Corp. into one company. CVPS transferred a significant ownership interest in VELCO to VLITE, which is a public benefit, nonprofit corporation. As an owner of VELCO, VLITE has the power to nominate three independent directors to serve on VELCO’s board of directors. VLITE draws its own board from representatives of energy policy interest groups, consumer and low-income advocates, public power utility sectors and members of State government. VLITE is to use its dividend income from VELCO to fund projects and initiatives that further the energy policies of Vermont.

Vermont Transmission Company, LLC (Vermont Transco):

Vermont Transco LLC is a limited liability corporation established on June 30, 2006 by Vermont Electric Power Company, Inc. and Vermont’s electric distribution companies. Vermont Transco owns Vermont’s high-voltage electric transmission system (115 kV and above) and provides service under applicable *FERC* tariffs to: all electric

distribution utilities in Vermont, two small distribution utility loads in New Hampshire, and loads throughout New England through *ISO-NE*.

Vermont Yankee Nuclear Power Station:

Vermont Yankee was a boiling water reactor type nuclear power plant currently owned by *Entergy Nuclear* and located in the town of Vernon, VT. It had the capacity to generate 620 *megawatts* of electricity. *Entergy Nuclear* has ceased electric generation at the plant.

Volt:

A volt is a unit of electric potential. A single volt is defined as the difference in electric potential across a wire when an electric current of one ampere dissipates one *watt* of power. The voltage of a *transmission line* is analogous to the water pressure in a pipe, given a certain flow of water.

Watt (kilowatt, megawatt):

A watt is a unit of electrical power. One watt is equivalent to 1 ampere flowing against an electrical pressure of one *volt*. One watt is equivalent to about 1/746 horsepower or one joule per second. One kilowatt equals 1,000 watts, and one megawatt equals one million watts or 1,000 kilowatts.

Weatherization:

Weatherization is the practice of protecting a building and its interior from the elements and modifying a building to reduce energy consumption and increase energy efficiency. Weatherization procedures may include: sealing cracks and gaps in the building envelope; insulating the building envelope; replacing older doors and windows; installing sufficient roofing and siding; and protecting pipes from corrosion and freezing.

Vermont has a weatherization program that is available for low-income residents through the Office of Economic Opportunity within the Department of Children and Families. The program provides comprehensive “whole house” assessments of energy-related problems; building diagnostics including blower door, carbon monoxide, and heating system testing; and energy-efficient retrofits such as sidewall insulation, air sealing, attic insulation, and heating system upgrades and replacements.