

DRAFT ENERGY GLOSSARY, 2012

by Manna Jo Greene

Access charge: A charge paid by all market participants withdrawing energy from the ISO controlled grid. The access charge will recover the portion of a utility's transmission revenue requirement not recovered through the variable usage charge.

Active solar: Systems, which collect and absorb solar radiation then transfer the solar heat directly to the interior space or to a storage system, from which the heat is distributed. If the system cannot provide adequate space heating, an auxiliary or back-up system provides the additional heat. Liquid systems are more often used when storage is included, and are well suited for radiant heating systems boilers with hot water radiators, and even absorption heat pumps and coolers Both air and liquid systems can supplement forced air systems. See, **passive solar, solar air heating, solar liquid heating.**

Adjustment Bid: A bid that is used by the ISO to adjust supply or demand when congestion is anticipated.

Adverse hydro: Water conditions that limit the production of hydroelectric power.

Alternative fuel: As defined by the National Energy Policy Act (EPA Act), alternative fuels are: methanol, denatured ethanol and other alcohols, separately or in mixtures of 85 percent by volume or more (or other percentage not less than 70 percent as determined by U.S. Department of Energy rule) with gasoline or other fuels; CNG; LNG; LPG; hydrogen; "coal-derived liquid fuels;" fuels "other than alcohols" derived from "biological materials;" electricity, or any other fuel determined to be "substantially not petroleum" and yielding "substantial energy security benefits and substantial environmental benefits" -- and are used in Alternative Fuel Vehicles (AFVs).

Annualized Growth Rate: Calculated as follows: $(x_n / x_1)^{1/n}$, where x is the value under consideration and n is the number of periods.

Annual Consumption: The amount of electricity used by a consumer in one year and is typically measured in kilowatt-hour (kWh).

Annual Energy Outlook (AEO): The projections in the U.S. Energy Information Administration's (EIA's) *Annual Energy Outlook 2012 (AEO2012)* focus on the factors that shape the U.S. energy system over the long term. Under the assumption that current laws and regulations remain unchanged throughout the projections, the *AEO2012* Reference case provides the basis for examination and discussion of energy production, consumption, technology, and market trends and the direction they may take in the future. It also serves as a starting point for analysis of potential changes in energy policies.

Annual Fuel Utilization Efficiency: A measure of heating efficiency, in consistent units, determined by applying the federal test method for furnaces. This value is intended to represent the ratio of heat transferred to the conditioned space by the fuel energy supplies over one year.

Area Load: The total amount of electricity being used at a given point in time by all consumers in a utility's service territory.

Article VII: Article VII "Siting of Major Utility Transmission Facilities" is the section of New York State Public Service Law that requires a full environmental, public health, and safety impact review of the siting, design, construction, and operation of major transmission facilities in New York State. See:

[www3.dps.ny.gov/W/PSCWeb.nsf/0/a021e67e05b99ead85257687006f393b/\\$FILE/Article_VII_Process_Guide.pdf](http://www3.dps.ny.gov/W/PSCWeb.nsf/0/a021e67e05b99ead85257687006f393b/$FILE/Article_VII_Process_Guide.pdf)

Article X: Article X provides for the siting review of new and repowered or modified major electric generating facilities in New York State by the Board on Electric Generation Siting and the Environment (Siting Board) in a unified proceeding instead of requiring a developer or owner of such a facility to apply for numerous state and local permits.

A previous version of such a law expired on January 1, 2003. Key provisions of the new law include:

1. Defines a major electric generating facility as facilities of 25 megawatts or more;
2. Requires environmental and public health impact analyses, studies regarding environmental justice and public safety, and consideration of local laws;
3. Directs applicants to provide funding for both the pre-application and application phases. It allows funding to be used to help intervenors (affected municipalities and other parties) hire experts to participate in the review of the application and for legal fees (but not for judicial challenges);
4. Requires a utility security plan reviewed by Homeland Security and, for New York City (NYC) plants, NYC's emergency management office;
5. Provides for appointment of ad hoc public members of the Siting Board from the municipality where the facility is proposed to be sited; and,
6. Requires a public information coordinator within the Department of public service to assist and advise interested parties and members of the public in participating in the siting process.

See:

[www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/143595fa3be36aea852579d00068b454/\\$FILE/Article10LawText%20.pdf](http://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/143595fa3be36aea852579d00068b454/$FILE/Article10LawText%20.pdf)

Availability Factor: A percentage representing the number of hours a generating unit is available to produce power (regardless of the amount of power) in a given period, compared to the number of hours in the period.

Avoided Cost (Regulatory): The amount of money that an electric utility would need to spend for the next increment of electric generation to produce or purchase elsewhere the power that it instead buys from a co-generator or small-power producer. Federal law establishes broad guidelines for determining how much a qualifying facility (QF) gets paid for power sold to the utility.

Backup Rate: A utility charge for providing occasional electricity service to replace on-site generation.

Barrel Oil Equivalent: A unit of energy equal to the amount of energy contained in a barrel of crude oil. A barrel of oil equivalent is approximately 5.78 million Btu or 1,700kWh. A barrel contains 42 gallons of liquid.

Base Load: The lowest level of power production needs during a season or year.

Base Load Capacity: The power output that electricity-generating equipment can continuously produce.

Base Load Demand: The minimum demand experienced by an electric utility, usually 30-40% of the utility's peak demand.

Baseline Forecast: A prediction of future energy needs which does not take into account the likely effects of new conservation programs that have not yet been started.

Base Rate: That portion of the total electric or gas rate covering the general costs of doing business unrelated to fuel expenses.

Best Available Control Technology (BACT): The combination of production processes, methods, systems and techniques that will result in the lowest achievable level of emissions of air pollutants from a given facility. BACT is an emission limitation that the permitting authority determines on a case-by-case basis, taking into account energy, environmental, economic and other costs of control. BACT may include fuel cleaning, treatment or innovative fuel combustion techniques.

Bilateral Transaction: A two-party agreement for the purchase and the sale of energy products and services.

Biodiesel: A biofuel produced through transesterification, a process in which organically derived oils are combined with alcohol (ethanol or methanol) in the presence of a catalyst to form ethyl or methyl ester. The biomass derived ethyl or methyl esters can be blended with conventional diesel fuel or used as a neat fuel. (100% biodiesel). Biodiesel can be made from soybean or rapeseed oils, animal fats, waste vegetable oils or micro algae oils.

Biofuels: Liquid fuels and blending components produced from biomass feedstocks, used primarily for transportation.

Biogas: A combustible gas derived from decomposing biological waste. Biogas normally consists of 50-60% methane.

Biomass: Plant materials and animal waste used as a source of fuel.

British Thermal Unit (BTU): A unit of heat energy equal to the heat needed to raise the temperature of one pound of water one degree Fahrenheit at one atmosphere pressure (sea level).

Capacity: A measure of how much electricity a generator can produce under specific conditions.

See: <http://www.eia.gov/tools/faqs/faq.cfm?id=101&t=3>

Capacity Additions: The addition of new energy capacity from the development and construction of new power sources.

Capacity Factor: A percentage that tells how much of a power plant's capacity is used over time. For example, typical plant capacity factors range as high as 80 percent for geothermal and 70 percent for co-generation.

Capacity Release: A secondary market for capacity that is contracted by a customer, which is not using all of its capacity.

Capacity Utilization: Capacity utilization is computed by dividing production by productive capacity and multiplying by 100.

Capacity Retirement: The loss of energy capacity from the closure of existing power sources.

Closed Cycle Cooling: The use of cold air-cooling systems instead of water-cooling systems in steam condensers. Closed cycle cooling reduces water intake volume and corresponding fish impacts by 90-99% compared to once-through cooling.

Combined Cycle: An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more gas (combustion) turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator for utilization by a steam turbine in the production of electricity. Such designs increase the efficiency of the electric generating unit.

Combined Heat and Power (CHP): Also known as "cogeneration," it is the simultaneous production of electricity and heat from a fuel source such as natural gas, biomass, biogas, coal, waste heat, or oil. Combined heat and power is not a single technology, but an integrated energy system that can be modified depending on the energy user's needs.

Community Choice Aggregation (CCA): CCA is a system (not a company or an organization) adopted into law in the states of Massachusetts, Ohio, California, New Jersey and Rhode Island, which allows cities and counties to aggregate the buying power of individual customers within a defined jurisdiction in order to secure alternative energy supply contracts. Currently, nearly one million Americans receive service from CCA's, which are de facto public utilities.

Comprehensive National Energy Policy: On August 8, 2005, President Bush signed the Energy Policy Act of 2005 into law. The Act is designed to spur domestic energy production, increase efficiency, modernize our electricity grid and energy delivery system, and invest in workable energy alternatives.

Cooling Towers: see: Closed Cycle Cooling

Cooperative Electric Utility: A joint venture organized by consumers to make electric utility service available in their area.

Cross-state Air Pollution Rule (CSAPR): On July 6, 2011, the US Environmental Protection Agency (EPA) finalized a rule that protects the health of millions of Americans by helping states reduce air pollution and attain clean air standards. This rule, known as the Cross-State Air Pollution Rule (CSAPR), requires states to significantly improve air quality by reducing power plant emissions that contribute to ozone and/or fine particle pollution in other states.

Demand Bid: A bid into the PX indicating a quantity of energy or an ancillary service that an eligible customer is willing to purchase and, if relevant, the maximum price that the customer is willing to pay.

Demand Billing: The electric capacity requirement for which a large user pays. It may be based on the customer's peak demand during the contract year, on a previous maximum or on an agreed minimum. Measured in kilowatts.

Demand Charge: The sum to be paid by a large electricity consumer for its peak usage level

Demand-Side Management (DSM): The methods used to manage energy demand including energy efficiency, load management, fuel substitution and load building. See *Load Management*

Deregulation. The elimination of federal, state or local regulations on an industry, including environmental regulations and trade restrictions.

Direct Current (DC): An electric current that flows in a constant direction. The magnitude of the current does not vary or has slight variation.

Distribution: The final stage in the delivery of electricity to end-users. A distribution system's network carries electricity from the transmission system and delivers it to consumers. Typically, the network would include medium-voltage (less than 50 kV) power lines, substations and pole-mounted transformers, low-voltage (less than 1 kV) distribution wiring and sometimes meters.

Diversity Factor: Diversity Factor: The ratio of sum of the individual non-coincident maximum demands of various subdivisions of the system to the maximum demand of the complete system. The diversity factor is always less than or equal to 1. The (unofficial) term diversity, as distinguished from diversity factor refers to the percent of time available that a machine, piece of equipment, or facility has its maximum or nominal load or demand (i.e., a 70% diversity means that the device in question operates at its nominal or maximum load level 70% of the time that it is connected and turned on).

Diversity factor is commonly used for a number of mathematics related topics. One such instance is when completing a coordination study for a system. This diversity factor is used to estimate the load of a particular node in the system.

Efficiency Service Company: A company that offers to reduce a client's electricity consumption with the cost savings being split with the client.

Electric Power Sector: An energy consuming sector that consists of electricity only and combined heat and power (CHP) plants whose primary business is to sell electricity or electricity and heat to the public. i.e. North American Industry Classification System 22 plants.

EPAct: The Energy Policy Act of 1992 addresses a wide variety of energy issues. The legislation creates a new class of power generators, exempt wholesale generators (EWGs), that are exempt from the provisions of the Public Utilities Holding Company Act of 1935 and grants the authority to FERC to order and condition access by eligible parties to the interconnected transmission grid.

Emissions Reduction Purchase Agreement (ERPA): A transaction that transfers carbon credits between

two parties under the Kyoto Protocol. The buyer pays the seller cash in exchange for carbon credits, thereby allowing the purchaser to emit more carbon dioxide into the atmosphere. The standards for these agreements are outlined by the International Emissions Trading Association.

Energy Crops: Crops grown specifically for their fuel value. These include food crops such as corn and sugarcane, and nonfood crops such as poplar trees and switchgrass. Currently two energy crops are under development: short rotation woody crops which are fast growing hardwood trees harvested in 5-8 years, and herbaceous energy crops such as perennial grasses, which are harvested annually after taking two to three years to reach full productivity.

Energy Service Company (ESCO): A commercial enterprise providing a comprehensive package of energy services including energy efficiency/conservation consultations, designs, infrastructure, power generation, risk management, and in some cases financing solutions.

Feed-in Contract (Feed-in Tariff): A renewable energy policy that typically offers a guarantee of payments to project owners for the total amount of renewable electricity they produce; access to the grid; and stable, long-term contracts.

Feed-in Tariff: see Feed-in Contract

FEMA: The Federal Emergency Management Agency. The federal agency in charge of disaster recovery in locations that have been declared disaster areas by a state's Governor and the President of the United States.

FERC: The Federal Energy Regulatory Commission. An independent regulatory commission within the U.S. Department of Energy that has jurisdiction over energy producers that sell or transport fuels for resale in interstate commerce; the authority to set oil and gas pipeline transportation rates and to set the value of oil and gas pipelines for ratemaking purposes; and regulates wholesale electric rates and hydroelectric plant licenses.

Federal Power Act: A law appearing in Chapter 12 of Title 16 of the United States code, entitled "Federal Regulation and Development of Power". Enacted as the Federal Water Power Act on June 10, 1920, and amended many times since, its original purpose was to more effectively coordinate the development of hydroelectric projects in the United States. Representative John J. Esch (R-Wisconsin) was the sponsor. Prior to this time and despite federal control of navigable waters and the necessary congressional approval to construct such facilities, Congress had left the regulation of hydroelectric power to the individual states. The first federal legislation broadly dealing with hydroelectric development regarded its competition with navigation usage; the passage of the Rivers and Harbors Act of 1899 Congress made it illegal to dam navigable streams without a license (or permit) from them. Until 1903, these congressional permits were given away on a 'first come first served' perpetual basis and controlled by the individual states. This would lead to a long debate between competing private and public development interests, and culminate in the act's passage in 1920.

The act created the Federal Power Commission (FPC) (now the Federal Energy Regulatory Commission as the licensing authority for these plants. The FPC regulated the interstate activities of the electric power and natural gas industries, and coordinated national hydroelectric power activities. The Commission's mandate called for it to maintain reasonable, nondiscriminatory and just rates to the consumer. It was ensured that 37.5% of the income derived from hydroelectric power leases given out under the Water Power Act of 1920 went to the state in which the dam was built.

In 1935 the law was renamed the Federal Power Act, and the FPC's regulatory jurisdiction was expanded to include all interstate electricity transmission.

Subsequent amendments to the law include the following statutes:

- Public Utility Regulatory Policies Act (PURPA) (Public Law 95-617), passed in 1978
- Energy Security Act (P.L. 96-294), passed in 1980

- Electric Consumers Protection Act of 1986 (PL 99-495)
- Energy Policy Act of 1992 (PL 102-486)

See: **PUHCA, PURPA**

Firm Energy: Power supplies, which are guaranteed to be delivered under terms defined by contract.

Flexible Fuel Vehicle (FFV): A vehicle that can operate on either alcohol fuels (methanol or ethanol) or regular unleaded gasoline or any combination of the two from the same tank.

Fossil Fuels: The nation's principle source of electricity popular due to their low costs. Fossil fuels come in three major forms, coal, oil and natural gas. Because fossil fuels are a finite resource and cannot be replenished once they are extracted and burned, they are not considered "renewable."

Fuel Cell: One or more cells capable of generating an electrical current by converting the chemical energy of a fuel directly into electrical energy. Fuel cells differ from conventional electrical cells in that the active materials such as fuel and oxygen are not contained within the cell but are supplied from outside.

Generation: How much electricity a generator produces over a specific period of time. For example, a generator with 1 megawatt (MW) capacity that operates at that capacity consistently for one hour will produce 1 MW-hour (MWh) of electricity.

Electricity is most often generated at a power station by electromechanical generators, primarily driven by heat engines fueled by chemical combustion or nuclear fission but also by other means such as the kinetic energy of flowing water and wind. There are many other technologies that can be and are used to generate electricity such as solar photovoltaic and geothermal power.

The seven forms of basic electricity generation are:

- Static electricity from the physical separation and transport of charge (examples: triboelectric effect and lightning)
- Electromagnetic induction, where an electrical generator, dynamo or alternator transforms kinetic energy (energy of motion) into electricity, this is most used form for generating electricity, it is based on Faraday's law, can be experimented by simply rotating a magnet within closed loop of a conducting material (e.g. Copper wire)
- Electrochemistry, the direct transformation of chemical energy into electricity, as in a battery, fuel cell or nerve impulse.
- Photoelectric effect, the transformation of light into electrical energy, as in solar cells.
- Thermoelectric effect, direct conversion of temperature differences to electricity, as in thermocouples, thermopiles, and thermionic converters.
- Piezoelectric effect, from the mechanical strain of electrically anisotropic molecules or crystals. Researchers at the US Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab) have developed a piezoelectric generator sufficient to operate a liquid crystal display using thin films of M13 bacteriophage.
- Nuclear transformation, the creation and acceleration of charged particles (examples: betavoltaics or alpha particle emission)

See: www.eia.gov

Geothermal energy: An electric generating station in which steam tapped from the earth drives a turbine-generator, generating electricity.

Gigawatt: A unit of measure equal to one billion watts or 1000 megawatts.

Green Energy: Electricity that is generated from renewable energy sources is often referred to as “green energy.” Green energy power products can include electricity generated exclusively from renewable resources or more frequently electricity produced from a combination of fossil and renewable resources. Also known as “blended” products these products typically have cheaper prices 100% renewable resources.

Green Pricing: In the case of renewable electricity, green pricing represents a market solution to the various problems associated with regulatory valuation of the non-market benefits of renewables. Customers generally pay a premium above market cost to acquire renewable energy resources.

Greenfield Plant: A greenfield is a project that lacks any prior constraints. A greenfield plant refers to a new facility designed and built from scratch, in some cases literally on a green field. For example, a new electric power-generating facility built from the ground up. Also: the hypothetical ideal for a new plant.

High Voltage: The term **high voltage** characterizes electrical circuits in which the voltage used is the cause of particular safety concerns and insulation requirements. High voltage is used in electrical power distribution, in cathode ray tubes, to generate X-rays and particle beams, to demonstrate arcing, for ignition, in photomultiplier tubes, and in high power amplifier vacuum tubes and other industrial and scientific applications.

Independent Energy Producers or Independent Power Producers (IPP): An Independent Power Producer (IPP) generates power that is purchased by an electric utility at wholesale prices. The utility then resells this power to end-use customers. Although IPPs generate power, they are not franchised utilities, government agencies or QFs. IPPs usually do not own transmission lines to transmit the power that they generate.

Independent System Operator (ISO): An organization formed at the direction or recommendation of the Federal Energy Regulatory Commission (FERC). In the areas where an ISO is established, it coordinates, controls and monitors the operation of the electrical power system, usually within a single US State, but sometimes encompassing multiple states. Regional Transmission Operators (RTOs) typically perform the same functions as ISOs, but cover a larger geographic area. A more detailed explanation of the differences is available.

Imbalance Energy: The real-time change in generation output or demand requested by the ISO to maintain reliability of the ISO-controlled grid.

Investor-Owned Utility (IOU): An investor owned utility. A company, owned by stockholders for profit, that provides utility services. A designation used to differentiate a utility owned and operated for the benefit of shareholders from municipally owned and operated utilities and rural electric cooperatives

Insolation: The total amount of solar radiation (direct, diffuse, and reflected) striking a surface exposed to the sky.

Interchange: The agreement among interconnected electric utilities under which they buy, sell and exchange power among themselves. This can, for example, provide for economy energy and emergency power supplies.

Internal Collector Storage (ICS): A solar thermal collector in which incident solar radiation is absorbed by the storage medium.

Kilowatt: One thousand (1,000) watts. A unit of measure of the amount of electricity needed to operate given equipment. On a hot summer afternoon a typical home, with central air conditioning and other equipment in use, might have a demand of four kW each hour.

Kilowatt Hour (kWh): The most commonly used unit of measure telling the amount of electricity consumed over time. It means one kilowatt of electricity supplied for one hour.

Kilowatt-Hours per Year (kWh/y): The amount of electricity supplied or used for one year.

Levelized Cost of Energy (LCOE): The price at which electricity must be generated from a specific source to break even. It is an economic assessment of the cost of the energy-generating system including all the costs over its lifetime: initial investment, operations and maintenance, cost of fuel, cost of capital, and is very useful in calculating the costs of generation from different sources.

Line Losses: The amount of energy lost during transmission and distribution of electricity, including unaccounted for uses.

Local Publicly Owned Electric Utility: A public utility company, which is owned and regulated by residents of the local community in which it is located. Generally governed by a local board of area residents.

Load: An end-use device or an end-use customer that consumes power. Load should not be confused with demand, which is the measure of power that a load receives or requires.

Load Diversity: The (unofficial) term load diversity, as distinguished from diversity factor refers to the percent of time available that a machine, piece of equipment, or facility has its maximum or nominal load or demand (i.e., a 70% diversity means that the device in question operates at its nominal or maximum load level 70% of the time that it is connected and turned on).

Load Factor: Load factor (electrical) is the average power divided by the peak power over a period of time in the electricity industry, load factor is a measure of the output of a power plant compared to the maximum output it could produce.

Loss of Load Probability (LOLP): A measure of the reliability of the electrical grid, the probability that there is insufficient generating supply to support electrical demand.

Megawatt: A larger measurement unit of power equal to one million watts or 1000 kilowatts.

Mercury and Air Toxics Standards Rule (MATS): EPA established standards, which limit the release of mercury, acid gases and other toxics from power plants. See: <http://www.epa.gov/mats/actions.html>

Microgrid: A localized grouping of electricity generation, energy storage, and loads that normally operates connected to a traditional centralized grid (macrogrid). This single point of common coupling with the macrogrid can be disconnected. The microgrid can then function autonomously. Generation and loads in a microgrid are usually interconnected at low voltage. From the point of view of the grid operator, a connected microgrid can be controlled as if it was one entity. Microgrid generation resources can include fuel cells, wind, solar, or other energy sources. The multiple dispersed generation sources and ability to isolate the microgrid from a larger network would provide highly reliable electric power. Byproduct heat from generation sources such as micro turbines could be used for local process heating or space heating, allowing flexible trade off between the needs for heat and electric power.

Municipally-Owned Utility (MOU): Public utilities, which are regulated by oversight public utility commissions, can be privately owned or publicly owned. Publicly owned utilities include cooperative and municipal utilities. Municipally-owned utilities can include territories outside of city or town limits, or may serve only a portion of the entire city or town. Cooperative utilities are owned by the customers they serve, and are usually found in rural areas. Private utilities, also called investor-owned utilities, are owned by investors.

Nameplate Capacity: Also known as rated capacity, nominal capacity or maximum effect; refers to the intended technical full-load sustained output of a facility such as a power plant, a chemical plant, fuel plant, metal refinery, mine, and many others.

NERC: North American Electric Reliability Corporation's (NERC) mission is to ensure the reliability of the North American bulk power system. NERC is the electric reliability organization (ERO) certified by the Federal Energy Regulatory Commission to establish and enforce reliability standards for the bulk power system. NERC develops and enforces reliability standards; assesses adequacy annually via a 10-year

forecast, and summer and winter forecasts; monitors the bulk power system; and educates, trains and certifies industry personnel. ERO activities in Canada related to the reliability of the bulk power system are recognized and overseen by the appropriate governmental authorities in that country.

Net-metering: An electricity policy for consumers who own (generally small) renewable energy facilities (such as wind solar power or home fuel cells) or V2G electric vehicles. "Net", in this context, is used in the sense of meaning "what remains after deductions" — in this case, the deduction of any energy outflows from metered energy inflows. Under net metering, a system owner receives retail credit for at least a portion of the electricity they generate.

New York Energy Research and Development Authority (NYSERDA): A public benefit corporation created in 1975 under Article 8, Title 9 of the State Public Authorities Law through the reconstitution of the New York State Atomic and Space Development Authority. NYSERDA's earliest efforts focused solely on research and development with the goal of reducing the State's petroleum consumption. Today, NYSERDA's aim is to help New York meet its energy goals: reducing energy consumption, promoting the use of renewable energy sources, and protecting the environment.

New York Independent System Operator (NYISO) is at the heart of New York State's electric system, operating the high-voltage transmission network, administering and monitoring the wholesale electricity markets, and planning for the state's energy future. The NYISO is responsible for the reliable operation of New York's nearly 11,000 miles of high-voltage transmission and the dispatch of over 500 electric power generators. In addition, the NYISO administers bulk power markets that trade an average of \$7.5 billion in electricity and related products annually.

Non-firm Energy: Electricity that is not required to be delivered or to be taken under the terms of an electric purchase contract.

Non-utility Power Producer: A corporation, person, agency authority or other legal entity that owns electric generating capacity and is not an electric utility.

Northern Westchester Energy Action Coalition (NWEAC)

Passive Solar: Solar panels or systems, which distribute solar energy in the form of heat in the winter and reject solar heat in the summer. This is called passive solar design or climatic design. Unlike active solar heating systems passive solar design doesn't involve the use of mechanical and electrical devices, such as pumps, fans, or electrical controls to move the solar heat.

Peak Demand, Peak Load: The highest electrical demand within a particular period of time. Daily electric peaks on weekdays occur in late afternoon and early evening. Annual peaks occur on hot summer days

Peaking Unit or Peaker: A power generating station that is normally used to produce extra electricity during peak load times.

Photovoltaics (PV): A method of generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photovoltaic effect. Photovoltaic power generation employs solar panels composed of a number of solar cells containing a photovoltaic material. Materials presently used for photovoltaics include monocrystalline silicon, polycrystalline silicon, amorphous silicon, cadmium telluride, and copper indium gallium selenide/sulfide. Due to the growing demand for renewable energy sources, the manufacturing of solar cells and photovoltaic arrays has advanced considerably in recent years.

PJM: PJM Interconnection is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.

Power Exchange (PX): An entity, which operates market platforms for trading in electric energy, natural gas, CO₂ emission allowances and coal.

Power Grid: An interconnected network for delivering electricity from suppliers to consumers. It consists of three main components: 1) power stations that produce electricity from combustible fuels (coal, natural gas, biomass) or non-combustible fuels (wind, solar, nuclear, hydro power); 2) transmission lines that carry electricity from power plants to demand centers; and 3) transformers that reduce voltage so distribution lines carry power for final delivery.

Power Pool: An entity established to coordinate short-term operations to maintain system stability and achieve least-cost dispatch. The dispatch provides backup supplies, short-term excess sales, reactive power support, and spinning reserve. Historically, some of these services were provided on an unpriced basis as part of the members' utility franchise obligations. Coordinating short-term operations includes the aggregation and firming of power from various generators, arranging exchanges between generators, and establishing (or enforcing) the rules of conduct for wholesale transactions. The pool may own, manage and/or operate the transmission lines ("wires") or be an independent entity that manages the transactions between entities. Often, the power pool is not meant to provide transmission access and pricing, or settlement mechanisms if differences between contracted volumes among buyers and sellers exist.

Power Purchase Agreement (PPA): A contract between two parties, one who generates electricity for the purpose of sale (the seller) and one who is looking to purchase electricity (the buyer). The PPA defines all of the commercial terms for the sale of electricity between the two parties, including when the project will begin commercial operation, schedule for delivery of electricity, penalties for under delivery, payment terms, and termination. A PPA is the principal agreement that defines the revenue and credit quality of a generating project and is thus a key instrument of project finance. There are many forms of PPA in use today and they vary according to the needs of buyer, seller, and financing counterparties.

Power usage effectiveness (PUE): A metric used to determine the energy efficiency of a data center PUE is determined by dividing the amount of power entering a data center by the power used to run the computer infrastructure within it. PUE is therefore expressed as a ratio, with overall efficiency improving as the quotient decreases toward 1. PUE was created by members of the Green Grid, an industry group focused on data center energy efficiency. Data center infrastructure efficiency (DCIE) is the reciprocal of PUE and is expressed as a percentage that improves as it approaches 100%.

Product Life Cycle Management (PLM): The process of managing the entire lifecycle of a product from its conception, through design and manufacture, to service and disposal. PLM integrates people, data, processes and business systems and provides a product information backbone for companies and their extended enterprise

Property Assessed Clean Energy (PACE): PACE is a bipartisan local government initiative that allows property owners to finance energy efficiency and renewable energy projects for their homes and commercial buildings. Interested property owners opt in to receive financing for improvements that is repaid through an assessment on their property taxes for up to 20 years. PACE financing spreads the cost of energy improvements such as weather sealing, insulation, energy efficient boilers and cooling systems, new windows, and solar installations over the expected life of the measures and allows for the repayment obligation to transfer automatically to the next property owner if the property is sold. PACE is unique because it:

- Creates badly needed local jobs.
- Uses private capital, not taxes or government subsidies.
- Saves money for building owners and increases property values.
- Is voluntary – not a government mandate.

- Promotes energy security without driving up energy costs.
- Avoids the need to build costly new power plants.
- Reduces air pollution

See: <http://pacenow.org/blog/>

Publicly Owned Utility (POU): An organization that maintains the infrastructure for a public service (often also providing a service using that infrastructure). Public utilities are subject to forms of public control and regulation ranging from local community-based groups to statewide government monopolies. (Common arguments in favor of regulation include the desire to control market power, facilitate competition, promote investment or system expansion, or stabilize markets. In general, though, regulation occurs when the government believes that the operator, left to his own devices, would behave in a way that is contrary to the government's objectives.)

The Public Utility Holding Company Act of 1935 (PUHCA): This act prohibits acquisition of any wholesale or retail electric business through a holding company unless that business forms part of an integrated public utility system when combined with the utility's other electric business. The legislation also restricts ownership of an electric business by non-utility corporations. See: **Federal Power Act,**

Public Utility Regulatory Policy Act of 1978 (PURPA): Among other things, this federal legislation requires utilities to buy electric power from private "qualifying facilities," at an avoided cost rate. This avoided cost rate is equivalent to what it would have otherwise cost the utility to generate or purchase that power themselves. Utilities must further provide customers who choose to self-generate a reasonably priced back-up supply of electricity. See: **Federal Power Act, PUHCA**

Pumped-Storage Hydroelectric Plant: A plant that usually generates electric energy during peak load periods by using water previously pumped into an elevated storage reservoir during off-peak periods when excess generating capacity is available to do so.

Qualifying Facility (QF): A cogeneration or small power production facility that meets certain ownership, operating and efficiency criteria established by the Federal Energy Regulatory Commission (FERC) pursuant to the Public Utility Regulatory Policies Act (PURPA) of 1978. See: Code of Federal Regulations, Title 18, part 292).

Rate Basing: Refers to practice by utilities of allotting funds invested in utility Research Development Demonstration and Commercialization and other programs from ratepayers, as opposed to allocating these costs to shareholders.

Real-time pricing: The instantaneous pricing of electricity based on the cost of the electricity available for use at the time the electricity is demanded by the customer.

Recovered energy: Reused heat or energy that otherwise would be lost. For example, a combined cycle power plant recaptures some of its own waste heat and reuses it to make extra electric power.

Regional Economic Development Council (REDC): Ten regional Councils created by Governor Cuomo in 2011 to develop long-term strategic plans for economic growth for their regions. A key component of Governor Cuomo's transformative approach to economic development, these councils are public-private partnerships made up of local experts and stakeholders from business, academia, local government, and non-governmental organizations.

Regional Transmission Organization (RTO): an organization that is responsible for moving electricity over large interstate areas. Like a transmission system operator (TSO), an RTO coordinates, controls and monitors an electricity transmission grid that is larger with much higher voltages than the typical power company's distribution grid. TSOs in Europe cross state and provincial borders like RTOs.

Regional Greenhouse Gas Initiative (RGGI): The Regional Greenhouse Gas Initiative (RGGI) is the first market-based regulatory program in the United States to reduce greenhouse gas emissions. RGGI is a cooperative effort among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. Together, these states have capped and will reduce CO₂ emissions from the power sector 10 percent by 2018. States sell nearly all emission allowances through auctions and invest proceeds in consumer benefits: energy efficiency, renewable energy, and other clean energy technologies. RGGI is spurring innovation in the clean energy economy and creating green jobs in each state.

Reliability Needs Assessment: is a systematic process for determining and addressing reliability needs, or "gaps" between current reliability conditions and desired reliability conditions or "wants."

Renewable Portfolio Standards: provides states with a mechanism to increase renewable energy generation using a cost-effective, market-based approach that is administratively efficient. An RPS requires electric utilities and other retail electric providers to supply a specified minimum amount of customer load with electricity from eligible renewable energy sources. The goal of an RPS is to stimulate market and technology development so that, ultimately, renewable energy will be economically competitive with conventional forms of electric power. States create RPS programs because of the energy, environmental, and economic benefits of renewable energy and sometimes other clean energy approaches, such as energy efficiency and combined heat and power (CHP). An RPS creates market demand for renewable and clean energy supplies. Currently, states with RPS requirements mandate that between 4 and 30 percent of electricity be generated from renewable sources by a specified date. 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).
- Purchasing electricity from a renewable facility inclusive of all renewable attributes (sometimes called "bundled renewable electricity").

See: www.epa.gov/chp/state-policy/renewable_fs.html

Repowering: (1) Rebuilding and replacing major components of a power plant instead of building a new one." (US EPA). (2) replacing older power stations with newer ones that either have a greater nameplate capacity or more efficiency which results in a net increase of power generated.

Reserve Capacity: The amount of power that can be produced at a given point in time by generating units that are kept available in case of special need. This capacity may be used when unusually high power demand occurs, or when other generating units are off-line for maintenance, repair or refueling.

SMEs (SMBs): Small and medium-sized enterprise (SMEs) or businesses (SMBs) -- and variations thereof -- are companies whose personnel numbers fall below certain limits. The abbreviation "SME" is used in the European Union and by international organizations such as the World Bank, the United Nations and the World Trade Organization (WTO). The term "small and medium businesses" (or "SMBs") is predominantly used in the USA. In most economies, smaller enterprises outnumber large companies by a wide margin. SMEs are said to be responsible for driving innovation and competition in many economic sectors. In the United States, the Small Business Administration sets small business criteria based on industry, ownership structure, revenue and number of employees (which in some circumstances may be as high as 1,500, although the cap is typically 500).

Solar air heating: Heating systems, which use air as the working fluid for absorbing and transferring solar energy. Solar air collectors (devices to heat air using solar energy) can directly heat individual rooms or can potentially pre-heat the air passing into a heat recovery ventilator or through the air coil of an air-source heat pump. Air collectors produce heat earlier and later in the day than liquid systems, so they may produce more

usable energy over a heating season than a liquid system of the same size. Also, unlike liquid systems, air systems do not freeze, and minor leaks in the collector or distribution ducts will not cause significant problems, although they will degrade performance. However, air is a less efficient heat transfer medium than liquid, so solar air collectors operate at lower efficiencies than solar liquid collectors. See: **active solar**

Solar thermal: An innovative technology for harnessing solar energy for thermal energy (heat). Solar thermal collectors are classified by the United States Energy Information Administration as low-, medium-, or high-temperature collectors. Low-temperature collectors are flat plates generally used to heat swimming pools. Medium-temperature collectors are also usually flat plates but are used for heating water or air for residential and commercial use. High-temperature collectors concentrate sunlight using mirrors or lenses and are generally used for electric power production. STE is different from and much more efficient than photovoltaics, which converts solar energy directly into electricity. While existing generation facilities provide only 600 megawatts of solar thermal power worldwide in October 2009, plants for an additional 400 megawatts are under construction and development is underway for concentrated solar power projects totaling 14,000 megawatts. See: **active solar, passive solar, solar water heating, solar air heating.**

Solar water heating: A system in which a heat transfer or "working" fluid such as water, antifreeze (usually non-toxic propylene glycol), or other type of liquid absorbs the solar heat. At the appropriate time, a controller operates a circulating pump to move the fluid through the collector.

The liquid flows rapidly through the collectors, so its temperature only increases 10°–20°F (5.6°–11°C) as it moves through the collector. Heating a smaller volume of liquid to a higher temperature increases heat loss from the collector and decreases the efficiency of the system. The liquid flows to either a storage tank or a heat exchanger for immediate use. See: **active solar.**

Stranded Investment/Costs (Embedded costs): Embedded costs of utility investments exceeding market prices are: 1) costs incurred pursuant to a regulatory or contractual obligation; 2) costs that are reflected in cost-based rates; and 3) cost-based rates that exceed the price of alternatives in the marketplace. ECEMPS may become "stranded costs" where they exceed the amount that can be recovered through the asset's sale. Regulatory questions involve whether such costs should be recovered by utility shareholders and if so, how they should be recovered. "Transition costs" are stranded costs, which are charged to utility customers through some type of fee or surcharge after the assets are sold or separated from the vertically integrated utility. "**Stranded assets**" are assets, which cannot be sold for some reason. The British nuclear plants are an example of stranded assets, which no one would buy. (Also referred to as Transition Costs.)

Supply-Side: Technologies that pertain to the generation of electricity.

Systems Benefit Charge (SBC): A non-bypassable fee on transmission interconnection; funds are allocated among public purposes, including the development and demonstration of renewable energy technologies.

Terawatt: A unit of measure equal to one trillion watts or 1000 gigawatts.

The Solar Energy Consortium (TSEC): The Solar Energy Consortium is an industry-led not-for-profit, formed in 2007, headquartered in Kingston, in the Hudson Valley Region of NYS. It currently has ten employees. TSEC's mission is to expedite the adoption of solar energy in the United States and create a solar R&D and manufacturing cluster in New York State, TSEC brings together industry, academic, and economic development partners to find solutions to the technical, economic, and marketing challenges facing the growing solar industry. TSEC's objectives include:

- Attract and grow sustainable solar energy-related companies. That work created over 250 new higher skill manufacturing/R&D jobs in 2009, projected to total 800 jobs by year-end 2010
- Advance solar innovations - Foster solar energy-related R&D
- Create solar solutions by supporting solar technology applications in the marketplace

- Disseminate information about advances in basic and applied solar energy research, products, systems, and services

See: <http://thesolarec.org/>

Tidal Power: The power available from the rise and fall of ocean tides. A tidal power plant works on the principal of a dam or barrage that captures water in a basin at the peak of a tidal flow, then directs the water through a hydroelectric turbine as the tide ebbs.

Time-of-Use Rates (TOU): The pricing of electricity based on the estimated cost of electricity during a particular time block. Time-of-use rates are usually divided into three or four time blocks per twenty-four hour period (on-peak, mid-peak, off-peak and sometimes super off-peak) and by seasons of the year (summer and winter). Real-time pricing differs from TOU rates in that it is based on actual (as opposed to forecasted) prices, which may fluctuate many times a day and are weather-sensitive, rather than varying with a fixed schedule.

Total Resource Cost Test: The total resource cost (TRC) test is one of many ways used to measure the cost-effectiveness of an energy conservation program. Utility costs are considered in the utility cost (UC) test of cost-effectiveness, which measures the net impact of acquiring a demand side management (DSM) resource based on the utility costs of the program. For both the TRC and UC tests, the benefit side of the equation reflects the value of the energy and capacity saved (i.e. avoided costs). The results of these tests can be expressed as benefit-cost ratios (benefits divided by costs, in net present value), or as net benefits (benefits minus costs, in net present value).

Transmission: The bulk transfer of electrical energy, from generating power plants to electrical substations located near demand centers. This is distinct from the local wiring between high-voltage substations and customers, which is typically referred to as electric power distribution. Transmission lines, when interconnected with each other, become transmission networks. In the US, these are typically referred to as "power grids" or just "the grid."

Turbine: A machine for generating rotary mechanical power from the energy of a stream of fluid (water, steam, hot gases). Turbines convert the kinetic energy of fluids to mechanical energy through the principles of impulse and reaction, or a mixture of the two.

Ultra-high voltage (UHV): 1,000 kV UHV transmission lines can send larger amounts of electricity up to three times further than traditional high voltage 500 kV lines, while also cutting electric "friction" losses by 25% to 40%. UHV can also reduce by 40% the amount of land required to construct the transmission lines.

U.S. Department of Energy (US DOE): The mission of the US DOE is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions. See: <http://energy.gov/>

U.S. Energy Information Administration: Organization, which provides independent information, statistics and analysis on U.S. energy usage. See: www.eia.gov/

Unbundling: Disaggregating electric utility service into its basic components and offering each component separately for sale with separate rates for each component. For example, generation, transmission and distribution could be unbundled and offered as discrete services

Unit Energy Consumption: The measure of the energy usage of an individual appliance or machine (unit). There are three basic methods available to derive unit energy consumption (UEC): load research metering, engineering simulation, and conditional demand analysis. Load research metering involves directly metering each appliance for which a UEC estimate is desired.

Engineering calculations use engineering specifications, along with assumptions regarding the timing and intensity of the utilization for each appliance. Conditional demand analysis is the multivariate regression

analysis of utility billing records combined with customer survey data on residential appliance saturations and household characteristics.

Usage: Energy consumption.

Useful Thermal Output: The thermal energy made available for use in any industrial or commercial process or used in any heating or cooling application, i.e. total thermal energy made available for processes other than electrical generation.

Utility: A regulated entity, which exhibits the characteristics of a natural monopoly. For the purposes of electric industry restructuring, "utility" refers to the regulated, vertically integrated electric company. "Transmission utility" refers to the regulated owner/operator of the transmission system only. "Distribution utility" refers to the regulated owner/operator of the distribution system, which serves retail customers.

Variable Speed Motors: Motors, which adjust their speeds according to output, need reducing energy consumption. Common in energy efficient furnaces, water heaters, and other appliances.

Wind Energy: Energy present in wind motion that can be converted to mechanical energy for driving pumps, mills and electric power generators. Wind pushes against, sails, vanes, or blades radiating from a central rotating shaft.

Wind Turbines: A term used for a wind energy conversion device that produces electricity; typically having one, two, or three blades.

Wheeling: The process of transmitting electricity over one or more separately owned electric transmission and distribution systems. (See Wholesale and Retail Wheeling.)

Wholesale Market: An **electricity market** is a system for effecting purchases, through bids to buy; sales, through offers to sell; and short-term trades generally in the form of financial or obligation swaps. Bids and offers use supply and demand principles to set the price. Long-term trades are contracts similar to power purchase agreements and generally considered private bi-lateral transactions between counterparties. Wholesale transactions (bids and offers) in electricity are typically cleared and settled by the market operator or a special-purpose independent entity charged exclusively with that function. Market operators do not clear trades but often require knowledge of the trade in order to maintain generation and load balance. The commodities within an electric market generally consist of two types: power and energy. Power is the metered net electrical transfer rate at any given moment and is measured in megawatts (MW). Energy is electricity that flows through a metered point for a given period and is measured in megawatt hours (MWh).

Wholesale Wheeling: The wheeling of electric power in amounts and at prices that generally have been negotiated in long term contracts between the power provider and a distributor or very large power customer.

Wood Energy: Wood and wood products used as fuel, including round wood (cord wood), limb wood, wood chips, bark, sawdust, forest residues, charcoal, pulp waste and spent pulping liquors.

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