THE MASSACHUSETTS
CLEAN ENERGY CAUCUS

Clean Energy Glossary

A

Alternative Fuel

An alternative to gasoline or diesel fuel that is not produced in a conventional way from crude oil. Examples include compressed natural gas (CNG), liquefied petroleum gas (LPG), liquefied natural gas (LNG), ethanol, methanol, and hydrogen.

B

Biodiversity

The variety of life in the world or in a particular habitat or ecosystem.

Biofuels

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

C

Carbon Dioxide

A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the earth's radiative balance.

Carbon Sequestration

The uptake and storage of carbon. Trees and plants, for example, absorb carbon dioxide, release oxygen and store carbon. Fossil fuels were at one time biomass and continue to store carbon until burned.

Carbon Stocks

The quantity of carbon stored in biological and physical systems including: trees, products of harvested trees, agricultural crops, plants, wood and paper products and other terrestrial biosphere sinks, soils, oceans, and sedimentary and geological sinks.

Climate

The composite or generally prevailing weather conditions of a region, throughout the year, averaged over a series of years.

Climate Change

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). 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; Natural processes within the climate system (e.g. changes in ocean circulation); 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.).

Coal

Coal is formed from plant and animal matter that has been subjected to geologic heat and pressure, transformed over millions of years into hard black solids. Coal-fired power plants generally cause more pollution per unit of electricity than any other fuel.

Compressed Air Energy Storage

A form of energy storage wherein electricity is used to compress air at up to 1,000 pounds per square inch and store it, often in underground caverns. When electricity demand is high, the pressurized air is released to generate electricity through an expansion turbine generator.

D

Dam

A physical barrier constructed across a river or waterway to control the flow of or raise the level of water. The purpose of construction may be for flood control, irrigation needs, hydroelectric power production, and/or recreation usage.

Distributed Generation

Distributed generation refers to a variety of technologies that generate electricity at or near where it will be used, such as solar panels and combined heat and power. Distributed generation may serve a single structure, such as a home or business, or it may be part of a microgrid.

E

Electric Vehicle

An electric vehicle (EV) is defined as a vehicle that can be powered by an electric motor that draws electricity from a battery and is capable of being charged from an external source.

Energy Efficiency

Energy efficiency refers to products or systems using less energy to do the same or better job than conventional products or systems. Energy efficiency saves energy and money on utility bills, and helps protect the environment by reducing the amount of electricity that needs to be generated.

Energy Retrofit

Modifying an existing building to improve energy efficiency and decrease energy waste.

Environmental Justice

Environmental justice is the equal protection and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits.

Equitable Transition

Achieving a transition to a more sustainable society in a way that is fair and equitable to all members.

Extreme Weather Events

Occurrences of unusually severe weather or climate conditions that can cause devastating impacts on communities and agricultural and natural ecosystems.

F

Flywheel Energy Storage

A form of energy storage wherein electricity is used to accelerate a flywheel (a type of rotor) through which the energy is conserved as kinetic rotational energy. When the energy is needed, the spinning force of the flywheel is used to turn a generator.

G

Geologic Sequestration

A type of engineered sequestration, where captured carbon dioxide is injected for permanent storage into underground geologic reservoirs, such as oil and natural gas fields, saline aquifers, or abandoned coal mines.

Geothermal Power

The Earth's interior heat made usable by extracting it from hot water or rock.

Global Warming

An increase in the near surface temperature of the Earth. Global warming has occurred in the distant past as the result of natural influences, but the term is most often used to refer to the warming predicted to occur as a result of increased emissions of greenhouse gases.

Greenhouse Effect

Warming of the Earth's atmosphere due to gases in the atmosphere that allow solar radiation (visible, ultraviolet) to reach the Earth's atmosphere but do not allow the emitted infrared radiation to pass back out of the Earth's atmosphere.

Greenhouse Gases

Gases in the Earth's atmosphere that contribute to the greenhouse effect, mainly carbon dioxide, methane, nitrous oxide, and fluorinated gases.

Ground-level Ozone

Ground-level ozone is formed by a chemical reaction between volatile organic compounds and oxides of nitrogen in the presence of sunlight. Ozone concentrations can reach unhealthful levels when the weather is hot and sunny with little or no wind. High concentrations of ozone near ground level are harmful to people, animals, crops, and other materials.

H

Heat Pump - Air Source

A heat pump in which a refrigerant transfers thermal energy from the outside air to heat within a building using a refrigeration cycle

Heat Pump - Geothermal

A heat pump in which a refrigerant transfers thermal energy from ground or ground water to heat within a building using a refrigeration cycle.

Hybrid Electric Vehicle

A vehicle combining a battery-powered electric motor with a traditional internal combustion engine. The vehicle can run on either the battery or the engine or both simultaneously, depending on the performance objectives for the vehicle.

Hydraulic Fracturing (Fracking)

A process that stimulates or increases production and ultimate recovery from an oil well by pumping a fluid and a proppant (sand or similar material) at high pressure into a well to create fractures in the reservoir that the proppant holds open. Hydraulic fracturing increases the surface of the formation available for oil and natural gas to flow into the wellbore (the hole drilled into the earth to extract oil and natural gas).

Hydraulic Turbine

A machine that produces power when a wheel or rotor revolves in a fast-moving flow of water.

Hydroelectric Power

The process of generating electricity by harnessing the power of moving water is called hydroelectricity. Hydroelectric power (hydropower) is generated by forcing water that is flowing downstream, often from behind a dam, through a hydraulic turbine that is connected to a generator.

Hydroelectric Power - Run-of-the-River

Electricity generated using the flow of a stream as it occurs and having little or no reservoir capacity for storage.

Hydrogen (H_2)

Hydrogen (H) is the most abundant element in the universe, but it is generally bonded to another element. Hydrogen gas (H_2) is a diatomic gas composed of two hydrogen atoms and is colorless and odorless. Hydrogen is flammable when mixed with oxygen over a wide range of concentrations.

Hydrogen Fuel Cell

A device that produces electricity through an electrochemical process, usually from hydrogen and oxygen.

I

J

K

L

Line Losses

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

Lithium Ion Battery

Type of rechargeable battery that stores energy using the reversible reduction in lithium ions.

M

Methane

A hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 23 times that of carbon dioxide (CO_2). Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Microgrid

A smaller grid that is also tied into the larger electricity delivery system, such as at a major industrial facility, a military base, or a large college campus.

Miles Per Gallon Equivalent (MPGE)

Energy content equivalent to that of a gallon of gasoline (114,320 Btu).

N

Natural Gas

Underground deposits of gases consisting of 50 to 90 percent methane (Ch_3) and small amounts of heavier gaseous hydrocarbon compounds such as propane (C_3H_8) and butane (C_4H_{10}) used as a fuel.

Net Metering

A system in which solar panels or other renewable energy generators are connected to a public-utility power grid and surplus power is transferred onto the grid, allowing customers to offset the cost of power drawn from the utility.

Nitrogen (N_2)

A diatomic colorless, tasteless, odorless gas that constitutes 78% of the atmosphere by volume.

Nitrogen Oxides (NOx)

Any chemical compound of nitrogen and oxygen. Nitrogen oxides result from high temperature and pressure in the combustion chambers of automobile engines and other power plants during the combustion process. When combined with hydrocarbons in the presence of sunlight, nitrogen oxides form smog.

Non Dispatchable

A non-dispatchable source of electricity generates electrical energy but cannot be turned on or off in order to meet societies fluctuating electricity needs, examples include wind power and solar power.

Nuclear Fission

Nuclear energy originates from the splitting of uranium atoms in a process called fission. At a nuclear power plant, the fission process is used to generate heat for producing steam, which is used by a turbine to generate electricity. Because nuclear power plants do not burn fuel, they do not emit air pollutant emissions, but do produce radioactive waste.

Nuclear Fusion

A nuclear reaction in which atomic nuclei of low atomic number fuse to form a heavier nucleus with the release of energy. This reaction does not produce long-lived nuclear waste. The technology is not yet widespread.

Nuclear Waste

Radioactive waste material produced from a nuclear reaction.

O

Ocean Thermal Energy Conversion (OTEC)

The process or technologies for producing energy by harnessing the temperature differences (thermal gradients) between ocean surface waters and that of ocean depths.

Oil

Oil, a liquid fossil fuel, is formed from layers of buried plants and animals that have been subjected to geologic heat and pressure over a long period of time. The energy that the plants and animals originally obtained from the sun is stored in the oil in the form of carbon. In addition to carbon, oil contains elements such as nitrogen, sulfur, mercury, lead, and arsenic.

P

Particulate Matter (PM)

Very small pieces of solid or liquid matter, such as particles of soot, dust, fumes, mists, or aerosols.

Passive Building Design

A set of design principles that reduces a building's ecological footprint and results in very low required energy inputs. Common elements include passive solar, excellent insulation and weatherization, and a consciousness of landscape elements including shade and wind patterns.

Passive Solar Heating

Passive solar technologies convert sunlight into usable heat and cause air movement for ventilating to heat and cool living spaces without active mechanical or electrical devices.

Photovoltaic Cell

An electronic device consisting of layers of semiconductor materials fabricated to form a junction (adjacent layers of materials with different electronic characteristics) and electrical contacts and being capable of converting incident light directly into electricity (direct current).

Photovoltaic Module (PVC)

An integrated assembly of interconnected photovoltaic cells designed to deliver a selected level of working voltage and current at its output terminals, packaged for protection against environmental degradation, and suited for incorporation in photovoltaic power systems.

Pumped Storage Hydropower

A form of energy storage wherein electricity is used to pump water up to a reservoir. When electricity is needed, water is released from the reservoir, it flows down through a turbine to generate electricity.

Q

R

Renewable Energy

A form of energy that is never exhausted because it is renewed by nature (within short time scales; e.g., wind, solar radiation, hydro power).

Reservoir

Body of water that builds up behind a dam.

S

Smog

Smog is the brownish haze that pollutes air, particularly over cities in the summertime. Smog can make it difficult for some people to breathe and it greatly reduces how far we can see through the air. The primary component of smog is ozone, a gas that is created when nitrogen oxides react with other chemicals in the atmosphere, especially in strong sunlight.

Solar Power

The conversion of solar radiation from the sun to electricity through the use of technology.

Solar radiation:

A general term for the visible and near visible (ultraviolet and near-infrared) electromagnetic radiation that is emitted by the sun. It has a spectral, or wavelength, distribution that corresponds to different energy levels; short wavelength radiation has a higher energy than long-wavelength radiation.

Solar Thermal Panels

A system that actively concentrates thermal energy from the sun by means of solar collector panels. The panels typically consist of fat, sun-oriented boxes with transparent covers, containing water tubes under a blackened heat absorbent panel. The energy is usually used for space heating, for water heating, and for heating swimming pools.

Substation

Equipment that reduces high voltage of electrical power transmission to a lower voltage suitable for consumers.

Sulfur Dioxide (SO_2)

High concentrations of sulfur dioxide affect breathing and may aggravate existing respiratory and cardiovascular disease.Sulfur dioxide is also a primary contributor to acid rain, which causes acidification of lakes and streams and can damage trees, crops, historic buildings, and statues. Sulfur dioxide is released primarily from burning fuels that contain sulfur (such as coal, oil, and diesel fuel).

T

Thermal Energy Storage

A form of energy storage wherein electricity is used to produce thermal energy, which can be stored until it is needed. For example, electricity can be used to produce chilled water or ice during times of low demand and later used for cooling during periods of peak electricity consumption.

Transformer

A device that transfers electric energy from one alternating-current circuit to one or more other circuits, either increasing (stepping up) or reducing (stepping down) the voltage.

Transmission

The process of long-distance transport of electrical energy, generally accomplished by raising the electric current to high voltages.

U

V

W

Weather

Atmospheric condition at any given time or place.

Wind Power

Power obtained by harnessing the energy of the wind and converting it to electricity.

Wind Turbine

A wind energy conversion device that produces electricity; typically three blades rotating about a horizontal axis and positioned up-wind of the supporting tower.

X-Z

Zero Energy Building

An energy-efficient building where the actual annual delivered energy is less than or equal to the on-site renewable exported energy.

Definitions sourced / adapted based on resources from EIA, EPA, EERE, USDA, NASA, EEA, and Encyclopedia Britannica