



A - Z

GLOSSARY OF ENERGY TRANSITION TERMS

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Glossary of Energy Transition Terms

ERRA Energy Transition Task Force (ETTF)

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The terms in this glossary are defined in the context of energy transition and climate change.

The purpose of this publication is to provide general definitions of the notions that may be relevant from the perspective of the work of the Energy Transition Task Force of ERRA, and not to give exact and detailed definitions of all the terms listed hereby according to encyclopaedical standards. The authors did best in their ability to provide reliable definitions, however they do not bear responsibility if a given term is misinterpreted or used in an incorrect manner by the audiences.

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A

Adaptation – Anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause, or taking advantage of opportunities that may arise.

Additionality – The amount of “extra good” produced by a carbon-reducing or storage activity relative to the good produced without that activity, or the baseline.

Advanced biofuels – Liquid fuels that are generally derived from non-food-based feedstocks and yield a lifecycle reduction in greenhouse gas emissions of at least 50% compared with fossil fuels.

Advanced biomethane – Use of certain feedstocks such as waste, by-products and integration crops, crops that do not cause indirect land use change for their production.

Aggregation – A function performed by a natural or legal person who combines multiple customer loads or generated electricity for sale, purchase or auction in any electricity market.

Alternative energy – Energy sources other than conventional fuels. They do not directly emit greenhouse gases during energy generation.

Auctioning – The most transparent method for allocating emission allowances that puts into practice the principle “polluter should pay”.

B

Battery electric vehicle (BEV) – A vehicle whose propulsion is entirely electric without any internal combustion engine.

Bidirectional charging – Smart charging where the direction of electric charge may be reversed, so that electric charge flows from the battery to the recharging point it is connected to.

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

Biogas – A mixture of methane and other gases produced by decomposing matter in an oxygen-free (anaerobic) environment with the assistance of microbes. Biogas is typically produced at landfills and anaerobic-digesters.

Biomass – The collective name given to solid biofuels. It typically comes from crop waste, wood, and specific resources that have been grown to create energy through burning in the presence of oxygen.

Biomethanol – Renewable methanol produced from biomass, such as forestry and agricultural waste and byproducts, biogas, sewage, municipal solid waste (MSW) and black liquor from the pulp and paper industry.

Burden sharing (Effort sharing) – In the context of mitigation, burden sharing refers to sharing the effort of reducing the sources or enhancing the sinks of greenhouse gases from historical or projected levels, usually allocated by some criteria, as well as sharing the cost burden across countries.

Baseline scenarios – Scenarios that are based on the assumption that no mitigation policies or measures will be implemented beyond those that are already in force and/or are legislated or planned to be adopted.

C

Cap-and-trade – A system that limits aggregate emissions from a group of emitters by setting a “cap” on maximum emissions.

Carbon – Carbon dioxide or other gaseous carbon compounds released into the atmosphere, associated with climate change.

Carbon Border Adjustment Mechanism (CBAM) – A carbon tariff on carbon intensive products, such as cement and some electricity, imported by the European Union. Legislated as part of the European Green Deal, it takes effect in 2026, with reporting starting in 2023.

Carbon capture and storage (CCS) – Process of reducing carbon emissions to tackle climate change. It’s a three-step process, involving: capturing the carbon dioxide produced by power generation or industrial activity, such as steel or cement making; transporting it; and then storing it deep underground.

Carbon credit – A permit which allows a country or organization to produce a certain amount of carbon emissions and which can be traded if the full allowance is not used.

Carbon footprint – The total amount of greenhouse gases (including carbon dioxide and methane) that are generated by our actions.

Carbon intensity – Carbon intensity is a measure of how clean our electricity is. It refers to how many grams of carbon dioxide (CO₂) are released to produce a kilowatt hour (kWh) of electricity.

Carbon leakage – Carbon leakage describes the risk that companies relocate their headquarters to a different country with laxer climate laws to avoid being subjected to more demanding climate policies, for example carbon pricing schemes. As a result of carbon leakage, there is no net reduction of emissions as the emissions simply occur elsewhere.

Carbon Neutral Commodities – Commodities that have been produced or traded in a way that results in net-zero carbon emissions. The carbon emissions that are generated during the production or transportation of the commodity are offset by an equal amount of carbon reduction or removal activities, such as reforestation, renewable energy projects, or carbon capture and storage.

Carbon neutrality – (Net zero CO₂ emissions) Net zero carbon dioxide emissions are achieved when anthropogenic CO₂ emissions are balanced globally by anthropogenic CO₂ removals over a specified period.

Carbon offsetting – A process that involves a reduction in, removal of, greenhouse gas emissions or an increase in carbon storage in order to compensate for emissions made elsewhere.

Carbon pricing – An instrument that captures the external costs of greenhouse gas emissions—the costs of emissions that the public pays for, such as damage to crops, health care costs from heat waves and droughts, and loss of property from flooding and sea level rise—and ties them to their sources through a price, usually in the form of a price on the carbon dioxide (CO₂) emitted.

Carbon registry – A platform that allows organizations to track, manage and trade greenhouse gas emissions.

Carbon sequestration – The process of storing carbon in a carbon pool.

Carbon Standard – The complete set of rules, procedures, and methodologies according to which certified carbon credits are generated and issued.

Carbon tax – An indirect tax levied on the carbon emissions required to produce goods and services to encourage a reduction in the greenhouse gas emissions.

Carbon trading schemes – The process of buying and selling permits and credits that allow the permit holder to emit carbon dioxide.

Certified Emission Reduction (CER) – A certificate issued by the United Nations to member nations for preventing one tonne of carbon dioxide emissions.

Charging point (CP) – Hardware equipment that supplies electric energy to recharge electric vehicles and plug-in hybrids.

Charging point operator (CPO) – Operator that implements and operates charging points.

Circular economy – Model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible.

Clean energy – Energy that does not pollute the environment thus does not cause climate change.

Climate change – Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer.

Climate change policy – Policy formulated specifically to tackle climate change and can be local, national or international in scope.

Coal phase-out – An environmental policy intended to stop using the combustion of coal in coal-burning power plants, and is part of fossil fuel phase-out.

Compliance market – A market for carbon offsets created by the need to comply with a regulatory act.

Conference of the Parties (COP) – The supreme body of UN conventions, such as the United Nations Framework Convention on Climate Change (UNFCCC), comprising parties with a right to vote that have ratified or acceded to the convention.

CORSIA (The Carbon Offsetting and Reduction Scheme for International Aviation) – A global market-based measure designed to offset international aviation CO₂ emissions in order to stabilize the levels of such emissions.

D

Decarbonisation – The process by which countries, individuals or other entities aim to achieve zero fossil carbon existence. Typically refers to a reduction of the carbon emissions associated with electricity, industry and transport.

Decarbonised economy – An economy based on energy sources that produce low levels of greenhouse gas emissions.

Decentralisation – Energy that is generated close to the site of consumption.

Decoupling – Decoupling (in relation to climate change) is where economic growth is no longer strongly associated with consumption of fossil fuels. Relative decoupling is where both grow but at different rates. Absolute decoupling is where economic growth happens but fossil fuels decline.

Demand-side measures – Policies and programmes for influencing the demand for goods and/or services. In the energy sector, demand-side management aims at reducing the demand for electricity and other forms of energy required to deliver energy services.

Demand response – The change of electricity load by final customers from their normal or current consumption patterns in response to market signals, including in response to time-variable electricity prices or incentive payments, or in response to the acceptance of the final customer's bid to sell demand reduction or increase at a price in an organised market, whether alone or through aggregation.

Digitalisation – Digitalisation is key to integrating renewables into electricity systems, improving the reliability of power grids and reducing the cost of access to electricity, therefore contributing to a more just and equitable energy transition. Digitalisation can help integrate the growing share of renewable energy by delivering flexible electricity systems that provide demand-side solutions and energy storage.

Digital transformation – Allowing the integration of more and more renewable energies throughout the electrical system, increasing network reliability, and helping to better manage energy demand. Digital transformation integrates digitised information and digitalised processes.

Digital twin – A virtual model designed to accurately reflect a physical object, and this technology helps users to optimise and lower facility energy consumption and enables production stabilization through reliable improvements that lead to more consistent energy and so production.

Digitisation – The process of converting analogue information to digital format.

Direct/Indirect emissions – Direct emissions are from sources that are owned or controlled by the reporting entity, while indirect emissions are emissions that are a result of the activities of a reporting entity, but occur at sources owned or controlled by another entity.

Distributed Energy Resources (DER) – Small-scale energy resources usually situated near sites of electricity use, such as rooftop solar panels and battery storage.

Distributed Energy Systems (DES) – A term which encompasses a diverse array of generation, storage and energy monitoring and control solutions.

Distributed generation – A variety of technologies that generate electricity at or near where it will be used, such as solar panels and combined heat and power.

Double counting – The term used when two different parties claim the same environmental benefits from the same generated green power.

E

E-mobility – The principle of using electric propulsion for a wide range of transportation types. This includes cars, buses, trucks and off-road vehicles, as well as ships, ferries and other sea going vessels.

E-roaming – The ability for an EV driver to charge on several charging networks using a single and unique badge or mobile app and receive a single invoice at the end of the month.

Electric Mobility Service Provider (EMSP) – A company offering an EV charging service to EV drivers.

Electric Vehicle (EV) – A vehicle whose propulsion is powered fully or mostly by electricity.

Electrolysis – A chemical process that uses electricity to break down a substance into its constituent elements.

Electrification – The process of replacing technologies that use fossil fuels with technologies that use electricity as a source of energy.

Emissions allocation – The process of distributing allowances to covered entities in an emissions trading system. There are two basic options for allocation: allowances can be either given away (freely allocated) or sold, often by auction.

Emissions cap – An emissions cap limits the maximum amount of greenhouse gas emissions a country or company is allowed to produce during a certain period of time.

Emissions trading – Emissions trading or cap and trade is a government-mandated, market-based approach to controlling pollution by providing economic incentives for achieving reductions in the emissions of pollutants.

Energy carrier – Substance or phenomenon (energy system) that contains energy produced from primary sources that can subsequently be converted to other forms, even at a later time or in another location like hydrogen.

Energy efficiency – Energy efficiency links the energy output to the energy input, meaning that a system, appliance or activity is more energy efficient than another system, appliance or activity if it delivers the same service for less energy input.

Energy mix – The combination of different primary energy sources that make up the total primary energy supply.

Energy poverty – Energy poverty is the lack of adequate warmth, cooling, lighting and the energy to power appliances.

Energy security – The uninterrupted availability of energy sources at an affordable price.

Energy storage – The capture of energy produced at one time for use at a later time.

Energy transition – Gradual and steady transformation of the global energy sector from fossil fuels to low or zero-carbon sources.

Energy transition enablers – Non-generation products or services that facilitate the energy transition, including energy storage, transmission and distribution, electric vehicle charging points and smart meters, amongst others.

Emissions Reduction Units (ERU) – A tradable unit representing one tonne of carbon dioxide-equivalent (tCO₂-e) of emissions abatement or sequestration.

EU Emissions Trading Scheme (EU ETS) – A system based on the idea of creating a price for carbon offers the most cost-effective way to achieve the significant cuts in global greenhouse gas emissions that are needed to prevent climate change from reaching dangerous levels.

European Green Deal – Approved in 2020, is a set of policy initiatives by the European Commission with the overarching aim of making the European Union (EU) climate neutral in 2050.

F

Feed-in-Premium (FIP) – Provides premium payments on top of electricity market price.

Feed-in Tariffs – Minimum prices for feeding into grids electricity generated from renewable energy sources.

Final energy consumption – The total energy consumed by end users.

Flexibility – The ability to adjust supply and demand to achieve that energy balance.

Flexible power production – The capacity to ramp up or ramp down output (or even switch on and off) as needed.

Fossil fuels – Carbon-based fuels from fossil hydrocarbon deposits, including coal, oil, and natural gas.

Free allocations – Transitional method of allocating allowances in contrast to the default method (auctioning).

Fuel switching – Substitution of inefficient fuels with cleaner and economical alternatives.

G

Global warming – The estimated increase in global mean surface temperature (GMST) averaged over a 30-year period, or the 30-year period centred on a particular year or decade, expressed relative to pre-industrial levels unless otherwise specified.

Greenhouse effect – A process that occurs when gases in Earth's atmosphere trap the Sun's heat.

Greenhouse Gas (GHG) – Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself and by clouds. This property causes the greenhouse effect. Water vapour (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) are the primary GHGs in the Earth's atmosphere.

Greenhouse gas emission – The emission into the earth's atmosphere of any of various gases, especially carbon dioxide, that contribute to the greenhouse effect.

Greenwashing – The practice where companies provide a false impression or inflated claims about their environmental credentials.

Guarantees of Origin (GoOs) – A tradable commodity that represents a claim to the environmental benefits associated with renewable power generation.

H

Heat pump – A mechanical system that allows for the transmission of heat from one location (the "source") at a lower temperature to another location (the "sink" or "heat sink") at a higher temperature.

Hybrid power plant – A power plant that generates electricity from more than one source and is usually renewable.

Hybrid electric vehicle – Vehicles that are powered by an internal combustion engine and one or more electric motors, which uses energy stored in batteries. A hybrid electric vehicle cannot be plugged in to charge the battery. Instead, the battery is charged through regenerative braking and by the internal combustion engine.

Hydrogen – A versatile, clean, and safe energy carrier that can be used as fuel for power or in industry as feedstock.

Colours of hydrogen

Green hydrogen is made by using clean electricity from surplus renewable energy sources, such as solar or wind power, to electrolyse water. **Blue hydrogen** is produced mainly from natural gas, using a process called steam reforming, which brings together natural gas and heated water in the form of steam. **Grey hydrogen** is created from natural gas, or methane, using steam methane reformation but without capturing the greenhouse gases made in the process. Grey hydrogen is essentially the same as blue hydrogen, but without the use of carbon capture and storage. **Pink hydrogen** is generated through electrolysis powered by nuclear energy. Nuclear-produced hydrogen can also be referred to as purple hydrogen or red hydrogen. **Black and brown hydrogen** uses black coal or lignite (brown coal) in the hydrogen-making process, these black and brown hydrogen are the absolute opposite of green hydrogen in the hydrogen spectrum and the most environmentally damaging. **Turquoise hydrogen** is made using a process called methane pyrolysis to produce hydrogen and solid carbon. **Yellow hydrogen** is a relatively new phrase for hydrogen made through electrolysis using solar power. **White hydrogen** is a naturally occurring, geological hydrogen found in underground deposits and created through fracking.

I

Independent aggregator – A market participant engaged in aggregation who is not affiliated to the customer's supplier.

Intergovernmental Panel on Climate Change (IPCC) – The United Nations body for assessing the science related to climate change.

Interoperability – The ability of two or more devices from the same vendor, or different vendors, to exchange information and to use that information for correct co-operation.

J

Just transition – Greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind.

K

Kyoto Protocol – The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) is an international treaty adopted in December 1997 in Kyoto, Japan, at the Third Session of the Conference of the Parties (COP3) to the UNFCCC. It contains legally binding commitments, in addition to those included in the UNFCCC.

L

Land use, land-use change and forestry (LULUCF) – A greenhouse gas inventory sector that covers emissions and removals of greenhouse gases resulting from direct human-induced land use such as settlements and commercial uses, land-use change, and forestry activities.

Landfill gas – A natural by-product of the decomposition of organic material in landfills.

Liquefied Natural Gas (LNG) – Natural gas which has been liquefied to minus 162 degrees Celsius at atmospheric pressure. The cooling process shrinks the volume of the gas by 600 times, which makes both storage and long-distance transportation economically feasible.

Low carbon commodity – A product causing low levels of greenhouse gas emissions while produced and used.

Low carbon economy – An economy based on energy sources that produce low levels of greenhouse gas emissions.

M

Measurement, Reporting and Verification (MRV) – A multi-step process to measure the amount of greenhouse gas emissions reduced by a specific mitigation activity, such as reducing emissions from deforestation and forest degradation, over a period of time and report these findings to an accredited third party. The third party then verifies the report so that the results can be certified and carbon credits can be issued.

Microgrid – A small network of electricity users with a local source of supply that is usually attached to a centralized national grid but is able to function independently.

Mine gas – Any of various harmful vapours produced during mining operations.

Mitigation – Making the impacts of climate change less severe by preventing or reducing the emission of greenhouse gases into the atmosphere.

N

National adaptation plans – A flexible process that builds on each country's existing adaptation activities and helps integrate climate change into national decision making.

Nationally Determined Contributions (NDC) – A climate action plan to cut emissions and adapt to climate impacts. Each Party to the Paris Agreement is required to establish an NDC and update it every five years.

Negative emissions – Removal of greenhouse gases from the atmosphere by deliberate human activities.

Net-metering – An electricity billing mechanism that allows residential and commercial customers, who generate their own electricity, to sell the unused amount back to the grid.

Net Zero – Cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance.

O

Omnisumer – Individuals or companies who participate in a dynamic energy ecosystem across a multitude of places, solutions and providers.

P

Paris Agreement – The Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) was adopted on December 2015 in Paris, France, at the 21st session of the Conference of the Parties (COP) to the UNFCCC. One of the goals of the Paris Agreement is 'Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels', recognising that this would significantly reduce the risks and impacts of climate change. Additionally, the Agreement aims to strengthen the ability of countries to deal with the impacts of climate change.

Peer-to-peer trading – The sale of renewable energy between market participants by means of a contract with pre-determined conditions governing the automated execution and settlement of the transaction, either directly between market participants or indirectly through a certified third-party market participant, such as an aggregator. The right to conduct peer-to-peer trading shall be without prejudice to the rights and obligations of the parties involved as final customers, producers, suppliers or aggregators.

Plug-in hybrid electric vehicle (PHEV) – Vehicles that use batteries to power an electric motor, as well as another fuel, such as gasoline or diesel, to power an internal combustion engine or other propulsion source.

Power-to-X – An umbrella term number for electricity conversion, energy storage, and reconversion pathways that use surplus electric power, typically during periods where fluctuating renewable energy generation exceeds load. "X" stands for the type of energy into which the electricity surplus is being converted.

Prosumer – Individuals or companies who are both energy producers and consumers.

Pumped storage – Type of hydroelectric energy storage method that stores and generates energy by moving water between two reservoirs at different elevations.

R

Renewable Energy Certificates (RECs) – A certificate that represents a unit of renewable electricity generated that can be used to verify the fulfilment of an obligation to source a certain percentage of renewable generation as required in Renewable Portfolio standard schemes.

Renewables power purchase agreement – A contract under which a natural or legal person agrees to purchase renewable electricity directly from an electricity producer.

Reforestation – Replanting of forests on lands that have recently been harvested or otherwise cleared of trees.

Regulatory sandbox – A regulatory approach that allows live, time-bound testing of innovations under a regulator's oversight.

Renewable energy – Energy that is capable of being renewed by the natural ecological cycle

Renewable natural gas – Biogas that has been upgraded and placed in the conventional natural gas system.

Repowering – Retrofitting and modernising existing power plants and installations. The idea is to replace older parts or equipment with modern ones that are more powerful.

Roaming platform – A platform that collects and exchanges information regarding the transactions between EMSPs and BEV owners/operators.

S

Sink – A reservoir (natural or human, in soil, ocean, and plants) where a greenhouse gas, an aerosol or a precursor of a greenhouse gas is stored.

Sludge gas – Biogas from the anaerobic fermentation of waste matter in sewage plants.

Smart energy – The process of using devices for energy-efficiency, focuses on powerful, sustainable renewable energy sources that promote greater eco-friendliness while driving down costs.

Smart grid – A grid that delivers electricity from suppliers to consumers using digital technology to save energy, reduce cost and increase reliability and transparency.

Smart meter – An electronic device that provides detailed information on consumption in order to reduce electricity bills and also increases knowledge about the status of the electricity grid, which improves its performance and the quality of service for customers.

Support scheme – Any instrument, scheme or mechanism applied, that promotes the use of energy from renewable sources by reducing the cost of that energy, increasing the price at which it can be sold, or increasing, by means of a renewable energy obligation or otherwise, the volume of such energy purchased. This includes, but is not restricted to, investment aid, tax exemptions or reductions, tax refunds, renewable energy obligation support schemes including those using green certificates, and direct price support schemes including feed-in tariffs and premium payments.

Sustainability – Dynamic process that guarantees the persistence of natural and human systems in an equitable manner.

Sustainable Development Goals (SDGs) – The 17 global goals for development for all countries established by the United Nations through a participatory process and elaborated in the 2030 Agenda for Sustainable Development, including ending poverty and hunger; ensuring health and well-being, education, gender equality, clean water and energy, and decent work; building and ensuring resilient and sustainable infrastructure, cities and consumption; reducing inequalities; protecting land and water ecosystems; promoting peace, justice and partnerships; and taking urgent action on climate change.

Sustainable energy – Effectively, the provision of energy such that it meets the needs of the future without compromising the ability of future generations to meet their own needs. Sustainable Energy has two key components; renewable energy and energy efficiency.

Sustainable taxonomy – A tool to help investors understand whether an economic activity is environmentally sustainable and navigate the transition to a low-carbon economy.

T

Technology transfer – The broad set of processes covering the flows of know-how, experience and equipment and is the result of many day-to-day decisions of the different stakeholders involved.

Time of-use (TOU) tariffs – A method of charging the customer based on the time of day when electricity is consumed.

Transition fuel – A substitute low-carbon fuel for higher content fossil fuels to reduce CO₂ emissions, while deploying renewable energy.

U

Universal access to energy – The United Nation’s Sustainable Development Goal 7 is to “ensure access to affordable, reliable and modern energy for all by 2030.

Utility-scale solar facility– A facility which generates solar power and gives it to the grid, supplying a utility with energy. Utility-scale solar facilities are called “in front of the meter” as opposed to distributed generation systems, which are “behind the meter”

V

Vehicle-to-everything (V2X) – The overarching term for transferring the electricity stored in electric vehicle (EV) batteries to the grid, buildings, houses, and other energy-consuming destinations.

Vehicle-to-grid (V2G) – The power grid uses stored EV electricity to balance loads during high-demand periods, avoids the need to increase generation capacity to meet increased demand to power EVs.

Verified Emission Reductions (VERs) – A type of carbon offset exchanged in the voluntary or over-the-counter market for carbon credits. VERs are usually certified through a voluntary certification process.

Virtual power plants (VPPs) – A network of decentralized, medium-scale power generating units as well as flexible power consumers and storage systems. VPPs help to balance that supply and demand of energy. They connect households and their batteries through networks, to help manage energy flow and reduce reliance on the grid in times of higher demand.

Voluntary market – Carbon markets outside the regulatory carbon framework that does not involve international agreements.

W

Waste-to energy – A form of renewable energy generation through any waste (Animal manure, food waste, wastewater) treatment process that creates energy.

List of Sources

- [ERRA RES Glossary](#)
- [ERRA Natural Gas Glossary](#)
- [IPCC Glossary](#)
- https://afdc.energy.gov/vehicles/electric_basics_phev.html
<https://afdc.energy.gov/vehicles/how-do-hybrid-electric-cars-work#:~:text=Hybrid%20electric%20vehicles%20are%20powered,by%20the%20internal%20combustion%20engine.>
- <https://www.ampeco.com/ev-charging-glossary/>
- <https://biotech4.co.uk/difference-between-biomass-and-biogas/#:~:text=Biomass%20is%20the%20collective%20name,biomass%20as%20an%20energy%20source.>
- <https://carbonpricingdashboard.worldbank.org/what-carbon-pricing#:~:text=Carbon%20pricing%20is%20an%20instrument,to%20their%20sources%20through%20a>
- https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/auctioning_en
- <https://climatehughes.org/ggr-briefing-paper/#:~:text=Carbon%20offsetting%20is%20a%20process,compensate%20for%20emissions%20made%20elsewhere.>
- https://climatepolicyinfohub.eu/glossary/4.html#Energy_efficiency
- <https://climatepolicyinfohub.eu/glossary/carbon-leakage.html>
- <https://climatepolicyinfohub.eu/index.html>
- http://documentacion.ideam.gov.co/openbiblio/bvirtual/005133/ipcc/tectran/IPCC_SRTT.pdf
- <https://driivz.com/glossary/vehicle-to-everything-v2x/>
- [https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Emissions_trading_system_\(ETS\)#:~:text=The%20European%20Union%20Emission%20trading,change%20from%20reaching%20dangerous%20levels.](https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Emissions_trading_system_(ETS)#:~:text=The%20European%20Union%20Emission%20trading,change%20from%20reaching%20dangerous%20levels.)
- https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Final_energy_consumption#:~:text=Final%20energy%20consumption%20is%20the,by%20the%20energy%20sector%20itself.
- https://en.wikipedia.org/wiki/Carbon_Border_Adjustment_Mechanism
- https://en.wikipedia.org/wiki/Circular_economy
- https://en.wikipedia.org/wiki/Coal_phase-out
- https://en.wikipedia.org/wiki/Energy_storage#:~:text=Energy%20storage%20is%20the%20capture,called%20an%20accumulator%20or%20battery.
- https://en.wikipedia.org/wiki/European_Green_Deal

- [https://en.wikipedia.org/wiki/Heat_pump_and_refrigeration_cycle#:~:text=A%20heat%20pump%20is%20a,%22\)%20at%20a%20higher%20temperature.](https://en.wikipedia.org/wiki/Heat_pump_and_refrigeration_cycle#:~:text=A%20heat%20pump%20is%20a,%22)%20at%20a%20higher%20temperature.)
- [https://en.wikipedia.org/wiki/Land_use,_land-use_change,_and_forestry#:~:text=Land%20use%2C%20land%2Duse%20change%2C%20and%20forestry%20\(LULUCF,%2C%20land%2Duse%20change%2C%20and](https://en.wikipedia.org/wiki/Land_use,_land-use_change,_and_forestry#:~:text=Land%20use%2C%20land%2Duse%20change%2C%20and%20forestry%20(LULUCF,%2C%20land%2Duse%20change%2C%20and)
- https://en.wikipedia.org/wiki/Low-carbon_economy
- [https://en.wikipedia.org/wiki/Low-carbon_economy#:~:text=A%20low%2Dcarbon%20economy%20\(LCE,since%20the%20mid%2D20th%20century](https://en.wikipedia.org/wiki/Low-carbon_economy#:~:text=A%20low%2Dcarbon%20economy%20(LCE,since%20the%20mid%2D20th%20century)
- https://en.wikipedia.org/wiki/Voluntary_Emission_Reduction#:~:text=Voluntary%20Emission%20Reductions%20or%20Verified,through%20a%20voluntary%20certification%20process.
- https://energy.ec.europa.eu/topics/energy-systems-integration/digitalisation-energy-system_en#:~:text=Digitalisation%20can%20help%20integrate%20the,side%20solutions%20and%20energy%20storage.&text=Digitalisation%20has%20an%20impact%20along,%2C%20distribution%2C%20supply%20and%20consumption.
- https://energyeducation.ca/encyclopedia/Energy_mix
- <https://fsr.eui.eu/interoperability-of-energy-services-in-europe-whats-behind-it/>
- <https://ghgprotocol.org/calculationg-tools-faq#:~:text=Direct%20GHG%20emissions%20are%20emissions,or%20controlled%20by%20another%20entity.>
- <https://hydrogencouncil.com/wp-content/uploads/2017/06/Hydrogen-Council-Vision-Document.pdf>
- <https://icapcarbonaction.com/en/allocation>
- https://www.ifri.org/sites/default/files/atoms/files/mathieu_eyl-mazzega_biomethane_2019.pdf
- <https://languages.oup.com/google-dictionary-en>
- <https://op.europa.eu/webpub/eca/special-reports/emissions-trading-system-18-2020/en/>
- <https://www.sciencedirect.com/science/article/pii/S1364032120308364#:~:text=Transition%20fuel%20in%20this%20context,the%20near%20future%20%5B3%5D>
- <https://smartenergyusa.com/what-is-smart-energy/#:~:text=Smart%20energy%20is%20the%20process,friendliness%20while%20driving%20down%20costs>
- <https://sympower.net/what-is-electrification-definition-and-examples/>
- <https://vcprimer.org/chapter-7-what-is-the-role-of-carbon-standards-in-the-voluntary-carbon-market/>
- <https://wiki.energytransition.org/glossary/e/>
- <https://www.agl.com.au/thehub/articles/2020/05/spotlight-on-flexible-generation#:~:text=The%20case%20for%20flexible%20generation&text=Unlike%20baseload%20power%2C%20flexible%20generation,it%20can%20do%20it%20quickly.>

- https://www.arup.com/-/media/arup/files/publications/d/des_full-report.pdf
- <https://www.bmwi-energiwende.de/EWD/Redaktion/EN/Newsletter/2016/08/Meldung/direkt-answers.html#:~:text=Repowering%20means%20retrofitting%20and%20modernising,power%20plant%20or%20power%20installation.>
- <https://www.britannica.com/technology/mine-gas#:~:text=mine%20gas%2C%20any%20of%20various,occurs%20naturally%20in%20coal%20seams.>
- <https://www.buschsystems.com/resource-center/knowledgeBase/glossary/what-is-the-certified-emissions-reduction-cer>
- <https://www.chevron.com/newsroom/2022/q2/things-to-know-about-renewable-natural-gas>
- <https://www.ciocoverage.com/digital-transformation-in-energy-sector/#:~:text=Digital%20transformation%20is%20a%20crucial,to%20better%20manage%20energy%20demand.>
- <https://www.cleanenergyregulator.gov.au/OSR/ANREU/types-of-emissions-units/emission-reduction-units#:~:text=Under%20the%20Kyoto%20rules%2C%20an,of%20emissions%20abatement%20or%20sequestration.>
- <https://www.danfoss.com/en/about-danfoss/insights-for-tomorrow/e-mobility/#:~:text=Electromobility%20E%20%80%93%20also%20known%20as%20e,and%20othe%20sea%20going%20vessels.>
- <https://www.eea.europa.eu/help/faq/what-is-the-difference-between>
- <https://www.eia.gov/tools/glossary/index.php>
- <https://www.enelgreenpower.com/learning-hub/glossary>
- [https://www.energypartnership-turkiye.org/fileadmin/user_upload/turkey/media_elements/Handbook on Planning and Operating an E-Mobility Infrastructure.pdf](https://www.energypartnership-turkiye.org/fileadmin/user_upload/turkey/media_elements/Handbook_on_Planning_and_Operating_an_E-Mobility_Infrastructure.pdf)
- <https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts#:~:text=Distributed%20generation%20refers%20to%20a,and%20combined%20heat%20and%20power>
- [https://www.epa.gov/lmop/basic-information-about-landfill-gas#:~:text=Landfill%20gas%20\(LFG\)%20is%20a,of%20non%20methane%20organic%20compounds.](https://www.epa.gov/lmop/basic-information-about-landfill-gas#:~:text=Landfill%20gas%20(LFG)%20is%20a,of%20non%20methane%20organic%20compounds.)
- <https://www.esgthereport.com/what-are-carbon-registry-systems-all-you-need-to-know/#:~:text=A%20carbon%20registry%20system%20is,report%20and%20verify%20emission%20reductions.>
- [https://www.etipbioenergy.eu/images/ETIP Bioenergy Biomethanol production and use as fuel.pdf](https://www.etipbioenergy.eu/images/ETIP_Bioenergy_Biomethanol_production_and_use_as_fuel.pdf)

- https://www.ey.com/en_gl/news/2021/10/the-rise-of-the-omnisumer-offers-energy-providers-an-opportunity-to-create-a-sophisticated-customer-experience
- https://www.faa.gov/about/office_org/headquarters_offices/apl/aee/corsia#:~:text=The%20Carbon%20Offsetting%20and%20Reduction,the%20levels%20of%20such%20emissions.
- <https://www.gireve.com/roaming-conveniently-connected-the-smart-way-of-charging/>
- <https://www.iberdrola.com/innovation/smart-meters#:~:text=A%20smart%20meter%20provides%20detailed,quality%20of%20service%20for%20customers.>
- <https://www.iea.org/reports/unlocking-the-potential-of-distributed-energy-resources>
- <https://www.iea.org/topics/energy-access>
- <https://www.iea.org/topics/energy-security>
- <https://www.ipcc.ch/about/>
- <https://www.law.cornell.edu/wex/cap-and-trade#:~:text=Cap%2Dand%2Dtrade%20is%20a,fuel%20alternatives%20and%20energy%20efficiency.>
- https://www.linkedin.com/pulse/carbon-neutral-commodities-emerging-trend-industry-faye-wang-yaoyao/?trk=public_post
- <https://www.mass.gov/service-details/advanced-biofuels>
- <https://www.nationalgrid.com/stories/energy-explained/hydrogen-colour-spectrum>
- <https://www.nationalgrid.com/stories/energy-explained/what-is-carbon-intensity#:~:text=Carbon%20intensity%20is%20a%20measure,generated%20creates%20CO2%20emissions.>
- <https://www.nationalgrid.com/stories/energy-explained/what-is-ccs-how-does-it-work>
- <https://www.nationalgrideso.com/document/189851/download#:~:text=Energy%20system%20flexibility%20is%20the,beyond%20the%20scope%20of%20FES1.>
- <https://www.nature.com/subjects/climate-change-policy#:~:text=Definition,national%20or%20international%20in%20scope>
- <https://www.nature.org/en-us/get-involved/how-to-help/carbon-footprint-calculator/>
- [https://www.next-kraftwerke.com/vpp/virtual-power-plant#:~:text=A%20Virtual%20Power%20Plant%20\(VPP,technology%20that%20powers%20our%20VPP.](https://www.next-kraftwerke.com/vpp/virtual-power-plant#:~:text=A%20Virtual%20Power%20Plant%20(VPP,technology%20that%20powers%20our%20VPP.)
- <https://www.scottishpower.co.uk/greenwashing#:~:text=Greenwashing%20is%20the%20practice%20where,friendly%20than%20they%20really%20are.>
- <https://www.solar.vic.gov.au/how-does-virtual-power-plant-work#:~:text=VPPs%20help%20to%20balance%20that,in%20times%20of%20higher%20demand.>

- [https://www.trackmyelectricity.com/learn-more/certificate-system/#:~:text=A%20Guarantee%20of%20Origin%20\(GO,associated%20with%20renewable%20power%20generation.](https://www.trackmyelectricity.com/learn-more/certificate-system/#:~:text=A%20Guarantee%20of%20Origin%20(GO,associated%20with%20renewable%20power%20generation.)
- <https://www.un.org/en/climatechange/all-about-ndcs#:~:text=Simply%20put%2C%20an%20NDC%2C%20or,update%20it%20every%20five%20years.>
- <https://www.un.org/en/climatechange/net-zero-coalition#:~:text=What%20is%20net%20zero%3F,oceans%20and%20forests%20for%20instance.>
- <https://www.unep.org/explore-topics/energy/what-we-do/digitalisation-energy>
- <https://www.unescap.org/sites/default/files/14.%20FS-Decentralized-energy-system.pdf>
- <https://www.unpri.org/policy/eu-policy/eu-taxonomy#:~:text=The%20EU%20taxonomy%20of%20sustainable,to%20a%20low%2Dcarbon%20economy.>
- [https://www.un-redd.org/glossary/voluntary-markets#:~:text=The%20term%20used%20to%20describe,companies%2C%20airlines\)%20and%20individuals.](https://www.un-redd.org/glossary/voluntary-markets#:~:text=The%20term%20used%20to%20describe,companies%2C%20airlines)%20and%20individuals.)
- <http://www.unescwa.org/sd-glossary/sewage-sludge-gas>
- [https://www.unsgsa.org/sites/default/files/resources-files/2020-09/Fintech Briefing Paper Regulatory Sandboxes.pdf](https://www.unsgsa.org/sites/default/files/resources-files/2020-09/Fintech%20Briefing%20Paper%20Regulatory%20Sandboxes.pdf)
- <https://www.virta.global/blog/emsp-cpo-ev-charging-roles-responsibilities#:~:text=An%20e%2Dmobility%20service%20provider%20is%20a%20company%20offering%20an,points%20around%20a%20geographic%20area.>
- <https://www.woodlandcarboncode.org.uk/standard-and-guidance/1-eligibility/1-6-additionality#:~:text=checked%20at%20validation,-.What%20is%20additionality%3F,a%20given%20project%20or%20activity>
- <https://www.worldbank.org/en/news/feature/2022/07/27/what-you-need-to-know-about-the-measurement-reporting-and-verification-mrv-of-carbon-credits>
- <https://www.wri.org/insights/clarifying-unfccc-national-adaptation-plan-process>
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