

Glossary

CCS: Carbon capture and storage is a set of technologies to capture CO₂ and inject it into carefully selected geological formations for safe, secure and permanent storage. CCS is recognized as a key option for reducing CO₂ emissions.

CCU: Carbon capture and utilization is a set of technologies to capture CO₂ and utilize it to make useable products and services.

Conventional vehicle: A type of light-duty vehicle with an internal combustion engine, typically either a gasoline-fueled spark ignition engine or a diesel-fueled compression ignition engine. Conventional includes vehicles with advanced technologies such as turbocharging and “mild hybrid” features such as a stop-start engine.

Electric vehicle (BEV): A type of light-duty vehicle that uses an electric motor exclusively. The motor is powered by a rechargeable electric battery.

Generation efficiency: The ratio of useful energy output to energy input in the generation of electricity from primary energy sources. Generation efficiency typically varies by generation type and region, however wind, solar PV and hydro are assumed to be 100% efficient.

Heavy-duty vehicle (HDV): A classification of road vehicles, primarily for commercial use, that include light, medium and heavy trucks, and buses. Heavy-duty fuel demand also includes other unclassified road fuel demand, such as 3-wheel vehicles.

Hybrid vehicle: A “full” hybrid is a type of light-duty vehicle that has a battery (usually a nickel metal hydride) and an electric motor, as well as a conventional internal combustion engine. When brakes are applied, the energy of the moving vehicle is stored in the battery and can be used later, thus saving fuel.

Hydrogen fuel cell vehicle: A type of light-duty vehicle for which hydrogen is the fuel and is stored onboard. This hydrogen is passed through a fuel cell that then provides electricity to power the vehicle.

Light-duty vehicle (LDV): A classification of road vehicles that includes cars, light trucks and sport utility vehicles (SUVs). Motorcycles are not included in the light-duty vehicle fleet size or fuel-economy, but the fuel used in motorcycles is included in light-duty transportation demand.

Liquefied natural gas (LNG): Natural gas (predominantly methane) that has been super-chilled for conversion to liquid form for ease of transport.

Liquefied petroleum gas (LPG): A classification of liquid hydrocarbon fuel including propane, butane and other similar hydrocarbons with low molecular weight.

Liquids: An energy classification that includes oil, liquid biofuels (such as ethanol and biodiesel) and derived liquids (e.g., gas-to-liquids)

Natural gas: An energy classification that includes natural gas (primarily methane) and synthetic gas (e.g., from coal-to-gas). Natural gas demand includes flared gas.

Natural gas liquid (NGL): A liquid fuel produced chiefly in association with natural gas. NGLs are components of natural gas that are separated from the gaseous state into liquid form during natural gas processing. Ethane, propane, butane, isobutane and pentane are all NGLs.

Oil: Oil supply includes crude oil (such as that coming from conventional, tight oil, deepwater and oil sands developments), condensate and natural gas liquids. Oil demand includes products such as gasoline, diesel, naphtha, kerosene/jet fuel, fuel oil, ethane, LPG, lubricants, asphalt, pet coke and refinery gas produced in oil refineries, natural gas processing plants or derived liquids plants (e.g., gas-to-liquids). Oil demand also includes crude oil and condensate that is used directly (e.g., for electricity generation). Oil excludes liquid biofuels.

Organisation for Economic Co-operation and Development (OECD): A forum for about 36 nations from across the world that work with each other, as well as with many more partner nations, to promote policies that will improve the economic and social well-being of people around the world. In this Outlook, **OECD** is referring to the 36 nations that are members of the forum; **Non-OECD** is a term used collectively for countries other than the above defined OECD nations.

“Other [geography]”/“Rest of [geography]”: Used in chart labels to cover the remaining geography referenced less any regions or countries independently plotted and/or represented on the chart.

Plug-in hybrid electric vehicle (PHEV): A type of light-duty vehicle that typically uses an electric motor. Unlike other electric vehicles, a PHEV also has a conventional internal combustion engine that can charge its battery using petroleum fuels if needed, and in some cases power the vehicle.

Primary energy: Includes energy in the form of oil, natural gas, coal, nuclear, hydro, geothermal, wind, solar and bioenergy sources (biofuels, municipal solid waste, traditional biomass) consumed as a fuel or used as a feedstock (i.e., for the production of chemicals, asphalt, lubricants, waxes and other specialty products). Coal demand includes metallurgical coal. Gas demand includes flared gas. To avoid double counting, derived liquids (e.g., gas-to-liquids) and synthetic gas (e.g., from coal-to-gas) are only accounted for in their final form (i.e., liquid or gas) and not in the energy type from which they were derived (i.e., gas or coal). The fuel and loss involved in the conversion process is accounted for in the energy industry sub-sector. Primary energy does not include electricity, market heat or hydrogen, which are secondary energy types reflecting conversion /production from primary energy sources.

Secondary energy: Energy types, including electricity, market heat and hydrogen, that are derived from primary energy sources. For example, electricity is a secondary energy type generated using natural gas, wind or other primary energy sources.

Glossary (continued)

| Unit | Description | Unit Type | Approximate conversion 1 QUAD = |
|---|---|------------|------------------------------------|
| Quadrillion BTU (QUAD) ⁽¹⁾ | Quadrillion (10 ¹⁵) British thermal units | Energy | 1 |
| Exajoule | Exa (10 ¹⁸) joules | Energy | 1.05 |
| MBDOE ⁽²⁾ | Million (10 ⁶) barrels per day oil equivalent | Energy | 0.49 |
| TWh | Tera (10 ¹²) watt-hours | Energy | 293 |
| BCFD | Billion (10 ⁹) cubic feet per day | Gas volume | 2.9 |
| TCF | Trillion (10 ¹²) cubic feet | Gas volume | 1.06 |
| GW | Giga (10 ⁹) watts | Power | N/A |
| Billion Tonnes CO ₂ ⁽³⁾ | Billion (10 ⁹) metric tons energy-related CO ₂ emissions | Emissions | N/A |

Table notes:

(1) For oil products, energy content is based on the specific energy density of each product (e.g., gasoline, diesel, LPG, etc.).

(2) MBDOE - Oil products are reported in physical barrels; all other energy types are reported on an oil-equivalent energy basis.

(3) CO₂ emissions from the combustion of fossil fuels.

Starting in the *2019 Energy Outlook*, the combustion of biofuels is assumed to have zero net CO₂ emissions (i.e., CO₂ emissions from combustion exactly balances against the photosynthetic uptake of CO₂ in the growth of biomass used in biofuels), consistent with traditional biomass. This change is intended to bring estimation of energy-related CO₂ emissions from biofuels in line with the method used for other fuel types and is consistent with the methodology used by the IEA.

Previous *Outlooks* attributed to biofuels the net carbon emissions over the full land-use cycle.