

## General conversion factors for energy

Convert to:	TJ	Gcal	Mtoe	MBtu	GWh
<b>From:</b>	multiply by:				
<b>TJ</b>	1	238.8	$2.388 \times 10^{-5}$	947.8	0.2778
<b>Gcal</b>	$4.1868 \times 10^{-3}$	1	$10^{-7}$	3.968	$1.163 \times 10^{-3}$
<b>Mtoe</b>	$4.1868 \times 10^4$	$10^7$	1	$3.968 \times 10^7$	11 630
<b>MBtu</b>	$1.0551 \times 10^{-3}$	0.252	$2.52 \times 10^{-8}$	1	$2.931 \times 10^{-4}$
<b>GWh</b>	3.6	860	$8.6 \times 10^{-5}$	3 412	1

Note: There is no generally accepted definition of boe; typically the conversion factors used vary from 7.15 to 7.40 boe per toe.

## Currency conversions

Exchange rates (2019 annual average)	1 US Dollar equals:
British Pound	0.78
Chinese Yuan Renminbi	6.91
Euro	0.89
Indian Rupee	70.42
Indonesian Rupiah	14 147.67
Japanese Yen	109.01
Russian Ruble	64.74
South African Rand	14.45

Source: OECD National Accounts Statistics: purchasing power parities and exchange rates dataset, July 2020.

## Definitions

**Advanced biofuels:** Sustainable fuels produced from non-food crop feedstocks, which are capable of delivering significant lifecycle greenhouse gas emissions savings compared with fossil fuel alternatives, and which do not directly compete with food and feed crops for agricultural land or cause adverse sustainability impacts. This definition differs from the one used for “advanced biofuels” in the US legislation, which is based on a minimum 50% lifecycle greenhouse gas reduction and which, therefore, includes sugar cane ethanol.

**Agriculture:** Includes all energy used on farms, in forestry and for fishing.

**Aviation:** This transport mode includes both domestic and international flights and their use of aviation fuels. Domestic aviation covers flights that depart and land in the same country; flights for military purposes are also included. International aviation includes flights that land in a country other than the departure location.

**Back-up generation capacity:** Households and businesses connected to the main power grid may also have some form of “back-up” power generation capacity that can, in the event of disruption, provide electricity. Back-up generators are typically fuelled with diesel

or gasoline and capacity can be as little as a few kilowatts. Such capacity is distinct from mini-grid and off-grid systems that are not connected to the main power grid.

**Biodiesel:** Diesel-equivalent, processed fuel made from the transesterification (a chemical process that converts triglycerides in oils) of vegetable oils and animal fats.

**Bioenergy:** Energy content in solid, liquid and gaseous products derived from biomass feedstocks and biogas. It includes solid biomass, biofuels and biogases.

**Biofuels:** Liquid fuels derived from biomass or waste feedstocks and include ethanol and biodiesel. They can be classified as conventional and advanced biofuels according to the technologies used to produce them and their respective maturity. Unless otherwise stated, biofuels are expressed in energy-equivalent volumes of gasoline and diesel.

**Biogas:** A mixture of methane, CO<sub>2</sub> and small quantities of other gases produced by anaerobic digestion of organic matter in an oxygen-free environment.

**Biogases:** Includes both biogas and biomethane.

**Biomethane:** Biomethane is a near-pure source of methane produced either by “upgrading” biogas (a process that removes any CO<sub>2</sub> and other contaminants present in the biogas) or through the gasification of solid biomass followed by methanation. It is also known as renewable natural gas.

**Buildings:** The buildings sector includes energy used in residential, commercial and institutional buildings and non-specified other. Building energy use includes space heating and cooling, water heating, lighting, appliances and cooking equipment.

**Bunkers:** Includes both international marine bunkers and international aviation bunkers.

**Capacity credit:** Proportion of the capacity that can be reliably expected to generate electricity during times of peak demand in the grid to which it is connected.

**Clean cooking facilities:** Cooking facilities that are considered safer, more efficient and more environmentally sustainable than the traditional facilities that make use of solid biomass (such as a three-stone fire). This refers primarily to improved solid biomass cookstoves, biogas systems, liquefied petroleum gas stoves, ethanol and solar stoves.

**Coal:** Includes both primary coal (including lignite, coking and steam coal) and derived fuels (including patent fuel, brown-coal briquettes, coke-oven coke, gas coke, gas-works gas, coke-oven gas, blast furnace gas and oxygen steel furnace gas). Peat is also included.

**Coalbed methane (CBM):** Category of unconventional natural gas, which refers to methane found in coal seams.

**Coal-to-gas (CTG):** Process in which mined coal is first turned into syngas (a mixture of hydrogen and carbon monoxide) and then into “synthetic” methane.

**Coal-to-liquids (CTL):** Transformation of coal into liquid hydrocarbons. It can be achieved through either coal gasification into syngas (a mixture of hydrogen and carbon monoxide),

combined using the Fischer-Tropsch or methanol-to-gasoline synthesis process to produce liquid fuels, or through the less developed direct-coal liquefaction technologies in which coal is directly reacted with hydrogen.

**Coking coal:** Type of coal that can be used for steel making (as a chemical reductant and source heat), where it produces coke capable of supporting a blast furnace charge. Coal of this quality is also commonly known as metallurgical coal.

**Conventional biofuels:** Fuels produced from food crop feedstocks. These biofuels are commonly referred to as first generation and include sugar cane ethanol, starch-based ethanol, fatty acid methyl ester (FAME) and straight vegetable oil (SVO).

**Decomposition analysis:** Statistical approach that decomposes an aggregate indicator to quantify the relative contribution of a set of pre-defined factors leading to a change in the aggregate indicator. The *World Energy Outlook* uses an additive index decomposition of the type Logarithmic Mean Divisia Index (LMDI).

**Demand-side integration (DSI):** Consists of two types of measures: actions that influence load shape such as energy efficiency and electrification; and actions that manage load such as demand-side response.

**Demand-side response (DSR):** Describes actions which can influence the load profile such as shifting the load curve in time without affecting the total electricity demand, or load shedding such as interrupting demand for short duration or adjusting the intensity of demand for a certain amount of time.

**Dispatchable:** Dispatchable generation refers to technologies whose power output can be readily controlled - increased to maximum rated capacity or decreased to zero - in order to match supply with demand.

**Electricity demand:** Defined as total gross electricity generation less own use generation, plus net trade (imports less exports), less transmissions and distribution losses.

**Electricity generation:** Defined as the total amount of electricity generated by power only or combined heat and power plants including generation required for own use. This is also referred to as gross generation.

**Energy sector CO<sub>2</sub> emissions:** Carbon dioxide emissions from fuel combustion (excluding non-renewable waste). Note that this does not include fugitive emissions from fuels, CO<sub>2</sub> from transport, storage emissions or industrial process emissions.

**Energy sector GHG emissions:** CO<sub>2</sub> emissions from fuel combustion plus fugitive and vented methane, and nitrous dioxide (N<sub>2</sub>O) emissions from the energy and industry sectors.

**Energy services:** See useful energy.

**Ethanol:** Refers to bio-ethanol only. Ethanol is produced from fermenting any biomass high in carbohydrates. Today, ethanol is made from starches and sugars, but second-generation

technologies will allow it to be made from cellulose and hemicellulose, the fibrous material that makes up the bulk of most plant matter.

**Gas-to-liquids (GTL):** Process featuring reaction of methane with oxygen or steam to produce syngas (a mixture of hydrogen and carbon monoxide) followed by synthesis of liquid products (such as diesel and naphtha) from the syngas using Fischer-Tropsch catalytic synthesis. The process is similar to those used in coal-to-liquids.

**Heat (end-use):** Can be obtained from the combustion of fossil or renewable fuels, direct geothermal or solar heat systems, exothermic chemical processes and electricity (through resistance heating or heat pumps which can extract it from ambient air and liquids). This category refers to the wide range of end-uses, including space and water heating, and cooking in buildings, desalination and process applications in industry. It does not include cooling applications.

**Heat (supply):** Obtained from the combustion of fuels, nuclear reactors, geothermal resources and the capture of sunlight. It may be used for heating or cooling, or converted into mechanical energy for transport or electricity generation. Commercial heat sold is reported under total final consumption with the fuel inputs allocated under power generation.

**Hydrogen:** Hydrogen is an energy carrier that can be burnt or used in fuel cells to generate electricity and heat. Main production pathways are natural gas reforming and electrolysis of water. It is called low-carbon if hydrogen is produced via CCUS-equipped reformers or electrolyzers running on low-carbon electricity.

**Hydropower:** The energy content of the electricity produced in hydropower plants, assuming 100% efficiency. It excludes output from pumped storage and marine (tide and wave) plants.

**Industry:** The sector includes fuel used within the manufacturing and construction industries. Key industry branches include iron and steel, chemical and petrochemical, cement, and pulp and paper. Use by industries for the transformation of energy into another form or for the production of fuels is excluded and reported separately under other energy sector. Consumption of fuels for the transport of goods is reported as part of the transport sector, while consumption by off-road vehicles is reported under industry.

**International aviation bunkers:** Includes the deliveries of aviation fuels to aircraft for international aviation. Fuels used by airlines for their road vehicles are excluded. The domestic/international split is determined on the basis of departure and landing locations and not by the nationality of the airline. For many countries this incorrectly excludes fuels used by domestically owned carriers for their international departures.

**International marine bunkers:** Covers those quantities delivered to ships of all flags that are engaged in international navigation. The international navigation may take place at sea, on inland lakes and waterways, and in coastal waters. Consumption by ships engaged in domestic navigation is excluded. The domestic/international split is determined on the basis of port of departure and port of arrival, and not by the flag or nationality of the ship.

Consumption by fishing vessels and by military forces is also excluded and included in residential, services and agriculture.

**Investment:** All investment data and projections reflect spending across the lifecycle of a project, i.e. the capital spent is assigned to the year when it is incurred. Investments for oil, gas and coal include production, transformation and transportation; those for the power sector include refurbishments, uprates, new builds and replacements for all fuels and technologies for on-grid, mini-grid and off-grid generation, as well as investment in transmission and distribution, and battery storage. Investment data are presented in real terms in year-2019 US dollars unless otherwise stated.

**Lignite:** Type of coal that is used in the power sector mostly in regions near lignite mines due to its low energy content and typically high moisture levels, which generally makes long-distance transport uneconomic. Data on lignite in the *World Energy Outlook* includes peat, a solid formed from the partial decomposition of dead vegetation under conditions of high humidity and limited air access.

**Liquids:** Refers to the combined use of oil and biofuels (expressed in energy-equivalent volumes of gasoline and diesel).

**Lower heating value:** Heat liberated by the complete combustion of a unit of fuel when the water produced is assumed to remain as a vapour and the heat is not recovered.

**Middle distillates:** Include jet fuel, diesel and heating oil.

**Mini-grids:** Small grid systems linking a number of households or other consumers.

**Modern energy access:** Includes household access to a minimum level of electricity; household access to safer and more sustainable cooking and heating fuels, and stoves; access that enables productive economic activity; and access for public services.

**Modern renewables:** Includes all uses of renewable energy with the exception of traditional use of solid biomass.

**Modern use of solid biomass:** Refers to the use of solid biomass in improved cookstoves and modern technologies using processed biomass such as pellets.

**Natural gas:** Comprises gases occurring in deposits, whether liquefied or gaseous, consisting mainly of methane. It includes both “non-associated” gas originating from fields producing hydrocarbons only in gaseous form, and “associated” gas produced in association with crude oil as well as methane recovered from coal mines (colliery gas). Natural gas liquids (NGLs), manufactured gas (produced from municipal or industrial waste, or sewage) and quantities vented or flared are not included. Gas data in cubic metres are expressed on a “gross” calorific value basis and are measured at 15 °C and at 760 mm Hg (“Standard Conditions”). Gas data expressed in tonnes of oil equivalent, mainly for comparison reasons with other fuels, are on a “net” calorific basis. The difference between the net and the gross calorific value is the latent heat of vaporisation of the water vapour

produced during combustion of the fuel (for gas the net calorific value is 10% lower than the gross calorific value).

**Natural gas liquids (NGLs):** Liquid or liquefied hydrocarbons produced in the manufacture, purification and stabilisation of natural gas. These are those portions of natural gas which are recovered as liquids in separators, field facilities or gas processing plants. NGLs include but are not limited to ethane (when it is removed from the natural gas stream), propane, butane, pentane, natural gasoline and condensates.

**Non-energy use:** Fuels used for chemical feedstocks and non-energy products. Examples of non-energy products include lubricants, paraffin waxes, asphalt, bitumen, coal tars and oils as timber preservatives.

**Nuclear:** Refers to the primary energy equivalent of the electricity produced by a nuclear plant, assuming an average conversion efficiency of 33%.

**Off-grid systems:** Stand-alone systems for individual households or groups of consumers.

**Offshore wind:** Refers to electricity produced by wind turbines that are installed in open water, usually in the ocean.

**Oil:** Oil production includes both conventional and unconventional oil. Petroleum products include refinery gas, ethane, liquid petroleum gas, aviation gasoline, motor gasoline, jet fuels, kerosene, gas/diesel oil, heavy fuel oil, naphtha, white spirit, lubricants, bitumen, paraffin, waxes and petroleum coke.

**Other energy sector:** Covers the use of energy by transformation industries and the energy losses in converting primary energy into a form that can be used in the final consuming sectors. It includes losses by gas works, petroleum refineries, blast furnaces, coke ovens, coal and gas transformation and liquefaction. It also includes energy own use in coal mines, in oil and gas extraction and in electricity and heat production. Transfers and statistical differences are also included in this category.

**Peri-urban:** Peri-urban areas are zones of transition from rural to urban which often form the urban-rural interface and may evolve into being fully urban.

**Power generation:** Refers to fuel use in electricity plants, heat plants and combined heat and power (CHP) plants. Both main activity producer plants and small plants that produce fuel for their own use (auto-producers) are included.

**Productive uses:** Energy used towards an economic purpose: agriculture, industry, services and non-energy use. Some energy demand from the transport sector (e.g. freight) could also be considered as productive, but is treated separately.

**Renewables:** Includes bioenergy, geothermal, hydropower, solar photovoltaic (PV), concentrating solar power (CSP), wind and marine (tide and wave) energy for electricity and heat generation.

**Residential:** Energy used by households including space heating and cooling, water heating, lighting, appliances, electronic devices and cooking equipment.

**Self-sufficiency:** Corresponds to indigenous production divided by total primary energy demand.

**Services:** Energy used in commercial (e.g. hotels, offices, catering, shops) and institutional buildings (e.g. schools, hospitals, offices). Services energy use includes space heating and cooling, water heating, lighting, equipment, appliances and cooking equipment.

**Shale gas:** Natural gas contained within a commonly occurring rock classified as shale. Shale formations are characterised by low permeability, with more limited ability of gas to flow through the rock than is the case with a conventional reservoir. Shale gas is generally produced using hydraulic fracturing.

**Shipping/navigation:** This transport sub-sector includes both domestic and international navigation and their use of marine fuels. Domestic navigation covers the transport of goods or persons on inland waterways and for national sea voyages (starts and ends in the same country without any intermediate foreign port). International navigation includes quantities of fuels delivered to merchant ships (including passenger ships) of any nationality for consumption during international voyages transporting goods or passengers..

**Solid biomass:** Includes charcoal, fuelwood, dung, agricultural residues, wood waste and other solid wastes.

**Steam coal:** Type of coal that is mainly used for heat production or steam-raising in power plants and, to a lesser extent, in industry. Typically, steam coal is not of sufficient quality for steel making. Coal of this quality is also commonly known as thermal coal.

**Tight oil:** Oil produced from shales or other very low permeability formations, using hydraulic fracturing. This is also sometimes referred to as light tight oil. Tight oil includes tight crude oil and condensate production except for the United States, which includes tight crude oil only (US tight condensate volumes are included in natural gas liquids).

**Total final consumption (TFC):** Is the sum of consumption by the various end-use sectors. TFC is broken down into energy demand in the following sectors: industry (including manufacturing and mining), transport, buildings (including residential and services) and other (including agriculture and non-energy use). It excludes international marine and aviation bunkers, except at world level where it is included in the transport sector.

**Total final energy consumption (TFEC):** Is a variable defined primarily for tracking progress towards target 7.2 of the Sustainable Development Goals. It incorporates total final consumption (TFC) by end-use sectors but excludes non-energy use. It excludes international marine and aviation bunkers, except at world level. Typically this is used in the context of calculating the renewable energy share in total final energy consumption (Indicator 7.2.1 of the Sustainable Development Goals), where TFEC is the denominator.

**Total primary energy demand (TPED):** Represents domestic demand only and is broken down into power generation, other energy sector and total final consumption.

**Traditional use of solid biomass:** Refers to the use of solid biomass with basic technologies, such as a three-stone fire, often with no or poorly operating chimneys.

**Transport:** Fuels and electricity used in the transport of goods or persons within the national territory irrespective of the economic sector within which the activity occurs. This includes fuel and electricity delivered to vehicles using public roads or for use in rail vehicles; fuel delivered to vessels for domestic navigation; fuel delivered to aircraft for domestic aviation; and energy consumed in the delivery of fuels through pipelines. Fuel delivered to international marine and aviation bunkers is presented only at the world level and is excluded from the transport sector at a domestic level.

**Useful energy:** Refers to the energy that is available to end-users to satisfy their needs. This is also referred to as energy services demand. As result of transformation losses at the point of use, the amount of useful energy is lower than the corresponding final energy demand for most technologies. Equipment using electricity often has higher conversion efficiency than equipment using other fuels, meaning that for a unit of energy consumed electricity can provide more energy services.

**Variable renewable energy (VRE):** Refers to technologies whose maximum output at any time depends on the availability of fluctuating renewable energy resources. VRE includes a broad array of technologies such as wind power, solar PV, run-of-river hydro, concentrating solar power (where no thermal storage is included) and marine (tidal and wave).

## Regional and country groupings

**Advanced economies:** OECD regional grouping and Bulgaria, Croatia, Cyprus<sup>1,2</sup>, Malta and Romania.

**Africa:** North Africa and sub-Saharan Africa regional groupings.

**Asia Pacific:** Southeast Asia regional grouping and Australia, Bangladesh, China, India, Japan, Korea, Democratic People's Republic of Korea, Mongolia, Nepal, New Zealand, Pakistan, Sri Lanka, Chinese Taipei, and other Asia Pacific countries and territories.<sup>3</sup>

**Caspian:** Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

**Central and South America:** Argentina, Plurinational State of Bolivia (Bolivia), Brazil, Chile, Colombia, Costa Rica, Cuba, Curaçao, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, Bolivarian Republic of Venezuela (Venezuela), and other Central and South American countries and territories.<sup>4</sup>

**China:** Includes the (People's Republic of) China and Hong Kong, China.



**Developing Asia:** Asia Pacific regional grouping excluding Australia, Japan, Korea and New Zealand.

**Emerging market and developing economies:** All other countries not included in the advanced economies regional grouping.

**Eurasia:** Caspian regional grouping and the Russian Federation (Russia).

**Europe:** European Union regional grouping and Albania, Belarus, Bosnia and Herzegovina, North Macedonia, Gibraltar, Iceland, Israel<sup>5</sup>, Kosovo, Montenegro, Norway, Serbia, Switzerland, Republic of Moldova, Turkey, Ukraine and United Kingdom.

**European Union:** Austria, Belgium, Bulgaria, Croatia, Cyprus<sup>1,2</sup>, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain and Sweden.

**IEA (International Energy Agency):** OECD regional grouping excluding Chile, Iceland, Israel, Latvia, Lithuania and Slovenia.

**Latin America:** Central and South America regional grouping and Mexico.

**Middle East:** Bahrain, Islamic Republic of Iran (Iran), Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic (Syria), United Arab Emirates and Yemen.

**Non-OECD:** All other countries not included in the OECD regional grouping.

**Non-OPEC:** All other countries not included in the OPEC regional grouping.

**North Africa:** Algeria, Egypt, Libya, Morocco and Tunisia.

**North America:** Canada, Mexico and United States.

**OECD (Organisation for Economic Co-operation and Development):** Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States. Colombia became a member of the OECD in April 2020, and its membership is not yet reflected in *WEO* projections for the OECD.

**OPEC (Organisation of the Petroleum Exporting Countries):** Algeria, Angola, Republic of the Congo (Congo), Equatorial Guinea, Gabon, the Islamic Republic of Iran (Iran), Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, United Arab Emirates and Bolivarian Republic of Venezuela (Venezuela), based on membership status as of October 2020.

**Southeast Asia:** Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic (Lao PDR), Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. These countries are all members of the Association of Southeast Asian Nations (ASEAN).

**Sub-Saharan Africa:** Angola, Benin, Botswana, Cameroon, Republic of the Congo (Congo), Côte d'Ivoire, Democratic Republic of the Congo, Eritrea, Ethiopia, Gabon, Ghana, Kenya, Mauritius, Mozambique, Namibia, Niger, Nigeria, Senegal, South Africa, South Sudan, Sudan, United Republic of Tanzania (Tanzania), Togo, Zambia, Zimbabwe and other African countries and territories.<sup>6</sup>

### Country notes

<sup>1</sup> Note by Turkey: The information in this document with reference to “Cyprus” relates to the southern part of the island. There is no single authority representing both Turkish and Greek Cypriot people on the island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the “Cyprus issue”.

<sup>2</sup> Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

<sup>3</sup> Individual data are not available and are estimated in aggregate for: Afghanistan, Bhutan, Cook Islands, Fiji, French Polynesia, Kiribati, Macau (China), Maldives, New Caledonia, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste and Tonga and Vanuatu.

<sup>4</sup> Individual data are not available and are estimated in aggregate for: Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bonaire, British Virgin Islands, Cayman Islands, Dominica, Falkland Islands (Malvinas), French Guiana, Grenada, Guadeloupe, Guyana, Martinique, Montserrat, Saba, Saint Eustatius, Saint Kitts and Nevis, Saint Lucia, Saint Pierre and Miquelon, Saint Vincent and Grenadines, Saint Maarten, Turks and Caicos Islands.

<sup>5</sup> The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD and/or the IEA is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

<sup>6</sup> Individual data are not available and are estimated in aggregate for: Burkina Faso, Burundi, Cabo Verde, Central African Republic, Chad, Comoros, Djibouti, Kingdom of Eswatini, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Réunion, Rwanda, Sao Tome and Principe, Seychelles, Sierra Leone, Somalia and Uganda.

## Abbreviations and Acronyms

<b>AC</b>	air-conditioning (unit); air conditioner
<b>AT&amp;C</b>	aggregate technical and commercial
<b>CCUS</b>	carbon capture, utilisation and storage
<b>CGD</b>	city gas distribution
<b>CIL</b>	Coal India Limited
<b>CNG</b>	compressed natural gas
<b>CO<sub>2</sub></b>	carbon dioxide
<b>CPCB</b>	Central Pollution Control Board
<b>DFC</b>	Dedicated Freight Corridor
<b>discom</b>	electricity distribution company
<b>DRI</b>	direct reduced iron
<b>DRS</b>	Delayed Recovery Scenario
<b>DSR</b>	demand-side response
<b>EESL</b>	Energy Efficiency Services Limited
<b>EIRR</b>	equity internal rate of return
<b>EPAR</b>	Environmental Protection Amendment Rules (Act)
<b>EPC</b>	energy performance contract
<b>ESCO</b>	energy service company
<b>ESG</b>	environmental, social and governance
<b>EU</b>	European Union
<b>EV</b>	electric vehicle
<b>FAME</b>	Faster Adoption and Manufacturing of Electric Vehicles
<b>G20</b>	Group of 20
<b>GDP</b>	gross domestic product
<b>GHG</b>	greenhouse gas
<b>GST</b>	Goods and Services Tax
<b>H<sub>2</sub>-DRI</b>	hydrogen-based direct reduced iron
<b>HELP</b>	Hydrocarbon Exploration and Licensing Policy
<b>HPO</b>	hydro purchase obligation
<b>ICAP</b>	India Cooling Action Plan
<b>ICE</b>	internal combustion engine
<b>IEA</b>	International Energy Agency
<b>IGX</b>	Indian Gas Exchange
<b>IMF</b>	International Monetary Fund
<b>INVT</b>	infrastructure investment trust
<b>IPO</b>	initial public offering
<b>IVC</b>	Indian Vision Case
<b>LCOE</b>	levelised cost of electricity
<b>LED</b>	light-emitting diode

<b>LNG</b>	liquefied natural gas
<b>LPG</b>	liquefied petroleum gas
<b>MBS</b>	mortgage-backed securities
<b>MSME</b>	micro, small and medium-sized enterprises
<b>NAAQS</b>	National Ambient Air Quality Standards
<b>NCAP</b>	National Clean Air Programme
<b>NCEEF</b>	National Clean Energy and Environment Fund
<b>NDC</b>	nationally determined contribution
<b>NO<sub>x</sub></b>	nitrogen oxides
<b>NUTP</b>	National Urban Transport Policy
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>ONGC</b>	Oil and Natural Gas Corporation Limited
<b>PAHAL</b>	Pratyaksh Hanstantrit Labh
<b>PAT</b>	Perform, Achieve and Trade
<b>PLI</b>	production-linked incentive
<b>PMAY</b>	Pradhan Mantri Awaas Yojana
<b>PMUY</b>	Pradhan Mantri Ujjwala Yojana
<b>PNG</b>	pipeline natural gas
<b>PPA</b>	power purchase agreement
<b>PPP</b>	purchasing power parity
<b>PSU</b>	public sector undertaking
<b>PV</b>	photovoltaics
<b>R&amp;D</b>	research and development
<b>RBI</b>	Reserve Bank of India
<b>REIT</b>	real estate investment trust
<b>RTM</b>	real-time power market
<b>SATAT</b>	Sustainable Alternative Towards Affordable Transportation
<b>SDG</b>	Sustainable Development Goal (United Nations)
<b>SDS</b>	Sustainable Development Scenario
<b>SECI</b>	Solar Energy Corporation of India
<b>SO<sub>2</sub></b>	sulphur dioxide
<b>SPR</b>	strategic petroleum reserve
<b>STEPS</b>	Stated Policies Scenario
<b>TFC</b>	total final consumption
<b>TV</b>	television
<b>UDAY</b>	Ujwal DISCOM Assurance Yojana
<b>UJALA</b>	Unnat Jyoti by Affordable LEDs for All
<b>UN</b>	United Nations
<b>VALCOE</b>	value-adjusted levelised cost of electricity
<b>VRE</b>	variable renewable energy
<b>WEO</b>	<i>World Energy Outlook</i>



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## India Energy Outlook 2021

### World Energy Outlook Special Report

The India Energy Outlook 2021 is a new special report from the International Energy Agency's World Energy Outlook series. The report explores the opportunities and challenges ahead for India as it **seeks to ensure reliable, affordable and sustainable energy to a growing population**. The report examines pathways out of the crisis that emerged from the Covid-19 pandemic, as well as longer-term trends, exploring how India's energy sector might evolve to 2040 under a range of scenarios. The report is presented as a series of 'deep dives' exploring cross-cutting issues, including:

- The effects of economic growth, urbanisation and industrialisation on India's fuel and sector-level demand trends.
- The evolution of mobility, including electrification, in the context of growing urbanisation.
- The prospects for expanding energy access, especially in rural areas.
- Flexibility requirements in the power sector under ambitious renewable capacity targets and a significant rise in electricity demand – especially from air conditioners.
- Challenges and opportunities for clean energy finance, including investments in solar energy and batteries
- The supply and infrastructure required for an expanded role for natural gas, along with a sector-level assessment of its potential.
- Impacts of India's energy policy choices on energy access, air pollution and carbon emissions.
- India's growing importance in global energy issues, and the implications of its development trajectory on international energy supply, trade and investment.

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