# IEA Market Report Series - Renewables 2021

## Definitions and notes

### Renewable Electricity

The electricity generation and capacity forecasts presented in the dynamic chart and the extended dataset correspond to this report's main and accelerated cases. The accelerated case illustrates how certain market and policy enhancements could increase renewable deployment.

#### Total renewable capacity/generation

Total renewable capacity and generation equals the sum of bioenergy, hydropower (including pumped storage for capacity), onshore and offshore wind, solar PV, solar CSP, geothermal, and ocean technologies.

#### Hydropower

Electricity generation excludes pumped storage hydropower.

#### Bioenergy

Capacity includes capacity from solid, liquid, and gaseous biomass and municipal waste (renewable and non-renewable). It does not include plants that co-fire biomass with fossil fuels; though fossil fuel to biomass conversions are included in this forecast, reported capacity data from IEA statistics (2017 and earlier data points) may not include bioenergy capacity converted from fossil fuels, particularly in mixed plants. Generation from bioenergy includes generation from solid, liquid, and gaseous biomass (including co-fired biomass) and the renewable portion of municipal waste.

#### Wind

Capacity corresponds to grid-connected capacity.

#### Solar PV

Capacity for grid-connected solar PV (including distributed PV) is counted at the time that the grid connection is made, and off-grid solar PV systems are included at the time of the installation.

#### Distributed PV

Small capacity Solar PV classified into three main categories: 1) residential (0 to 10 kW); 2) commercial and industrial (10 kW to 1,000 kW); and 3) off-grid applications (such as solar home systems, small commerical applications, and mini-grids). These groupings take not only size into account, but the purpose of the installation and the availability of data.

#### Ocean

Capacity and generation includes wave, tide, and ocean technologies.

#### Sources

Renewable electricity generation data for 2020 in OECD countries is Renewables Information: Overview 2021, [www.iea.org/statistics/](http://www.iea.org/statistics/)

Renewable capacity data is based on a variety sources that are technology dependent.

For hydropower, bioenergy, and geothermal, 2020 capacity is based largely upon S&P Market Intelligence (2021). For CSP, the 2020 capacity data is based largely upon NREL (2021) and BNEF (2021).

For solar PV, onshore wind, offshore wind, and ocean capacity, a variety sources are used ranging from the IEA Technology Collaboration Platforms, BNEF (2021), IRENA (2021) and in-country analysis and project pipelines.

#### Geographical coverage

The following focus countries and regions are covered in the electricity dataset:

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Country Code | Region | Region code |
| Argentina | ARGENTINA | Africa | AFRICA2 |
| Australia | AUSTRALI | Asia (exc. China) and Pacific | APAC |
| Belgium | BELGIUM | Association of Southeast Asian Nations | ASEAN |
| Brazil | BRAZIL | Eurasia | EURASIA2 |
| Canada | CANADA | Europe | EUROPE |
| Chile | CHILE | European Union | EU |
| China | CHINA | G20 | G20 |
| Denmark | DENMARK | Latin America | LAM |
| Egypt | EGYPT | Middle East and North Africa | MENA |
| Ethiopia | ETHIOPIA | North America | NAM |
| France | FRANCE | Sub-Saharan Africa | SSAFR |
| Germany | GERMANY | World | WORLD |
| India | INDIA |  |  |
| Indonesia | INDONESIA |  |  |
| Islamic Republic of Iran | IRAN |  |  |
| Israel | ISRAEL |  |  |
| Italy | ITALY |  |  |
| Japan | JAPAN |  |  |
| Jordan | JORDAN |  |  |
| Kenya | KENYA |  |  |
| Korea | KOREA |  |  |
| Mexico | MEXICO |  |  |
| Morocco | MOROCCO |  |  |
| Netherlands | NETHLAND |  |  |
| Nigeria | NIGERIA |  |  |
| Pakistan | PAKISTAN |  |  |
| Philippines | PHILIPPINE |  |  |
| Poland | POLAND |  |  |
| Russian Federation | RUSSIA |  |  |
| Saudi Arabia | SAUDIARABI |  |  |
| South Africa | SOUTHAFRIC |  |  |
| Spain | SPAIN |  |  |
| Sweden | SWEDEN |  |  |
| Thailand | THAILAND |  |  |
| Turkey | TURKEY |  |  |
| Ukraine | UKRAINE |  |  |
| United Arab Emirates | UAE |  |  |
| United Kingdom | UK |  |  |
| United Republic of Tanzania | TANZANIA |  |  |
| United States | USA |  |  |
| Viet Nam | VIETNAM |  |  |

The regions are made of the following countries:

* North America: United States, Mexico and Canada.
* Latin America: Argentina, Plurinational State Of Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Curacao/Netherlands Antilles, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua Other Non-OECD Americas, Panama, Paraguay, Peru, Trinidad And Tobago, Uruguay and Venezuela.
* Europe: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.
* Africa: Benin, Botswana, Cameroon, Angola, Congo, Democratic Republic Of The Congo, Eritrea, Ethiopia, Gabon, Ghana, Cote D'ivoire, Kenya, Mauritius, Mozambique, Namibia, United Republic Of Tanzania, Niger, Nigeria, Senegal, South Africa, South Sudan, Sudan, Togo, Zambia, Zimbabwe, Other Africa, Algeria, Egypt, Morocco, Tunisia and Libya.
* Association of Southeast Asian Nations (ASEAN): Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.
* Sub-Saharan Africa: Benin, Botswana, Cameroon, Angola, Congo, Democratic Republic Of The Congo, Eritrea, Ethiopia, Gabon, Ghana, Cote D'ivoire, Kenya, Mauritius, Mozambique, Namibia, United Republic Of Tanzania, Niger, Nigeria, Senegal, South Africa, South Sudan, Sudan, Togo, Zambia, Zimbabwe and Other Africa.
* Middle East and North Africa: Islamic Republic Of Iran, Iraq, Jordan, Bahrain, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, Yemen, Israel, Algeria, Egypt, Morocco, Tunisia and Libya.
* European Union: Austria, Belgium, Bulgaria, Croatia, Cyprus, 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.
* G20: Australia, Canada, United States, Saudi Arabia, India, Russian Federation, South Africa, Turkey, Argentina, Brazil, Mexico, France, Germany, Italy, United Kingdom, People's Republic Of China, Indonesia, Japan, Korea and rest of EU countries .
* Asia (exc. China) and Pacific: Japan, Korea, New Zealand, Australia, Bangladesh, Brunei Darussalam, Cambodia, Chinese Taipei, India, Indonesia, Malaysia, Mongolia, Myanmar, Nepal, Democratic People's Republic Of Korea, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Viet Nam and Other Asia.
* Eurasia: Azerbaijan, Belarus, Bosnia And Herzegovina, Armenia, Georgia, Gibraltar, Kazakhstan, Kosovo, Kyrgyzstan, Republic Of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, North Macedonia, Montenegro and Serbia.
* World: North America, Latin America, Europe, APAC, Eurasia, SSAFR, MENA and China Region.

### Renewable Transport

#### Ethanol

Consumption (TES), production (INDPROD) and net trade (NETTRADE) presented in volume (million litres per year); to convert to energy an approximate calorific value of 21 MJ/litre can be used.

#### Biodiesel

Consumption (TES), production (INDPROD) and net trade (NETTRADE) presented in volume (million litres per year); to convert to energy an approximate calorific value of 33 MJ/litre can be used.

*Renewable Diesel*

Consumption (TES), production (INDPROD) and net trade (NETTRADE) presented in volume (million litres per year); to convert to energy an approximate calorific value of 34 MJ/litre can be used.

*Biojet*

Consumption (TES), production (INDPROD) and net trade (NETTRADE) presented in volume (million litres per year); to convert to energy an approximate calorific value of 34.5 MJ/litre can be used.

#### Sources

Biofuels: IEA analysis; CNMC, 2021; IEA, 2021; EPA, 2021; MAPA, 2021; Ministère de la Transition Écologique, 2020, Ministério de Mins e Energia, 2021; Statistics Canada, 2021; US EIA, 2021, IHS Markits 2021

#### Time period

Data available from 2010 to 2026

#### Geographical coverage

The following focus countries and regions are covered in the transport dataset:

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Country Code | Region | Region code |
| Argentina | ARGENTINA | Africa | AFRICA |
| Australia | AUSTRALI | Asia and Pacific | APAC |
| Austria | AUSTRIA | Europe | EUROPE |
| Belgium | BELGIUM | Latin America | LATIN AMERICA |
| Brazil | BRAZIL | Middle East | MIDDLEEAST |
| Canada | CANADA | North America | NORTH AMERICA |
| China | CHINA | World | WORLD |
| Colombia | COLOMBIA |  |  |
| France | FRANCE |  |  |
| Germany | GERMANY |  |  |
| Hungary | HUNGARY |  |  |
| India | INDIA |  |  |
| Indonesia | INDONESIA |  |  |
| Italy | ITALY |  |  |
| Malaysia | MALAYSIA |  |  |
| Netherlands | NETHLAND |  |  |
| Paraguay | PARAGUAY |  |  |
| Philippines | PHILIPPINE |  |  |
| Poland | POLAND |  |  |
| Singapore | SINGAPORE |  |  |
| Spain | SPAIN |  |  |
| Thailand | THAILAND |  |  |
| United Kingdom | UK |  |  |
| United States | USA |  |  |

The regions are made of the following countries:

* Africa: Algeria, Angola, Benin, Botswana, Cameroon, Congo, Congorep, Egypt, Eritrea, Ethiopia, Gabon, Ghana, Coteivoire, Kenya, Libya, Mauritius, Morocco, Mozambique. Namibia, Niger, Nigeria, Senegal, South Africa, South Sudan, Sudan, Tanzania, Togo, Tunisia, Zambia, Zimbabwe and Other Africa.
* Middle East:, Bahrain, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudiarabi, Syria, UAE and Yemen.
* Asia and Pacific: Japan, Korea, New Zealand, Australia, Bangladesh, Brunei Darussalam, Cambodia, Chinese Taipei, India, Indonesia, Malaysia, Mongolia, Myanmar, Nepal, Democratic People's Republic Of Korea, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Viet Nam and Other Asia.
* World: United States, Mexico, Canada, Argentina, Plurinational State Of Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Curacao/Netherlands Antilles, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua Other Non-OECD Americas, Panama, Paraguay, Peru, Trinidad And Tobago, Uruguay, Venezuela, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Japan, Korea, New Zealand, Australia, Bangladesh, Brunei Darussalam, Cambodia, Chinese Taipei, India, Indonesia, Malaysia, Mongolia, Myanmar, Nepal, Democratic People's Republic Of Korea, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Viet Nam, Other Asia, Azerbaijan, Belarus, Bosnia And Herzegovina, Armenia, Georgia, Gibraltar, Kazakhstan, Kosovo, Kyrgyzstan, Republic Of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, North Macedonia, Montenegro, Serbia, Benin, Botswana, Cameroon, Angola, Congo, Democratic Republic Of The Congo, Eritrea, Ethiopia, Gabon, Ghana, Cote D'ivoire, Kenya, Mauritius, Mozambique, Namibia, United Republic Of Tanzania, Niger, Nigeria, Senegal, South Africa, South Sudan, Sudan, Togo, Zambia, Zimbabwe, Other Africa, Islamic Republic Of Iran, Iraq, Jordan, Bahrain, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, Yemen, Israel, Algeria, Egypt, Morocco, Tunisia, Libya, People's Republic Of China and Hong Kong

### Renewable Heat

#### Total heat consumption (incl. traditional uses of biomass)

Refers to the total amount of renewable and non-renewable energy used for heat by industry, buildings and agriculture sectors. It includes estimates of traditional uses of biomass, but excludes ambient heat harnessed by heat pumps, for which data is not available.

#### Total non-renewable heat consumption

Refers to the total amount of non-renewable energy used for heat by industry, buildings and agriculture sectors.

#### Total renewable heat consumption (incl. traditional uses of biomass and indirect consumption)

Refers to the total amount of renewable energy used for heat by industry, buildings and agriculture sectors. It includes direct consumption of solar thermal, geothermal and bioenergy for heat, as well as indirect consumption of renewable energy through district heating networks and electricity used for heat and estimates of traditional uses of biomass. Indirect consumption of renewable energy for heat is estimated based on the national shares of renewable sources in electricity generation and in district heating supplies. It does not account for ambient heat harnessed by heat pumps, for which data is not available.

#### Modern renewable heat consumption (incl. indirect consumption)

Refers to the total amount of renewable energy used for heat, and excludes the traditional uses of biomass. It includes direct consumption of solar thermal, geothermal and bioenergy for heat, as well as indirect consumption of renewable energy through district heating networks and electricity used for heat. Indirect consumption of renewable energy for heat is estimated based on the national shares of renewable sources in electricity generation and in district heating supplies. It does not account for ambient heat harnessed by heat pumps, for which data is not available.

#### Direct modern renewable heat consumption

Includes direct consumption of bioenergy, solar thermal and geothermal heat. It does not account for ambient heat harnessed by heat pumps, for which data is not available.

#### Indirect renewable heat consumption (renewable electricity for heat and renewable district heating and cooling)

includes renewable energy consumed through district heating networks and renewable electricity used for heat. These are estimated based on national shares of renewable sources in district heating supplies and electricity generation. It does not account for ambient heat harnessed by heat pumps, for which data is not available.

#### Sources:

#### IEA, 2021; World Energy Outlook 2021 & IEA 2021; World Energy Statistics and Balances

#### Geographical coverage

The following focus countries and regions are covered in the heat dataset:

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Country Code | Region | Region code |
| Canada | CANADA | European Union | EU |
| Japan | JAPAN | World | WORLD |
| Russia | RUSSIA |  |  |
| China | CHINA |  |  |
| India | INDIA |  |  |
| Brazil | BRAZIL |  |  |
| United States | USA |  |  |

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* World: United States, Mexico, Canada, Argentina, Plurinational State Of Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Curacao/Netherlands Antilles, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua Other Non-OECD Americas, Panama, Paraguay, Peru, Trinidad And Tobago, Uruguay, Venezuela, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Japan, Korea, New Zealand, Australia, Bangladesh, Brunei Darussalam, Cambodia, Chinese Taipei, India, Indonesia, Malaysia, Mongolia, Myanmar, Nepal, Democratic People's Republic Of Korea, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Viet Nam, Other Asia, Azerbaijan, Belarus, Bosnia And Herzegovina, Armenia, Georgia, Gibraltar, Kazakhstan, Kosovo, Kyrgyzstan, Republic Of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, North Macedonia, Montenegro, Serbia, Benin, Botswana, Cameroon, Angola, Congo, Democratic Republic Of The Congo, Eritrea, Ethiopia, Gabon, Ghana, Cote D'ivoire, Kenya, Mauritius, Mozambique, Namibia, United Republic Of Tanzania, Niger, Nigeria, Senegal, South Africa, South Sudan, Sudan, Togo, Zambia, Zimbabwe, Other Africa, Islamic Republic Of Iran, Iraq, Jordan, Bahrain, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, Yemen, Israel, Algeria, Egypt, Morocco, Tunisia, Libya, People's Republic Of China and Hong Kong