Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix

Indicator 7.2.1: Renewable energy share in the total final energy consumption

Institutional information

Organization(s):

International Energy Agency (IEA)

United Nations Statistics Division (UNSD)

International Renewable Energy Agency (IRENA)

Concepts and definitions

Definition:

The renewable energy share in total final consumption is the percentage of final consumption of energy that is derived from renewable resources.

Concepts:

Renewable energy consumption includes consumption of energy derived from: hydro, solid biofuels, wind, solar, liquid biofuels, biogas, geothermal, marine and waste. Total final energy consumption is calculated from national balances and statistics as total final consumption minus non-energy use.

Comments with regard to specific renewable energy resources:

- Solar energy consumption includes solar PV and solar thermal.
- Liquid biofuel energy consumption includes biogasoline, biodiesels and other liquid biofuels.
- Solid biofuel consumption includes fuelwood, animal waste, vegetable waste, black liquor, bagasse and charcoal.
- Waste energy covers energy from renewable municipal waste.

Rationale:

The target “By 2030, increase substantially the share of renewable energy in the global energy mix” impacts all three dimensions of sustainable development. Renewable energy technologies represent a major element in strategies for greening economies everywhere in the world and for tackling the critical global problem of climate change. A number of definitions of renewable energy exist; what they have in common is highlighting as renewable all forms of energy that their consumption does not deplete their availability in the future. These include solar, wind, ocean, hydropower, geothermal resources, and bioenergy (in the case of bioenergy, which can be depleted, sources of bioenergy can be replaced within a short to medium-term frame). Importantly, this indicator focuses on the amount of renewable energy actually consumed rather than the capacity for renewable energy production, which

cannot always be fully utilized. By focusing on consumption by the end user, it avoids the distortions caused by the fact that conventional energy sources are subject to significant energy losses along the production chain.

Comments and limitations:

- A limitation with existing renewable energy statistics is that they are not able to distinguish whether renewable energy is being sustainably produced. For example, a substantial share of today's renewable energy consumption comes from the use of wood and charcoal by households in the developing world, which sometimes may be associated with unsustainable forestry practices. There are efforts underway to improve the ability to measure the sustainability of bio-energy, although this remains a significant challenge.
- Off-grid renewables data are limited and not sufficiently captured in the energy statistics
- The method of allocation of renewable energy consumption from electricity and heat output assumes that the share of transmission and distribution losses are the same between all technologies. However, this is not always true because renewables are usually located in more remote areas from consumption centers and may incur larger losses.
- Likewise, imports and exports of electricity and heat are assumed to follow the share of renewability of electricity and heat generation, respectively. This is a simplification that in many cases will not affect the indicator too much, but that might do so in some cases, for example, when a country only generates electricity from fossil fuels but imports a great share of the electricity it uses from a neighboring country's hydroelectric power plant.
- Methodological challenges associated with defining and measuring renewable energy are more fully described in the Global Tracking Framework (IEA and World Bank, 2013) Chapter 4, Section 1, pages 194-200. Data for traditional use of solid biofuels are generally scarce globally, and developing capacity in tracking such energy use, including developing national level surveys, is essential for sound global energy tracking.

Methodology

Computation method:

This indicator is based on the development of comprehensive energy statistics across supply and demand for all energy sources – statistics used to produce a national energy balance. Internationally agreed methodologies for energy statistics are described in the "International Recommendations for Energy Statistics" (IRES), adopted by the UN Statistical Commission, available at: unstats.un.org/unsd/energystats/methodology/ires.

Once a national energy balance is developed, the indicator can be calculated by dividing final energy consumption from all renewable sources by total final energy consumption. Renewable energy consumption is derived from three tables of the IEA world energy statistics and balances: total final consumption, electricity output and heat output. All volumes reported in the total final consumption table are taken as reported. Since volumes for electricity and heat in the final consumption table are not broken down by technology, electricity and heat output tables are used instead to break down final consumption of electricity and heat by technology. The allocation by technology is done by deriving the share of technology in electricity and heat output tables and multiplying that share by final energy consumption of electricity and heat, respectively. For instance, if total final consumption table reports 150 TJ for biogas energy, while total final consumption of electricity is 400 TJ and heat 100 TJ, and the share of biogas in total electricity output is 10 percent and 5 percent in heat, the total reported number for biogas consumption will be 195 TJ (150 TJ+400TJ*10%+100TJ*5%). The Global Tracking Framework Report (IEA and World Bank, 2013) provides more details on the suggested methodology for defining and measuring renewable energy (Chapter 4, Section 1, page 201-202).

UNSD follows the same methodology to compute the indicators, though information may come from different tables.

Regional aggregates:

Aggregates are calculated, whether by region or global, using final energy consumption as weights.

Data sources

Data on renewable energy consumption are available through national energy balances compiled based on data collected by the International Energy Agency (for around 150 countries) and the United Nations Statistics Division (UNSD) for all countries. The energy balances make it possible to trace all the different sources and uses of energy at the national level.

Some technical assistance may be needed to improve these statistics, particularly in the case of renewable energy sources. Specialized industry surveys (e.g. on bioenergy use) or household surveys (in combination with the measurement of other indicators) would be feasible approaches to filling in data gaps (e.g. for use of firewood, off-grid solar energy).

Data availability

Description:

Between the various existing data sources, primarily the IEA Energy Balances and the UN Energy Statistics Database, annual total and renewable energy consumption for every country and area can be collected. The *Tracking SDG7: The Energy Progress Report* (formerly *Sustainable Energy for All Global Tracking Framework*) is reporting this indicator at a global level between 2010 and 2030.

Time series:

2000 – present

Disaggregation:

Disaggregation of the data on consumption of renewable energy, e.g. by resource and end-use sector, could provide insights into other dimensions of the goal, such as affordability and reliability. For solar energy, it may also be of interest to disaggregate between on grid and off-grid capacity.

Calendar

Data collection:

Data are collected on an annual basis.

Data release:

The IEA Energy Balances are published in summer (publishing information for two calendar years prior). The UN Energy Statistics Database is made available towards the end of the calendar year (publishing information for two calendar years prior).

Data providers

National administrations, as described in documentation on sources for IEA and UNSD:

http://wds.iea.org/wds/pdf/WORLDBAL_Documentation.pdf

unstats.un.org/unsd/energystats/data

Data compilers

Name:

The International Energy Agency (IEA) and the United Nations Statistics Division (UNSD)

Description:

The IEA and UNSD are the primary compilers of national energy statistics and develop internationally comparable energy balances based on internationally agreed methodologies. Aggregates are based on analysis merging of IEA and UNSD data.

References

URL:

www.iea.org

unstats.un.org/unsd/energystats

References:

IEA Energy Balances and Statistics

http://www.iea.org/statistics/

UN Energy Statistics Database

unstats.un.org/unsd/energystats/data (description) and data.un.org/Explorer.aspx?d=EDATA (data)

IEA SDG 7 webpage: http://www.iea.org/sdg

International Recommendations for Energy Statistics (IRES)
unstats.un.org/unsd/energystats/methodology/ires

International Energy Agency (IEA), International Renewable Energy Agency (IRENA), United Nations Statistics Division (UNSD), the World Bank, World Health Organization (WHO). 2019. “Tracking SDG7: The Energy Progress Report 2019”. trackingsdg7.esmap.org/

International Energy Agency (IEA), International Renewable Energy Agency (IRENA), United Nations Statistics Division (UNSD), the World Bank, World Health Organization (WHO). 2018. “Tracking SDG7: The Energy Progress Report 2018”. trackingsdg7.esmap.org/

International Energy Agency (IEA) and the World Bank. 2017. “Global Tracking Framework 2017—Progress toward Sustainable Energy”. World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO

International Energy Agency (IEA) and the World Bank. 2015. “Global Tracking Framework 2015—Progress Toward Sustainable Energy”, World Bank, Washington, DC. Doi: 10.1596/978-1-4648-0690-2 License: Creative Commons Attribution CC BY 3.0 IGO

International Energy Agency (IEA) and the World Bank. 2013. “Global Tracking Framework 2013”

IRENA Renewable Energy Database http://resourceirena.irena.org/gateway/dashboard