Renewable energy can be defined as the contribution of renewable resources to total primary energy (TPES). Renewables include the primary energy equivalent of hydro (excluding pumped storage), geothermal, solar, wind, tide and wave sources. Energy derived from solid biofuels, biogasoline, biodiesels, other liquid biofuels, biogases and the renewable fraction of municipal waste are also included. Biofuels are defined as fuels derived directly or indirectly from biomass (material obtained from living or recently living organisms). This includes wood, vegetal waste (including wood waste and crops used for energy production), ethanol, animal materials/wastes and sulphite lyes. Municipal waste comprises wastes produced by the residential, commercial and public service sectors that are collected by local authorities for disposal in a central location for the production of heat and/or power. This indicator is measured in thousand toe (tonne of oil equivalent) as well as in percentage of total primary energy supply.

<https://data.oecd.org/energy/renewable-energy.htm>

what is the renewable energy?

Renewable energy can be defined as the contribution of renewable resources to the total primary energy. Renewable energy sources include hydro, geothermal,solar and wind sources. Some renewable sources also include waste collected to be recycled at a suitable location for the generation of heat or electricity produced by local places.

Primary energy supply is defined as energy production plus energy imports, minus energy exports, minus international bunkers, then plus or minus stock changes. The International Energy Agency (IEA) energy balance methodology is based on the calorific content of the energy commodities and a common unit of account: tonne of oil equivalent (toe). Toe is defined as 107 kilocalories (41.868 gigajoules). This quantity of energy is, within a few per cent, equal to the net heat content of one tonne of crude oil. The difference between the “net” and the “gross” calorific value for each fuel is the latent heat of vaporisation of the water produced during combustion of the fuel. For coal and oil, net calorific value is about 5% less than gross, for most forms of natural and manufactured gas the difference is 9-10%, while for electricity the concept of calorific has no meaning. The IEA calculates balances using the physical energy content method to find the primary energy equivalent. This indicator is measured in million toe and in toe per 1 000 USD.

<https://data.oecd.org/energy/primary-energy-supply.htm#indicator-chart>

What is primary Energy?

Primary energy supply is defined as energy production, plus energy imports, minus energy exports, then plus or minus stock changes.

Growth of wind and solar in China is slowing as government funding for green energy falters and upgrades to the transmission infrastructure lag. With China’s CO2 emissions again on the rise, experts worry the world’s largest emitter may fall short of key climate goals.

In addition, as renewable energy prices have fallen and the central government has grown increasingly concerned about the impact of the U.S.-China trade war on China’s economy, renewable subsidies are being phased out. Wind and solar facilities must now compete directly at auction with other forms of power generation. China’s green energy sector seems increasingly capable of winning that competition, but solar energy installations are nevertheless expected to drop by about half this year, from a peak of 53 gigawatts in 2017.

What happens with China’s green energy transition has broader significance in the global climate fight, given that the country is the world’s largest emitter of greenhouse gases. With its renewable energy growth slowing and its fossil fuel use rising, analysts fear that China’s emissions may not level off by 2030, the target set in the Paris Climate Agreement, which would be a significant setback for efforts to slow global warming. Renewable energy proponents are now seeking to avert a continued slowdown in China’s alternative energy sector and spark new green energy growth.

Some say they think China could install as much as 100 gigawatts of solar power annually, if renewables were given higher priority.

This process has started to slow the overall added capacity for wind and solar. While new solar photovoltaic installations hit an all-time high of 53 gigawatts [GW] in 2017, they slipped to around 41 GW last year and current figures put solar installations at slightly more than 11 GW for the first half of 2019. Projections are for about 25 GW of solar power to be installed this year and in succeeding years through 2025, an amount that would not sharply curtail fossil fuel use.

<https://e360.yale.edu/features/why-chinas-renewable-energy-transition-is-losing-momentum>

Growth of wind and solar in China is slowing because of government funding for renewable energy and the transmission lag. With China’s carbon dioxide emissions again rising, experts are worrying about the world’s largest carbon dioxide emitter may fall short of SDGs. In addition, renewable energy plans are being delayed one by one as renewable energy prices fall and the impact of the US-China trade war on the Chinese economy increases.

Given that the country is the world's largest emitter of greenhouse gases, China's transition to renewable energy has greater importance in the global climate fight. With its renewable energy growth slowing and its fossil fuel use rising, analysts fear that China’s emissions may not level off by 2030 which would be a significant setback for efforts to slow global warming.

<https://e360.yale.edu/assets/site/_1500x1500_fit_center-center_80/GettyImages-576858530_China-wind-turbines_web.jpg>

<https://e360.yale.edu/assets/site/TotalCO2Emissions_China_2012-2019_web_v2.jpg>

<https://e360.yale.edu/assets/site/_1500x1500_fit_center-center_80/Standaert_solar-farm_web.jpg>

<https://www.omfif.org/wp-content/uploads/2022/04/MicrosoftTeams-image-6.png>

Given that target, which groups in China are ultimately going to lead the charge in developing renewable energy? In terms of funding and investments, the public and private sectors will both play a role. However, the extent to which the Chinese government is driving investments for renewable energy is astonishing. Because of profitability challenges, private investment is currently more focused on specific areas within renewable energy technology — for example, equipment manufacturing rather than energy production. As a result, China’s renewable energy sector is being driven primarily by public-sector spending to meet the goals set by the central government.

China’s renewable energy policies target three areas: hydro, solar and wind. In terms of potential, China’s hydro energy future seems almost infinite. Already the global leader in hydro electricity, the country’s bountiful landscapes of rivers and streams present an untapped resource that will shape the face of its energy future. Currently, China’s hydro energy represents 23% of the nation’s growing electricity consumption and is second only to coal-generated electricity. Within this vast “green” promise, hydro energy is classified into two sources: small hydro plants, which produce 25 megawatts or less annually, and large hydro plants, such as the Three Gorges Dam in Hubei, the world’s largest hydro-electric power station.

The Chinese government has enacted a number of laws encouraging continued wind development. For example, China’s Renewable Energy Law of 2006 requires power grid companies to buy all output of local registered renewable energy producers. This has been instrumental in creating an extensive market for wind power. Provincial governments have also been quick to incorporate clear targets for wind power generation capacity in their five-year plans, ensuring the continued growth of China’s wind power sector.

As China continues its path as a global economic powerhouse, its massive investments in renewable energy present an unprecedented opportunity for the development of sustainable technologies. Although these initiatives are largely for pragmatic reasons rather than environmental concerns, the coming decades of investment, both public and private, should yield global benefits. The future for renewable energy in China is bright, primarily because it is a necessity, not an alternative.

<https://knowledge.wharton.upenn.edu/article/renewable-energy-in-china-a-necessity-not-an-alternative/>