Tracking Energy Efficiency Progress

The IEA Energy Efficiency Progress Tracker allows users to view the current rate of progress on energy efficiency at global and regional levels, containing the very latest energy demand and efficiency estimates.

COP28 saw a historic agreement reached with paragraph 28a of the First Global Stocktake, calling for "doubling the global average annual rate of energy efficiency improvements by 2030". The Tracker provides a view on how the world is progressing towards meeting this pledge and can inform countries developing efficiency strategies in a manner appropriate to their own national and regional circumstances.

The most comprehensive measure of energy efficiency is the energy intensity of the world economy, which encompasses the ratio of energy input to economic activity. Primary energy intensity is the main indicator used by the United Nations (UN) Sustainable Development Goals to track energy efficiency. It comprises the amount of total energy supply (TES) used to produce a given amount of Gross Domestic Product (GDP) measured in constant purchasing power parity (PPP) terms. Energy intensity progress – illustrated as positive values in this Tracker – is the annual reduction in energy intensity of the economy.

Energy efficiency is a measure of energy performance for a specific end use or process, such as heating, cooling, transport or manufacturing a product. Energy efficiency improves when less energy is required to meet the same needs or achieve similar output. This concept closely relates to energy intensity, a broader metric that reflects overall energy consumption relative to economic activity.

The Tracker brings together data from the IEA's Energy Data Centre (EDC), the fuel market reports of the IEA's Energy Markets and Security Directorate (EMS), and the World Energy Outlook (WEO). Consistent with the United Nations Tracking Sustainable Energy Goals (SDG7) Energy Progress Report, the Tracker uses World Energy Balances (WEB) for its baseline historical data with the most recent years derived by scaling up WEB values with the rates of change from the latest EMS and WEO estimates. Current year estimates are preliminary.

Three WEO scenarios, none of which are forecasts, are illustrated to provide a framework for exploring different energy futures. These scenarios are not designed to predict the most likely pathway —but rather to examine a range of potential futures.

The Stated Policies Scenario (STEPS) provides a sense of the prevailing direction of travel for the energy sector based on a detailed reading of the latest policy settings in countries around the world. It accounts for energy, climate, and related industrial policies that are in place or that have been announced. The aims of these policies are not automatically assumed to be met; they are incorporated in the scenario only

to the extent that they are underpinned by adequate provisions for their implementation.

The Announced Pledges Scenario (APS) starts from the same detailed reading of government policies assuming that all national energy and climate targets, including longer-term net zero emissions targets and pledges in Nationally Determined Contributions, are met in full and on time.

The Net Zero Emissions by 2050 Scenario (NZE) portrays a pathway for the global energy sector to achieve net zero CO_2 emissions by 2050, which is consistent with limiting long-term global warming to 1.5°C with limited overshoot (with a 50% probability). The NZE Scenario also meets the key energy-related UN Sustainable Development Goals, in particular achieving universal access to modern energy services by 2030 and securing major improvements in air quality.

The rate of electrification progress is also included as a feature of the Tracker as electric end uses are much more efficient than those based on fossil fuels. Electrification also has many other benefits as it enables a deeper penetration of renewable energy which eliminates thermal heat losses associated with fossil fuel use in power generation. The rate of change in electrification can be measured by the annual percentage change in the share of electricity consumption in total final energy consumption (TFC). A positive change indicates a shift towards electricity whereas a negative change indicates a shift towards the direct use of other fuels.

While primary energy intensity is the main metric for tracking efficiency progress, energy intensity can also be measured based on TFC, which represents the energy consumed in all end-use sectors – including transport, industry, and buildings. This excludes the losses from energy conversion, distribution, and transmission, which are included in TES.

Exchange rates measured in USD PPP terms are most commonly used for international comparisons. This is the approach used in this Tracker, although market exchange rates or natural currency units are also used. The reference year used for USD GDP PPP in this Tracker is 2015. Different reference years are also used, subject to regular updates. Such alternative approaches can introduce differences in intensity levels and rates of progress. At the most granular, as efficiency touches every energy-consuming activity that exists, it also can be measured in terms of the energy used for each unit of physical activity across a multitude of activities. Such data can be explored in the IEA's Energy End Uses and Efficiency Data Explorer.