The Sustainable Development Goals Extended Report 2023

7 AFFORDABLE AND CLEAN ENERGY

Note: This unedited 'Extended Report' includes all indicator storyline contents as provided by the SDG indicator custodian agencies as of 30 April 2023. For instances where the custodian agency has not submitted a storyline for an indicator, please see the custodian agency focal point information for further information. The 'Extended Report' aims to provide the public with additional information regarding the SDG indicators and is compiled by the Statistics Division (UNSD) of the United Nations Department of Economic and Social Affairs.

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Target 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services

Indicator 7.1.1 Proportion of population with access to electricity

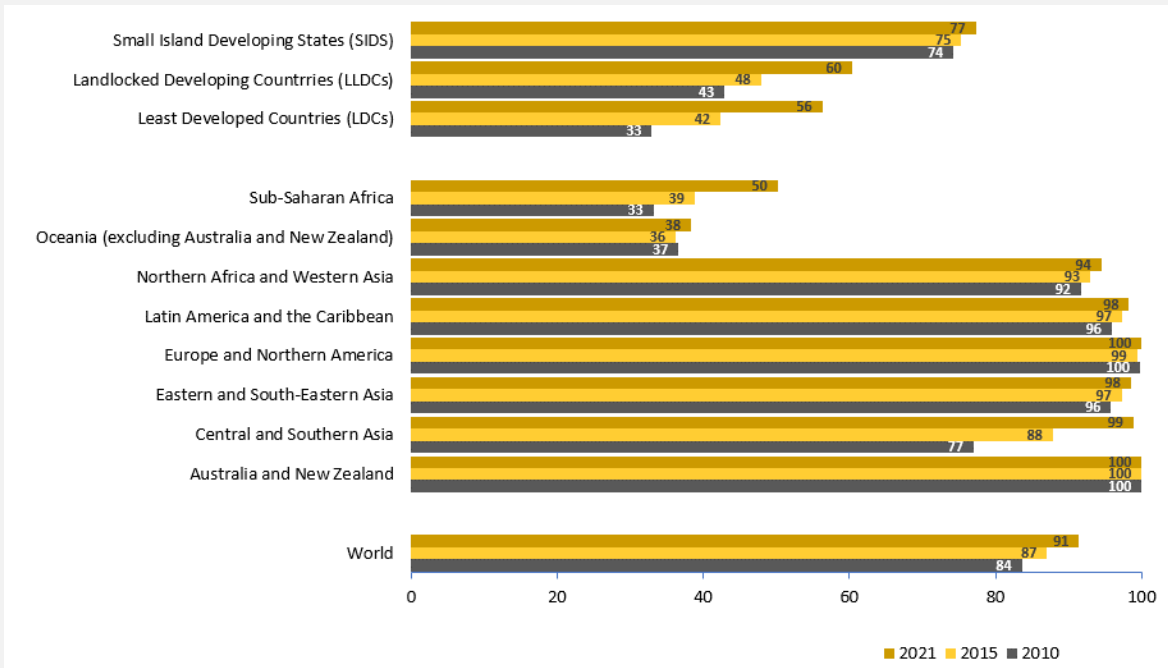
Stronger action and investments should be accelerated, especially in Sub-Saharan Africa, to reach universal access in time as an important step to unlock opportunities for economic activities and improve living standards.

Globally, the share of people with access to electricity has increased from 84 percent in 2010 to 91 percent in 2021. This is equivalent to an increase of 1.4 million people electrified over the past decade. Although the pace of electrification bounced back between 2019 and 2021, the recent progress has slowed down compared to the previous years. The annual access growth in 2019–21 was 0.6 percentage points, electrifying 114 million people each year, a lower rate than 0.8 percentage points in 2015–19 when 135 million people gained access every year. In 2021, 675 million people still didn't have access to electricity, and at this slow pace, about 660 million people will remain unelectrified by 2030. Therefore, the access rate should grow by 1.0 percentage points annually between 2021 and 2030 to be on track to secure universal electricity access by 2030.

Regional disparities have even widened recently. Compared to other regions, Sub-Saharan Africa made the fastest growth in electrification from 47 percent in 2019 to 50 percent in 2021. However, 567 million people lacked access, comprising more than 80 percent of the global access deficits in 2021 as the population in the region has grown rapidly. Furthermore, Sub-Saharan Africa accounted for more than half of the 481 million people without access in the Least-Developed Countries (LDCs). In 2021, the electrification rate of 38 percent in Oceania (excluding Australia and New Zealand) also showed a wide gap with the global access rate of 91 percent. In contrast, the other regions became close to universal access or showed a moderate distance to the target.

The number of people without access has increasingly concentrated in Sub-Saharan Africa. In 2021, the top 3 countries with the largest access deficits, including Nigeria, the Democratic Republic of the Congo, and Ethiopia were in the region. According to the Regulatory Indicators for Sustainable Energy Report 2022 published by the World Bank, Sub-Saharan Africa has recovered from the COVID-19 crisis by improving regulatory and policy frameworks for electricity access. Hence, it is a pivotal moment for governments and international communities to focus on accelerating progress toward universal access to strengthen socioeconomic inclusion in the region.

Proportion of population with access to electricity, 2010 and 2021 (percentage)



Additional resources, press releases, etc. with links:

- Tracking SDG7: The Energy Progress Report; Link: https://trackingsdg7.esmap.org/downloads
- Regulatory Indicators for Sustainable Energy; Link: https://rise.esmap.org/

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Custodian agency(ies): World Bank

Indicator 7.1.2 Proportion of population with primary reliance on clean fuels and technology

In 2021, 2.3 billion people still lacked access to clean and safe fuels and technologies

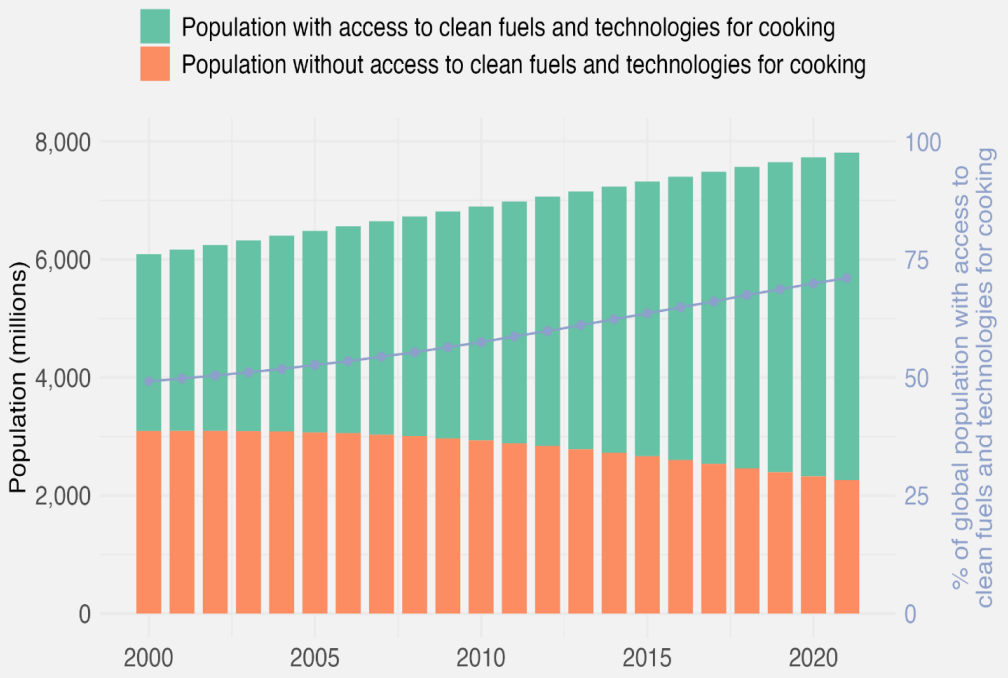
Globally, the number of people without access to clean cooking continues to decrease each year. In 2021, 71 percent of the global population, had access to clean cooking fuels and technologies. However, large regional variability exists and still 2.3 billion people remain without access to clean cooking and rely primarily on inefficient and polluting cooking systems.

Most countries with low access rates are in sub-Saharan Africa and the number of people without access in this SDG region is growing, currently at a rate of almost 20 million people year. This trend reflects the fact that gains in the share of people with access are failing to keep pace with population growth, to the detriment of the almost 1 billion people already suffering the negative health and socioeconomic impacts of polluting cooking in this region. Unless the accelerating access deficit in sub-Saharan Africa is addressed, global access will stall and rapidly begin to decline as early as 2025.

On the global level, with current trends, number of people gaining access to clean cooking will increase by 510 million people from 2021 to 2025. This demonstrates the considerable and urgent need to scale up action to ensure an additional 1 billion people with access to clean cooking solutions by 2025, as pledged by the Global Roadmap for Accelerated SDG7 Action in Support of the 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change.

Without strengthening further efforts, the overwhelming majority of low- and middle-income countries could still have rates of access to clean cooking below 95 percent of the national population in 2050 and beyond.

Change over time in the absolute number of people (left axis) and percentage of the global population (right axis) with access to clean cooking



Additional resources, press releases, etc. with links:

- The Energy Progress Report (https://trackingsdg7.esmap.org/)

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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

Progresses in both renewable energy deployment and energy conservation need to scale up rapidly, significantly and durably in all sectors to keep global energy and climate objectives in reach.

The share of renewable sources in total final energy consumption (TFEC) increased 1.4 percentage point to 19.1% globally in 2020. This progress resulted from a 2.6% year-on-year increase in renewable energy consumption while TFEC declined 4.7%, as the COVID-19 pandemic disrupted social and economic activities worldwide. Since 2015, the share of renewables in TFEC increased by just 2.4 percentage points despite renewable energy consumption expanding by more than a quarter. This points to the importance of containing energy consumption through energy efficiency, material efficiency and sufficiency to progress towards the Sustainable Development Goal (SDG) target 7.2.

Traditional uses of biomass still represented more than a third of total renewable energy use in 2020, with their share in TFEC slightly rebounding in 2020 after more than a decade of decline. Excluding traditional uses of biomass, the share of modern renewable sources in TFEC is slowly expanding, from 10 percent in 2015 to 12.5 percent in 2020.

Progress differs across end-use sectors. Renewable electricity records the highest share of renewables among end-use categories (28.2%), and in 2020 saw the largest annual progression over the past three decades. Hydropower remains by far the largest source of renewable electricity globally, followed by wind and solar PV. Wind and solar PV recorded the largest absolute growth in 2020, accounting for two-thirds of the increase in renewable electricity consumption observed since 2015.

In the heat sector, excluding ambient heat and electricity used for heat for which limited data are available, renewable sources met 24 percent of global demand in 2020 – more than half of which is from traditional used of biomass, essentially occurring in Sub-Saharan Africa and Asia. The share of modern renewables in final heat consumption progressed only 1.2 percentage point since 2015.

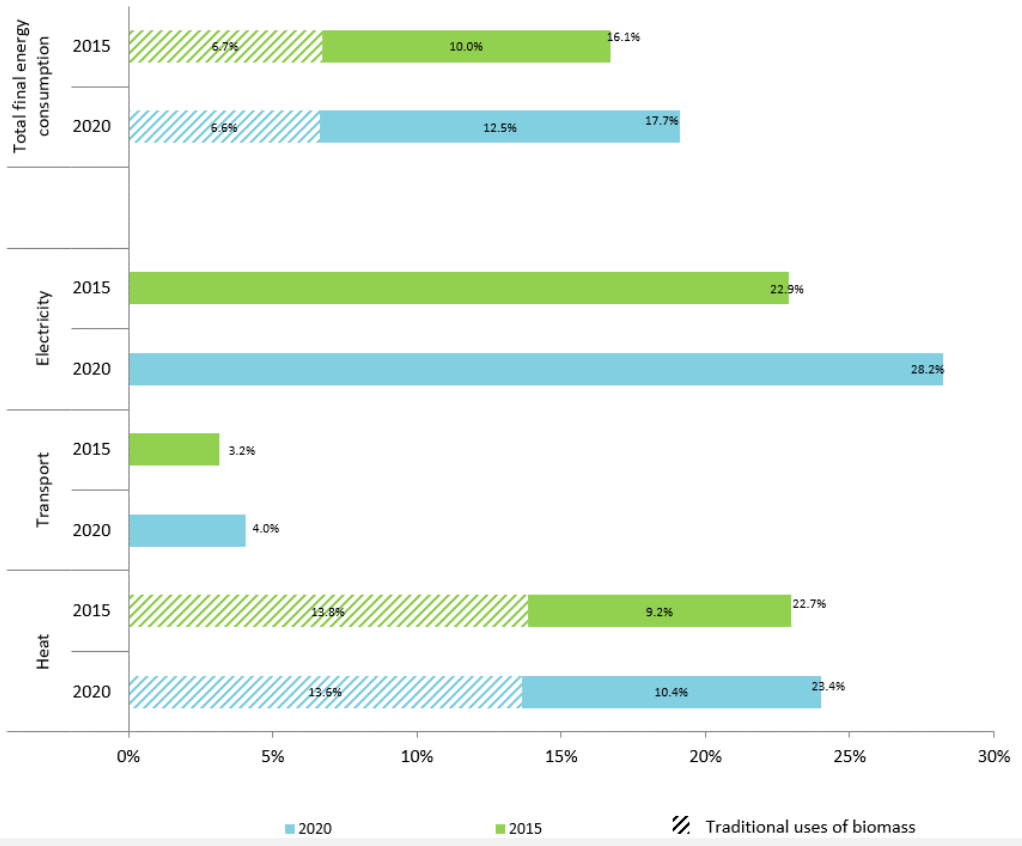
Globally, transport energy consumption declined 14% in 2020. Biofuels for transport, which represent 90% of renewable energy for transport, were relatively less impacted, with an estimated 4% decline in consumption year-on-year, owing to greater penetration in transport fuel mixes and relatively lower demand decline in large biofuel markets. Renewable electricity used in vehicles and trains continues to expand, albeit from a small basis, owing to new electric vehicles sales and higher share of renewables in electricity used for transport. Overall, the share of renewable energy in transport rose to 4% in 2020 up from 3.6% in 2019.

Excluding traditional uses of biomass, Latin America and the Caribbean show the highest share of modern renewable energy in TFEC, owing to significant hydropower generation, and to the consumption of bioenergy in industrial processes and biofuels for transport. In 2020, almost half of the global year-on-year increase in modern renewable energy consumption took place in Eastern Asia – essentially China – where wind, hydropower and solar PV dominated the growth, followed by Europe. The share of renewables in TFEC progressed the fastest in Latin America and in Europe, supported in both cases by significant declines in energy demand caused by responses to the pandemic.

Despite strong disruption of supply chains, renewable energy developments have shown resilience through the COVID-19 pandemic, especially in the electricity sector. More recently, the global energy crisis triggered by the war in Ukraine and related sanctions on Russia has revived energy security concern in many regions, as 80% of the world's population live in countries that are net energy importers. This crisis has further underscored the value of domestically generated renewable electricity for energy security and affordability, as well as the importance of efforts for sustainable industrialisation.

Yet, keeping up with SDG7 and Paris agreement ambitions requires sustained policy momentum to scale up both renewable energy deployment and energy conservation in all sectors and mobilise public and private investment worldwide, particularly in developing countries.

Share of renewable sources in final energy consumption, by end-use sector, 2015 and 2020, world



Additional resources, press releases, etc. with links:

- IEA. 2022. Renewables 2022, IEA, Paris https://www.iea.org/reports/renewables-2022
- IRENA. 2023. Renewable Capacity Statistics 2023, IRENA, Abu Dhabi (forthcoming)
- IEA, IRENA, UNSD, World Bank, World Health Organization. 2023. Tracking SDG7: The Energy progress Report 2023. (forthcoming)

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Custodian agency(ies): UNSD,IEA,IRENA

Target 7.3 By 2030, double the global rate of improvement in energy efficiency

Indicator 7.3.1 Energy intensity measured in terms of primary energy and GDP

2020 was the worst year of the decade for energy intensity improvement. A strong rebound is needed to reach SDG7 targets

The rate of improvement in primary energy intensity, which had already slowed in recent years, dropped to 0.6 percent in 2020. This makes it the worst year for energy intensity improvement since the global financial crisis. Worldwide, energy intensity was 4.63 megajoules (MJ) per U.S. dollar (2017 PPP) in 2020.

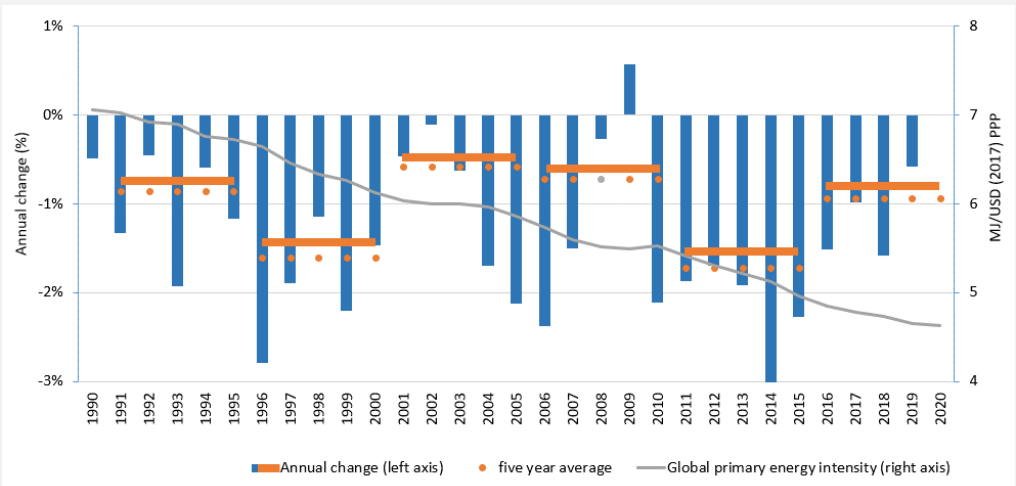
Energy intensity improvements thus continue to remain well below the 2.6% needed to reach the target set under the United Nations Sustainable Development Goals (SDGs) of doubling the rate of improvement in energy efficiency globally by 2030, compared to the base period of 1990-2010. Between 2010 and 2020, the average annual rate of improvement in global energy intensity was only 1.8 percent. Moreover, the higher rates of improvement happened at the beginning of the decade, and progress then slowed down in 2015-2020. Annual improvement through 2030 must now average 3.4 percent to meet the target of SDG 7.3. However, estimates for 2021 point to a continued low improvement in intensity improvement as a result of the COVID-19 crisis, with early estimates for 2022 suggesting a return to the average rate of improvement during the previous decade.

In 2020, for the first time since the global financial crisis, which impacted energy efficiency improvement until 2010, both GDP and total energy supply decreased, by 3.2 and 3.8% respectively. GDP decreasing slightly less than energy supply resulted in a very small improvement in energy intensity, the smallest of the decade. This slowdown was influenced by a shift in economic structure during the COVID-19 crisis crisis towards more energy-intensive industrial production, combined with only modest avoided demand from fuel switching towards electricity. Another cause of this downturn was slower rates of technical efficiency improvements, in a context where lower energy prices extended payback period for energy efficiency measures.

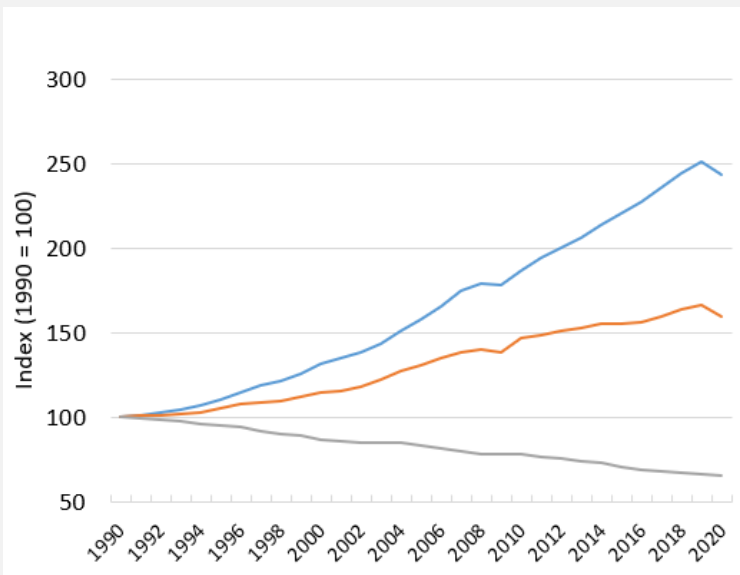
Energy intensity is expected to improve at a higher pace in 2022, in a context of energy crisis that brings more urgency to energy savings, but not on par with the rate now needed to reach SDG7. The energy crisis was a strong reminder that in addition to helping reach the target, well-designed and well-implemented policies can deliver a range of benefits beyond savings in energy and emissions. These include better energy security, lessened exposure to worldwide shift in energy prices, reduced energy bills for households and businesses, new jobs in energy efficiency retrofits and health owing to better air quality.

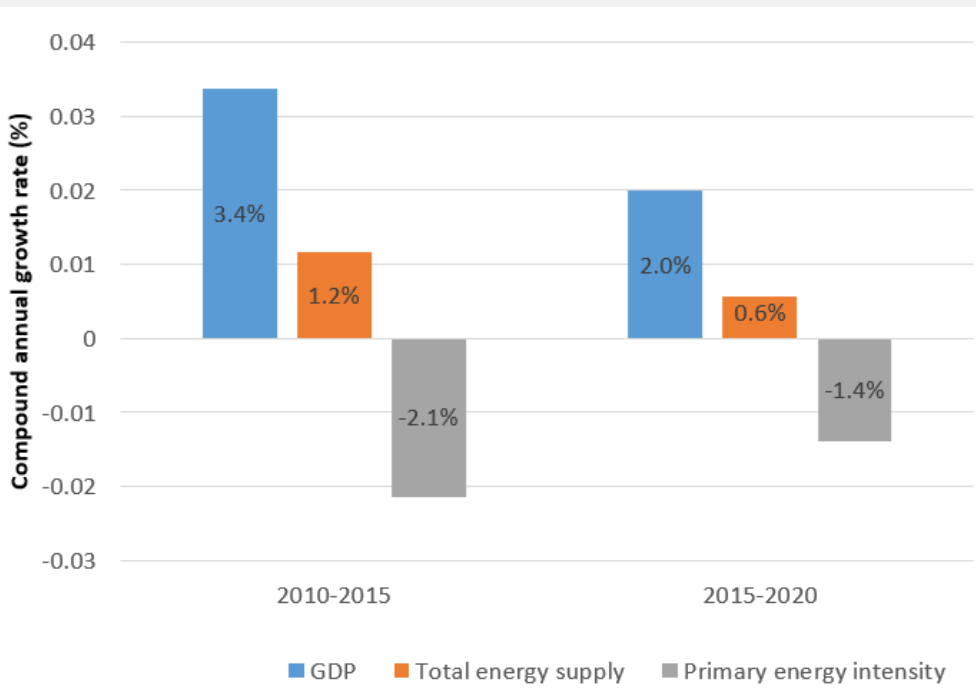
Energy efficiency measures must be made a priority in policy and investment over the coming years to help the world achieve SDG 7.3, promote economic development, improve health and wellbeing, and ensure universal access to clean and efficient energy.

Global primary energy intensity and its annual change, 1990–2020



Trends in underlying components of global primary energy intensity, 1990–2020 (left); and CAGR of GDP, total energy supply, and primary energy intensity, 2010–2020 (right)





Additional resources, press releases, etc. with links:

- IEA, 2022. Energy Efficiency Indicators Data Explorer. (https://www.iea.org/data-and-statistics/data-tools/energy-efficiency-indicators-data-explorer)
- IEA. (2022). Energy efficiency market report (https://iea.blob.core.windows.net/assets/7741739e-8e7f-4afa-a77f-49dadd51cb52/EnergyEfficiency2022.pdf)
- IEA. (2022). The value of urgent action on energy efficiency. (https://iea.blob.core.windows.net/assets/6ed712b4-32a3-4934-9050-d97a83a45a80/Thevalueofurgentaction-7thAnnualGlobalConferenceonEnergyEfficiency.pdf)
- IEA. (2022). The value of urgent action on energy efficiency – policy toolkits (https://www.iea.org/reports/the-value-of-urgent-action-on-energy-efficiency/policy-toolkit#abstract)

Storyline authors(s)/contributor(s): Pauline Henriot, IEA; Pouya Taghavi, IEA

Custodian agency(ies): UNSD,IEA

Target 7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology

Indicator 7.a.1 International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems

International public financial flows in support of clean energy in developing countries have a decreasing trend that started before the COVID-19 pandemic and continued through 2021, amounting to USD 10.8 billion

International public financial flows in support of clean energy in developing countries have a decreasing trend that started before the COVID-19 pandemic and continued through 2021. In 2021, they amounted to USD 10.8 billion—an 11% drop from 2020. This was 35% less than the 2010–19 decade-long average, and less than half the 2017 peak of USD 26.4 billion. Looking at a five-year moving average trend, 2021 accounted for USD 15.8 billion, still 2.6 times larger than the 2010 moving average of USD 6.2 billion. The downward trend in public investments is expected to continue in 2022, with it possibly taking several years to make up for the lower commitments. Financing stays lower than what is needed to reach SDG 7, in particular for the least-developed countries, landlocked developing countries, and small island developing states.

The distribution of flows by technology in 2021 shifted. Solar energy attracted most flows at 43%, followed by 33% of flows directed to multiple/other renewables and 16% to hydropower. Wind and geothermal energy received less than 10% of commitments. These decreases reflect the fact that commitments increasingly fall into the "multiple/other renewables" category populated by energy funds, green bonds, and other government-led programs to support renewables, energy efficiency, and electricity access. This category is growing in importance as there is increasing interest in funding mechanisms that target multiple energy technologies at once.

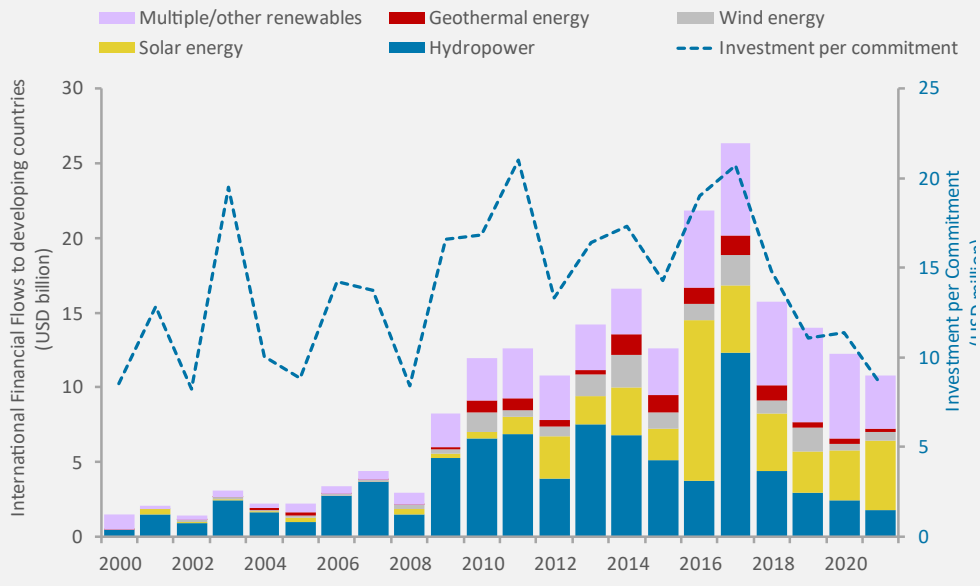
Geographically, all regions saw an annual decrease in international public flows in 2020 of 13%, and then again in 2021 of 11%. Yet in 2021, several regions saw increases in financial flows. Northern America and Europe received 81% more (USD 180 million); Sub-Saharan Africa had a large recovery of 45% from 2020 (USD 1,213 million); Eastern Asia and South-eastern Asia increased by 23% (USD 251 million); and "unspecified countries" increased slightly by 4% (USD 21 million), respectively.

Commitments are increasingly more widely distributed, with a larger group of countries receiving a larger share of investments. During 2010-19, 36 countries received 80% of all commitments, but since then, the number has slightly increased to 38, including unspecified countries and sub-regions without allocations. The improved distribution is a result of several factors. First, more investments are going to unallocated countries or residual countries in specific regions or unspecified countries, which statistically diversifies the recipients of the investments. Second, expanding the analysis to cover a longer period flattens the variability of flows and results in a more even distribution. Third, although the number of donors investing in renewables has decreased in 2020-21, the top investors have slightly increased how many recipients they support.

The number of countries that did not receive commitments decreased to 29 in 2021 from 49 in 2010, which is a positive trajectory. Most of these countries receiving more than USD 5 per capita are island nations in Oceania. Looking at trends in distribution of flows by population, a continuation of the decreasing trend in flows in the past two years can be observed with all recipient countries receiving on average USD 1.67 and USD 1.24 per capita respectively during 2020 and 2021. Unfortunately, those countries most in need (least developed countries, landlocked developing countries and small island developing states) had worse distributions of flows in 2021. SIDS were the most affected in terms of decreases, receiving USD 3.23 per capita in 2021, a 53% drop from USD 4.94 per capita in 2020. Yet, these countries still receive greater flows per capita than LLDCs at USD 2.39 per capita and LDCs at USD 1.85 per capita in 2021.

The proportion of debt instruments from public financing sources has consistently declined, standing at two-thirds of flows in 2021 from nearly 90% in 2018. In turn, the share of grants, equity, and guarantees has increased. The increase in flows in grants as well as its larger share of the flows is a major help to recipient countries as they are debt-free. At the same time, the absolute decline in loan flows, which provide financing for profitable projects, is limiting the sources of funding for profitable projects that need capital to start and that would pay back the loans with interest.

International public financial flows (commitments) to developing countries in support of clean energy, 2000–21, by technology (at 2020 prices and exchange rates)



Storyline authors(s)/contributor(s): Gerardo Escamilla, IRENA; Arvydas Lebedys, IRENA

Custodian agency(ies): OECD, IRENA

Target 7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support

Indicator 7.b.1/12.a.1 Installed renewable energy-generating capacity in developing countries (in watts per capita)

In 2021, there was a record-breaking installation of 268 Watts per capita of renewable capacity in developing countries

SDG indicator 7.B.1 tracks the installation of renewable energy generating capacity in developing countries. In 2021, there was a record-breaking installation of 268 watts per capita of renewable capacity, representing a year-on-year growth rate of 9.8%. However, even with this positive and accelerating growth, developing countries are not on track to meet SDG7 by 2030. Moreover, the positive global and regional trends hide the fact that the countries that are most in need of support are being left behind, even among developing countries. There are still only four developing countries with more than 1,000 Watts per capita and they are the same as last year (Bhutan, The Lao People's Democratic Republic and Uruguay). While the growth rate in renewables capacity per capita was high for the developing world, at a compound annual growth rate of 9.6% over 2016-21, growth was significantly lower for small island developing states (8.5%), the least developed countries (5.5%), and landlocked developing countries (3.8%). This trend is concerning, as it underscores the urgent need for greater support and investment to ensure that developing countries can meet their renewable energy and development goals and contribute to global efforts to combat climate change.

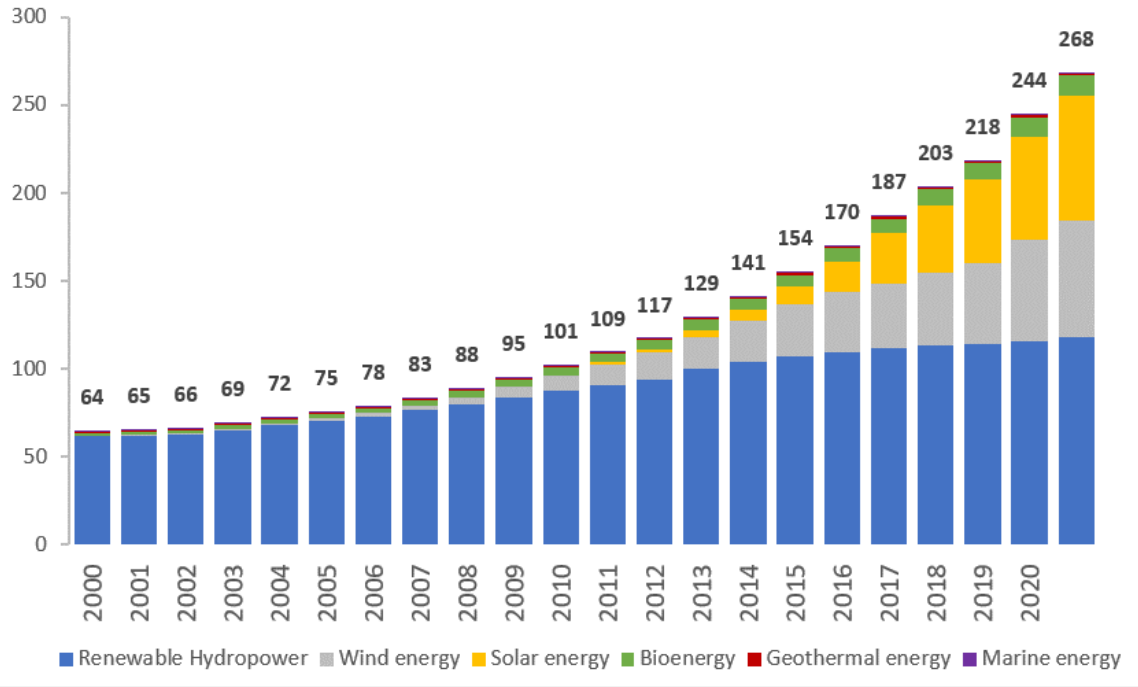
Renewable capacity additions have been growing at a steady pace over the past two decades and have consistently outpaced population growth. In the first decade of the 21st century, the CAGR of renewable capacity per capita was 4.6%. This figure was surpassed by an 8.6% CAGR during 2010-15, and more recently, the CAGR increased to 9.6% in the 2015-20 period. In 2021, the growth rate continued to accelerate, reaching 9.8%. Meanwhile, the addition of non-renewable capacity decreased by 2% between 2020 and 2021, dropping from 77.1 GW to 75.7 GW. This trend of decreasing non-renewable additions started in 2016 after reaching an all-time high of 137.7 GW in 2015.

Over the past decade, the growth in renewable energy generating capacity varied across regions. The Eastern and South-Eastern Asia region witnessed an impressive growth in capacity, increasing from 135 to 525 Watts per capita from 2010 to 2021, primarily due to additions of wind and solar power. Lao PDR, China, and The Republic of Korea showed the most growth in the region. In Latin America and the Caribbean, capacity increased by 57%, from 285 to 446 watts per capita, with the chief components being wind energy (35%), solar energy (28%), and hydropower (27%). Uruguay, Chile, and Panama showed the most growth in renewables-fueled capacity in the region. In Western Asia and North Africa and Central and Southern Asia, per capita capacity doubled during 2010–21, with a CAGR of 7.4% and 7.5% respectively, driven by solar and wind power. Bhutan, Türkiye, and The United Arab Emirates led this region. However, countries in Oceania and Sub-Saharan Africa are lagging, with per capita capacity growing by 20% and 59%, respectively, over the period. Tokelau, Niue, and The Cook Islands showed the most growth in renewables in these regions.

Moreover, the growth rates across country groups reveal worrying disparities, with Small Island Developing States (SIDS), The Least Developed Countries (LDCs), and Landlocked developing countries (LLDCs) lagging even behind other developing countries. At current annual growth rates, LDCs would need almost 40 years, LLDCs 25 years, and SIDS 13 years to reach a level of deployment similar to the average 2021 level of developing countries.

Closing the geographic gap in the deployment of renewables-based capacity will require tailored policies and investment measures to ensure a just and climate-safe energy transition in the long term. The ambitious deployment of renewable capacity across regions is crucial to avoid locking in unsustainable and polluting energy choices and to prevent the creation of stranded assets.

Installed renewable energy-generating capacity in developing countries (in Watts per capita), by technology between 2000 and 2021



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Custodian agency(ies): IRENA