The Sustainable Development Goals Extended Report 2024

Inputs and information provided as of 30 April 2024

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 2024. 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.

Contents

Indicator 7.1.1 Proportion of population with access to electricity 2

Indicator 7.1.2 Proportion of population with primary reliance on clean fuels and technology 3

Indicator 7.2.1 Renewable energy share in the total final energy consumption 4

Indicator 7.3.1 Energy intensity measured in terms of primary energy and GDP 5

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 6

Indicator 7.b.1 Installed renewable energy-generating capacity in developing and developed countries (in watts per capita) 7

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

Increased efforts and fresh insights are needed to achieve an average annual increase of 1.08% per year to avoid 660 million people being without electricity in 2030; most of them in Sub-Saharan Africa. Decentralized Renewable Energy (DRE), Solar Productive Use of Electricity (PUE), and Electricity as-a-service (EaaS) models can play an increasingly important role in closing this pernicious access gap

2022 data showed that the number of people living without electricity access, grew for the first time in over a decade. A slowing of progress is observable in the last 5 years which may have been caused by a combination of COVID-19 and supply disruption issues in the short-term, as well as the long-term challenge of an increasingly remote and low-income population remaining unserved. Despite global electricity access rate remaining steady at 91% , new connections lagged population growth. Significant progress was made between 2010 – 2020, with access to electricity growing at an average of 0.77 % per year during the period. This pace dropped to 0.4% between 2020–22, putting increased pressure on future efforts to achieve SDG7 which would now require an average annual increase of 1.08% per year until 2030. While Central and South Asia made substantial progress, Sub-Saharan Africa lagged and now holds 83% of the global access deficit, up from 50% in 2010. Population increases in Sub-Saharan Africa outpaced new connections, leaving 569 million without electricity in 2022, surpassing slightly the 566 million figure in 2010.

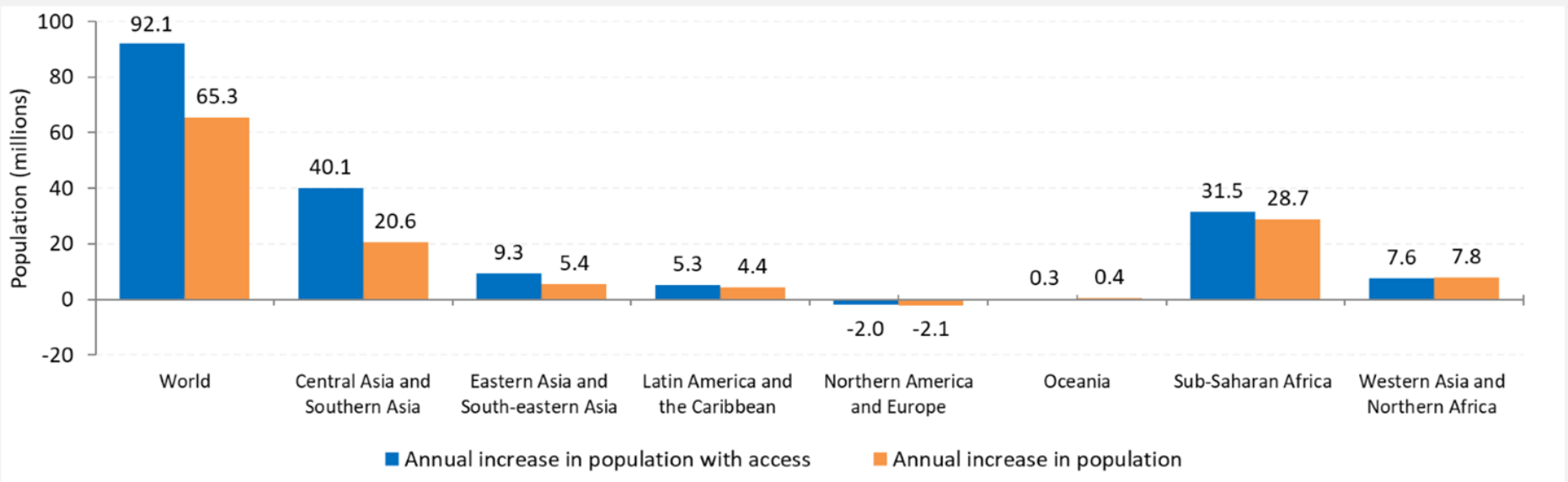
Eighteen of the top twenty countries with the largest access deficit in 2022 are in Sub-Saharan Africa, with Nigeria, the Democratic Republic of the Congo, and Ethiopia accounting for a third of the entire global deficit. Notably, 85% of those without electricity in 2022 reside in rural areas. The rate of energy access improvement slowed in 2022 for the least developed countries (LDCs) and those affected by violence and conflict (FCVs). Despite rapid growth from 2010 to 2019, progress stagnated in 2022, with just a 1% increase in access rates for both LDCs and FCVs, leading to a rise in the number of people without electricity in these regions.

Decentralized Renewable Energy plays a pivotal role in addressing the global electricity access gap. Off-grid solar solutions highlighted substantial progress in electricity access rates from 2016 to 2019, particularly in rural areas where grid connectivity is limited. Despite a brief setback during Covid-19, off-grid solar has rebounded. Projections indicate that by 2030, off-grid solutions could provide affordable access to 464 million sub-Saharan Africans. The most commonly used off-grid solution were solar lanterns (50%), followed by solar home systems (17%), mini-grids (13%), generators (12%), and rechargeable batteries (10%).

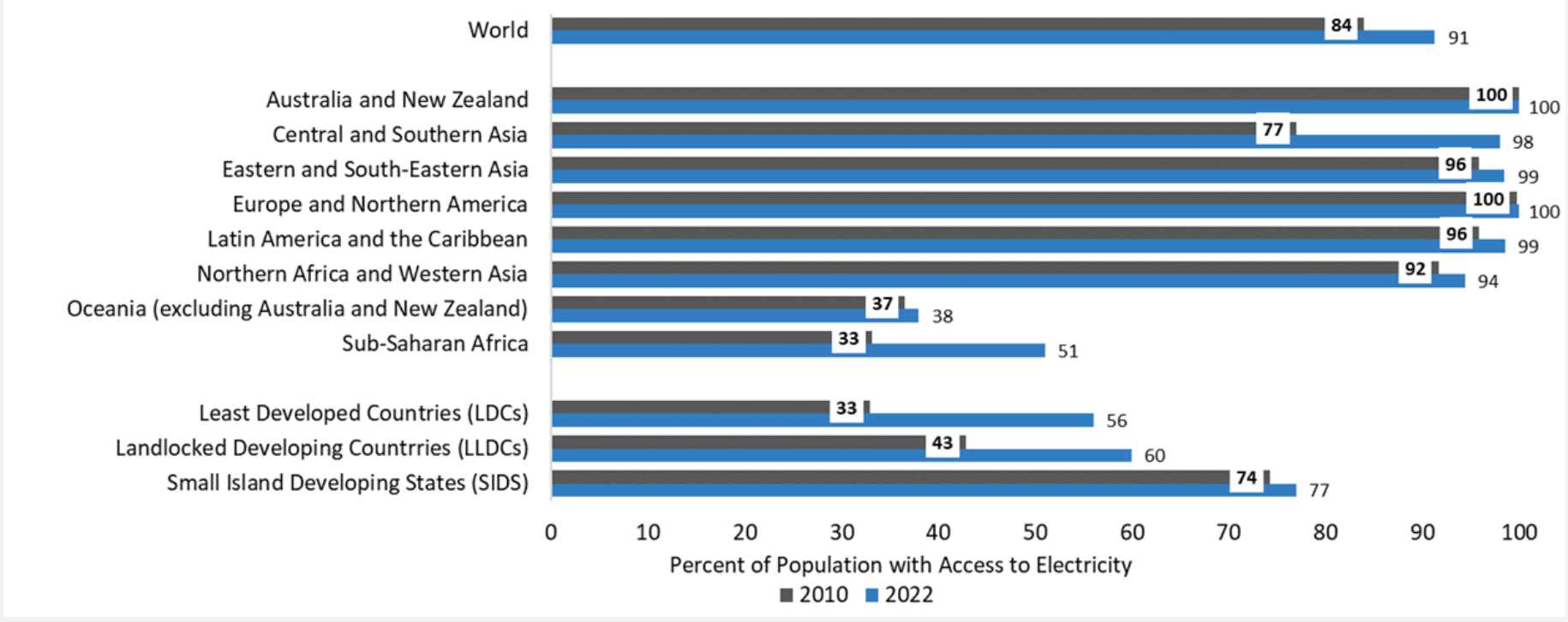
Complementing this, Stand Alone Solar Productive Use of Electricity (PUE) holds promise for rural communities by linking electricity access to increased productivity, income growth, and an improved quality of life. However, the standalone PV sector is projected to raise only USD 7.8 billion in investments between 2022 and 2030, far short of what is needed. Thus, addressing this slow rate requires fresh thinking on business models, and collaborative efforts across energy, water, and agriculture sectors to overcome hurdles. Focus on understanding consumer behavior, improving consumer awareness, and addressing affordability through innovative finance is key to closing this gap.

The Electricity-as-a-service (EaaS) model offers a strategic approach, targeting sustainable electrification of rural public institutions through stand-alone solar systems. A recent longitudinal study found that after four years, 86% of solar water pump end-users reported increased yields and 70% found that quality of life had improved significantly. For refrigerator owners, 96% reported their businesses had evolved through increased number of customers, longer hours of operation, and increased inventory/supplies, whilst 38% reported quality of life had very much improved. The challenge lies in being able to replicate these successes exponentially within the limited remaining time to 2030.

Annual Increases in Electrification and Population, 2020 – 2022, by region



Percent of Population with Access to Electricity



Additional resources, press releases, etc. with links:

- Tracking SDG7: The Energy Progress Report; Link: https://trackingsdg7.esmap.org/downloads

Storyline authors(s)/contributor(s): World Bank is contributing agency

Custodian agency(ies): World Bank

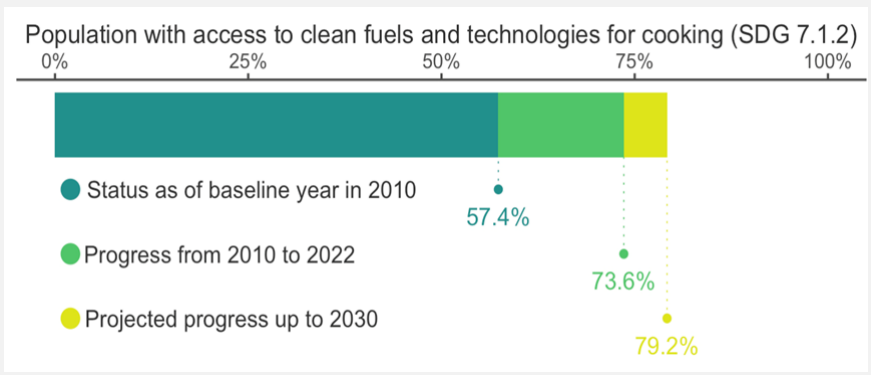
Indicator 7.1.2 Proportion of population with primary reliance on clean fuels and technology

Projected access deficit to clean cooking fuels and technologies to surpass 1.7 billion by 2030

In the midst of compounding global crises, such as pandemics, economic shocks, and climate change, the goal of achieving universal access to clean cooking is more relevant than ever. In 2022, while 74 per cent of the world's population had access to clean cooking solutions (e.g., stoves powered by electricity, LPG, natural gas, biogas, solar, and alcohol), a staggering 2.1 billion people still depend on, such as charcoal, coal, crop waste, dung, kerosene, and wood, as their primary energy source for cooking. The lack of access to clean cooking is more than a polluting fuels and technologies energy issue; this is a profound challenge of equity and justice, often trapping the most vulnerable in poverty cycles. The reliance on traditional stoves and pollution fuels (often free or at low costs)—driven by poverty—leads to substantial health risks and environmental degradation. The situation also presents an opportunity cost, particularly impacting women and children who are often tasked with cooking and fuel gathering, further perpetuating gender inequalities and limiting opportunities for education and economic participation. Additionally, traditional cooking methods emit significant greenhouse gases and pollutants like black carbon, contributing to more than half of man-made black carbon emissions.

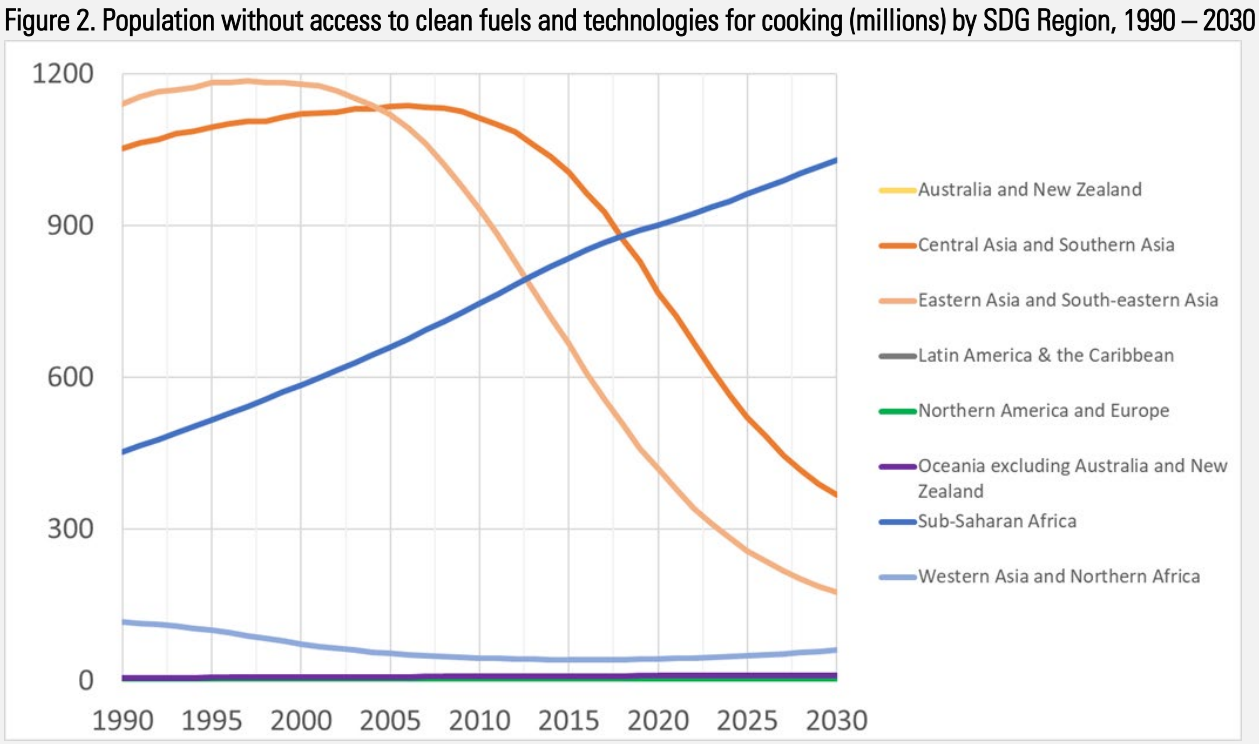
While there has been progress toward the 2030 target for universal access, significant disparities and a slow pace of advancement highlight the insufficiency of current efforts to achieve the goal within the stipulated timeframe. If current trends persist, it is projected that only 79 per cent of the global population will have access to clean cooking fuels and technologies by the target year; a shortfall (over 1.8 billion people without access) demands urgent action (Figure 1). The disparity in access is stark: 88 per cent of urban households versus 54 per cent of rural households globally have access to clean cooking solutions. Notably, in sub-Saharan Africa, only 7 per cent of rural households cook with clean fuels and technologies, compared to 40 per cent in urban areas.

Figure 1. Global progress towards achieving SDG 7.1.2 between 2010 and 2030 (per cent)



Regionally, the access deficit to clean cooking has decreased consistently in Eastern Asia and South-eastern Asia since 2000 and in Central Asia and Southern Asia since 2010. Conversely, sub-Saharan Africa remains the only region where the number of people without access is still rising. The access deficit in sub-Saharan Africa has more than doubled between 1990 and 2022, primarily due to population growth, which translates into 923 million people without access to clean cooking fuels and technologies in 2022. The current trends suggest that, without immediate and targeted intervention, the access deficit in sub-Saharan Africa alone could exceed 1 billion by 2030, derailing efforts to achieve the 2030 target (Figure 2).

Figure 2. Population without access to clean fuels and technologies for cooking (millions) by SDG Region, 1990 – 2030



Additional resources, press releases, etc. with links:

- All indicators relevant to clean cooking in the context of exposure to household air pollution are available on dedicated WHO Global Health Observatory webpage: https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/gho-phe-household-air-pollution-exposure
- Tracking SDG7 The Energy Progress Report website (the new edition of the report is usually released in June/July): https://trackingsdg7.esmap.org
- Country Profiles for SDG 7.1.2 are also available on Tracking SDG7 The Energy Progress Report website: https://trackingsdg7.esmap.org/countries

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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

Renewable energy deployment needs to scale up rapidly and durably in all sectors to keep global energy and climate objectives in reach and strengthen resilience, improve energy access and address multiple global crises

In 2021, the global share of renewable energy sources in total final energy consumption (TFEC) decreased by 0.34 percentage points year-on-year to 18.7 percent. However, excluding traditional biomass use, the share of modern renewable energy sources in TFEC expanded gradually, rising from 10 percent in 2015 to 12.5 percent in 2021.

In 2021, traditional uses of biomass accounted for slightly over a third of total renewable energy consumption, with their share in TFEC reverting to 2019 levels contributing to the slight regression of renewables share in TFEC. Renewable energy consumption saw a 3.2 percent year-on-year rise in 2021, that came from a 5.1 percent rebound in TFEC (360 EJ to 378 EJ), as social and economic activities began to recover from the disruptions caused worldwide by the COVID-19 pandemic since 2020.

Progress varies across different end-use sectors. Particularly, renewable electricity boasts the highest share among end-use categories, with renewables amounting to 28.2 percent of power generation. Hydropower remains the predominant source of renewable electricity globally and in addition wind and solar PV demonstrated the largest absolute growth, with its share 2.3 times larger than in 2015.

Despite enduring multiple crises related to energy security concerns, volatile commodity prices, supply chain constraints, and trade measures, renewable energy developments have showcased resilience. These crises have underscored the value of domestically generated renewable electricity for enhancing energy security and affordability and emphasizing the critical stakes of sustainable industrialization.

In 2021, renewable sources accounted for 23.5 percent of global energy use for heat. Notably, over half of this renewable heat stemmed from use of traditional biomass, of which 95 percent is concentrated in Africa and Asia. However, the share of modern renewables in final heat consumption progressed marginally, by 1.2 percentage points, since 2015.

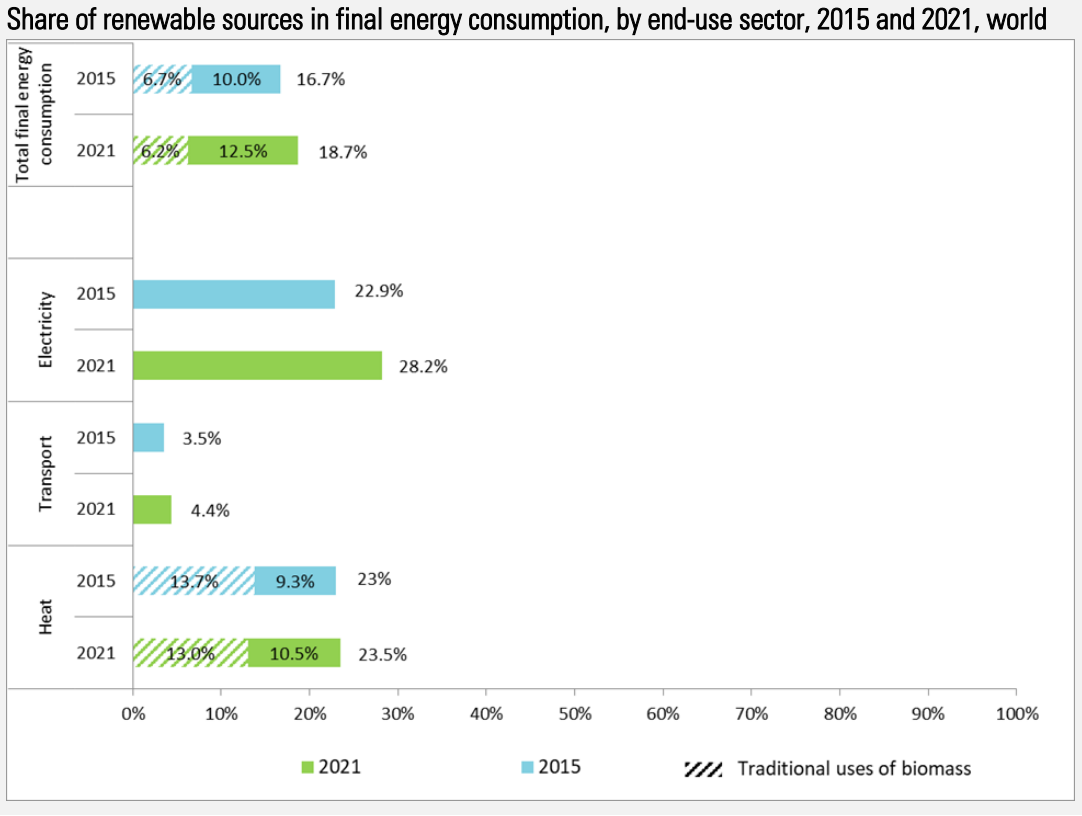
The share of renewable energy in transport TFEC rose to 4.4% in 2021, up from 3.5% in 2015. TFEC in transport surged by 8 percent in 2021, nearly returning to 2015 levels after a sharp downturn in 2020. Biofuels (90 percent) dominated the renewable energy use in transport, with 7 percent year-on-year increase in 2021. Remarkably, renewable electricity used in vehicles and trains expanded 34 percent compared to 2015, driven by the rise in electric vehicle sales and a higher proportion of renewables in transport-related electricity.

Excluding traditional use of biomass, Latin America and the Caribbean exhibited the highest share of modern renewable energy in TFEC. This is attributed to significant hydropower generation and the consumption of bioenergy in industrial processes and for transport. In 2021, Eastern Asia and Southeastern Asia contributed to almost 60 percent of the global year-on-year increase in modern renewable energy consumption, primarily driven by China, where wind, hydropower, and solar PV dominated the growth, followed by Europe at 17 percent.

Continued advancement toward the objectives outlined in SDG7 and the Paris Agreement necessitates sustained policy impetus to bolster the expansion of renewable energy deployment and promote energy conservation across all sectors. This endeavour requires mobilizing both public and private investment on a global scale, using the former to leverage the latter, and with a particular focus on fostering investment in developing nations.

Furthermore, during the COP28 climate change conference held in Dubai, over 130 national governments collectively committed to the ambitious goal of tripling global renewable capacity by 2030. This pledge aligns closely with the targets set forth in SDG7 Indicator 7.2, which aims to substantially increase the proportion of renewable energy within the global energy mix by 2030. Appropriate tools and metrics will be key to track and monitor progress and support countries toward this objective in the electricity, heat, and transportation sectors.

Share of renewable sources in final energy consumption, by end-use sector, 2015 and 2021, world



Additional resources, press releases, etc. with links:

- B IEA (2024), Renewables 2023, IEA, Paris https://www.iea.org/reports/renewables-2023
- IEA, IRENA, UNSD, World Bank, World Health Organization. 2024. Tracking SDG7: The Energy progress Report 2024

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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

2021 saw the highest annual rise in energy demand in 50 years, leading to limited progress in energy intensity. Annual progress of around 4% is needed between 2022 and 2030 to reach SDG 7.3 target

The rate of improvement in primary energy intensity, which had already slowed down in recent years, reached 0.8% in 2021. This marks the second year in a row for which the energy intensity improvement is well below the long-term average. Worldwide, energy intensity was 4.59 Megajoules (MJ) per U.S. dollar (2017 PPP) in 2021.

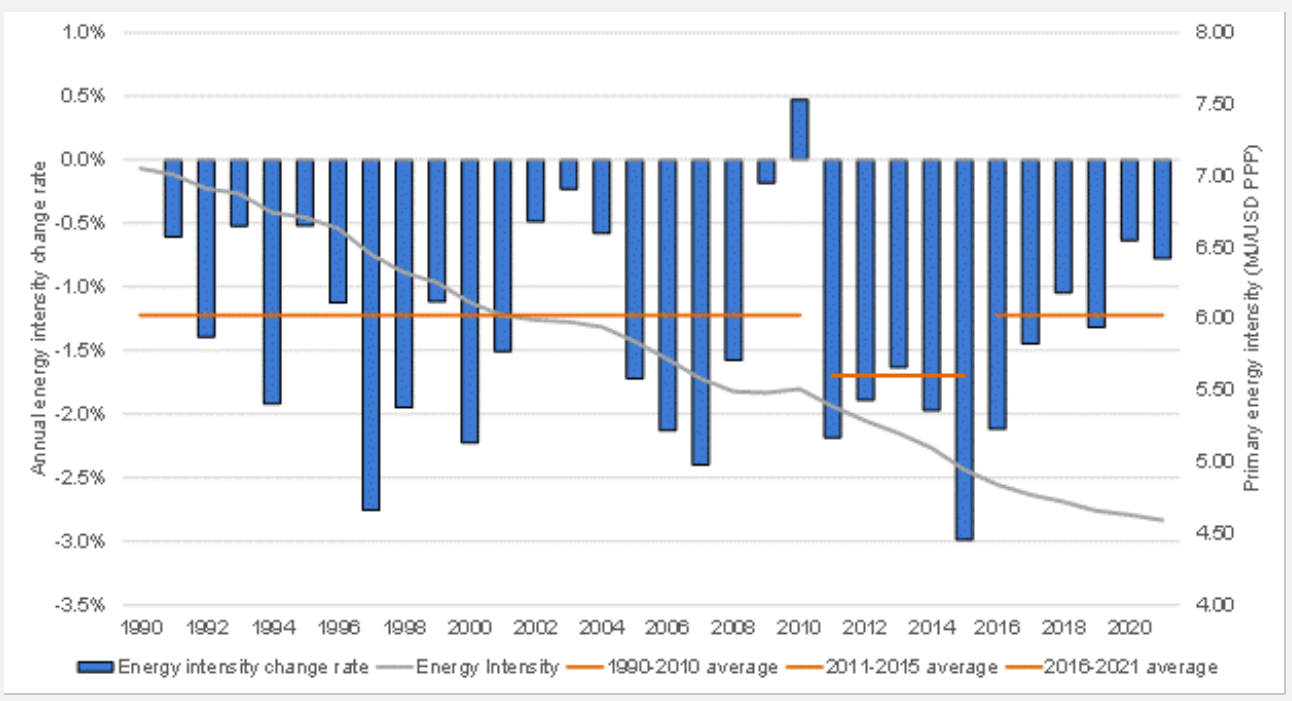
In 2021, after the economic slowdown caused by the covid pandemic and movement restrictions during 2020, the rebound effect brought a global economic growth of nearly 6%, with an increase in energy supply of around 5.4%, the largest in 50 years. Key factors included a higher share of energy-intensive industry in energy demand and the recovery of other demand sectors that were affected by the reactions to the pandemic. 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 improvements for the year 2022 show more promising results, in a context of higher energy costs that bring more urgency to energy savings, but not in line with the rate needed to reach the target. The energy crisis and gas price surge were strong drivers for behavioural changes and new policy implementations that will have lasting effects on energy efficiency progress. This is also expected to lead to an improvement in 2023 above the values found in 2020 and 2021.

Overall, energy intensity improvements continue to remain below the target set under the United Nations Sustainable Development Goals (SDGs). This target requires an average annual improvement of 2.6%[1] between 2010-2030, equivalent to doubling the average improvement rate observed in the 1990-2010 period. However, between 2010 and 2020, the average annual rate of improvement was only 1.7%. Although better than the 1.2% seen between 1990 and 2010, it is still well below the SDG 7.3 target. After another year falling short, annual improvements through 2030 must now average 4% to meet the initial target. This updated value is in line with one the new target of doubling global progress on energy efficiency by 2030[2], one of the main outcomes of COP 28 and an important milestone in the IEA Net Zero Roadmap.

Key actions to achieve the target include switching to more efficient fuels, by electrifying final uses and providing universal access to clean cooking, improving technical efficiency of equipment and processes, and using energy and materials more efficiently. To achieve this, global investment in energy efficiency would need to triple by 2030. However, high interest rates following the economic recovery in 2021 pose a challenge to this progress, as financing new projects becomes more expensive, particularly in emerging markets and developing economies.

Global primary energy intensity (MJ/USD) and its annual change, 1990–2021



Note: MJ = megajoule; PPP = purchasing power parity.

Additional resources, press releases, etc. with links:

- IEA. (2023). Energy efficiency market report. (https://iea.blob.core.windows.net/assets/dfd9134f-12eb-4045-9789-9d6ab8d9fbf4/EnergyEfficiency2023.pdf)
- IEA. (2023). A global target to double efficiency progress is essential to keep net zero on the table. (https://www.iea.org/commentaries/a-global-target-to-double-efficiency-progress-is-essential-to-keep-net-zero-on-the-table)
- IEA, 2023. 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 – policy toolkits (https://www.iea.org/reports/the-value-of-urgent-action-on-energy-efficiency/policy-toolkit#abstract)

Storyline authors(s)/contributor(s): Federico Callioni, IEA; Juha Koykka, IEA; Leonardo Souza, UNSD

Custodian agency(ies): UNSD, IEA

[1] The first SDG measurement of energy efficiency improvement in the 1990-2010 reference period was 1.3% a year, leading to a doubling target of 2.6% annual improvements. It has been later revised to 1.2%, but the numeric target has been kept for consistency purposes.

[2] The target agreed during COP 28 takes progress in year 2022 as baseline, thus requiring an annual progress of 4%.

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 rebounded in 2022

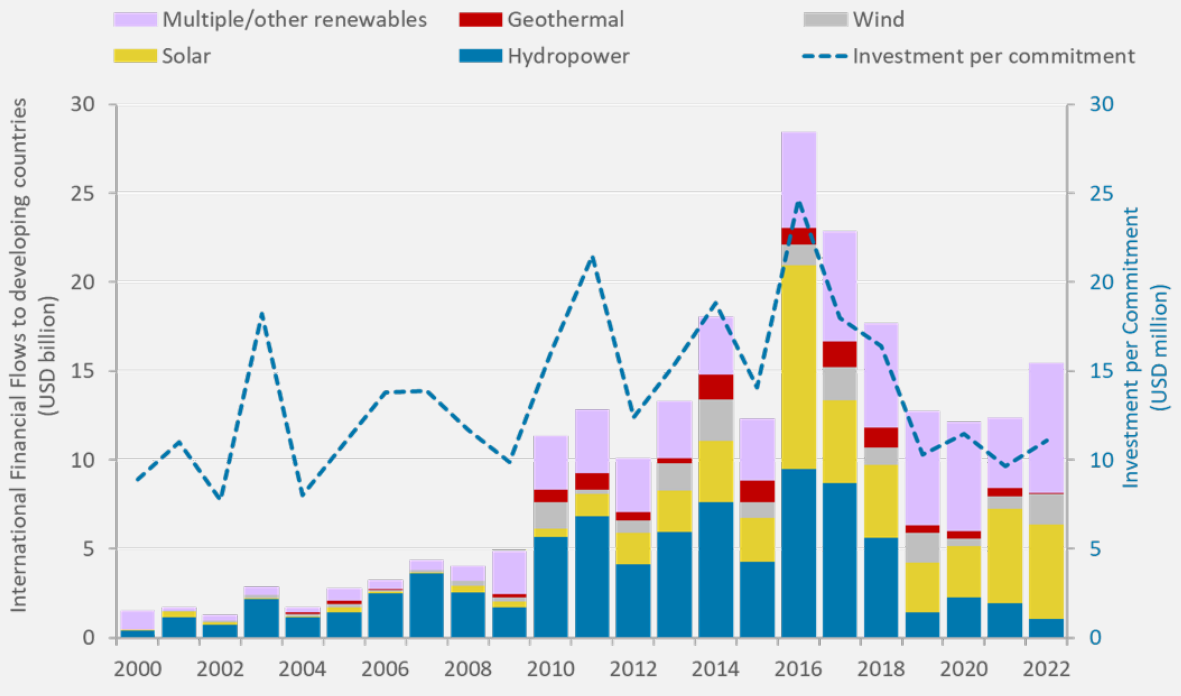
Tracking of Sustainable Development Goal (SDG) indicator 7.a.1 reveals that international public financial flows in support of clean energy in developing countries rebounded in 2022. In 2022, these flows amounted to USD 15.4 billion, an increase of 25 percent from 2021, yet still around half of the 2016 peak of USD 28.5 billion. All things equal in 2023, we can expect a reduction in global five-year average flows of USD 450.0 million. For the trend to recover, 2023 flows need to surpass the USD 17.7 billion mark. The decreasing trend in international public financial flows may delay achievement of SDG 7, especially for least-developed countries (LDCs), landlocked developing countries (LLDCs), and small island developing states (SIDS).

The technological trend of the last decade clearly signals a diminishing weight of hydropower investments, favouring instead a mix of solar energy commitments and those in the multiple/other category. This is an expected trend that is likely to continue, unless disrupted in specific years due to multi-billion-dollar investments in single hydropower projects. Almost half (47 percent) of commitments in 2022 were dedicated to multiple/other renewables, solar energy investments equaled to 35 percent of flows. The rest of the flows are almost equally distributed between wind energy (11 percent) and hydropower (7 percent), leaving traces of flows to geothermal energy (0.4 percent).

Compared to 2021, the flows changed substantially for each region, except for Sub-Saharan Africa. Six regions saw increases in 2022, while two regions experienced drops in their inflows. Oceania had the largest increase of 662 percent (USD 85.9 million); unspecified countries second, at 193 percent (USD 1,076.7 million); flows to Western Asia and Northern Africa followed with an increase of 135 percent (USD 990.5 million); flows to Latin America and the Caribbean rose 114 percent (USD 1,994.0 million); flows to Northern America and Europe increased by 24 percent (USD 90.0 million); and flows to Sub-Saharan Africa stayed stable at a modest 2.5 percent increase (USD 112.5 million). On the other hand, flows decreased by 39 percent to Central Asia and Southern Asia (USD 1,166.7 million), and by 9.0 percent to Eastern Asia and South-eastern Asia (USD 135.4 million).

Commitments are becoming marginally more widely distributed. In 2021, 80 percent of commitments were distributed among 19 countries. While 2022 saw a more even distribution with 25 countries receiving most of the commitments, this figure is still lower than when compared to the 2010-22 range. The number of countries that did not receive any commitments decreased from 28 to 27 in 2022. Positively, 43 LDCs received some sort of financing during 2022, leaving only Guinea-Bissau and Burundi without inflows for the year. LLDCs attracted more finance than LDCs when looking at the past decade's performance. Flows to SIDS reflect the most even distribution to the population among these three groupings, with 80 percent of flows going to countries where 86 percent of the population lives.

International public financial flows (commitments) to developing countries in support of clean energy, 2000–22, by technology (at 2021 prices and exchange rates)



Additional resources, press releases, etc. with links:

- More analysis will be published in the annual Tracking SDG 7 report

Storyline authors(s)/contributor(s): Gerardo Escamilla, IRENA; Julian Prime, 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 Installed renewable energy-generating capacity in developing and developed countries (in watts per capita)

Installed renewable energy-generating capacity in developing and developed countries is making progress and is on a continuous rise

Renewable installed capacity per capita is making progress and is on a continuous rise. In 2022, it reached 424 watts per person globally, 1,073 watts per person in developed countries and 293 watts per person in developing countries. The renewable capacity grew 8.5 percent from 391 watts per person in 2021 and presenting an all-time trend of 8.1 percent compound annual growth rate (CAGR) over five-year periods. Developed countries had a smaller growth of 7.2 percent from 1,001 watts per person in 2021 and with a CAGR of 6.9 percent. Developing countries drove the global growth in 2022, increasing by 10.1 percent and with a CAGR of 9.5 percent.

The case of developing countries continues to be relevant as these countries are responsible for most of the growth in renewable capacity per capita given the proliferation of solar and wind energy of the 2010s.

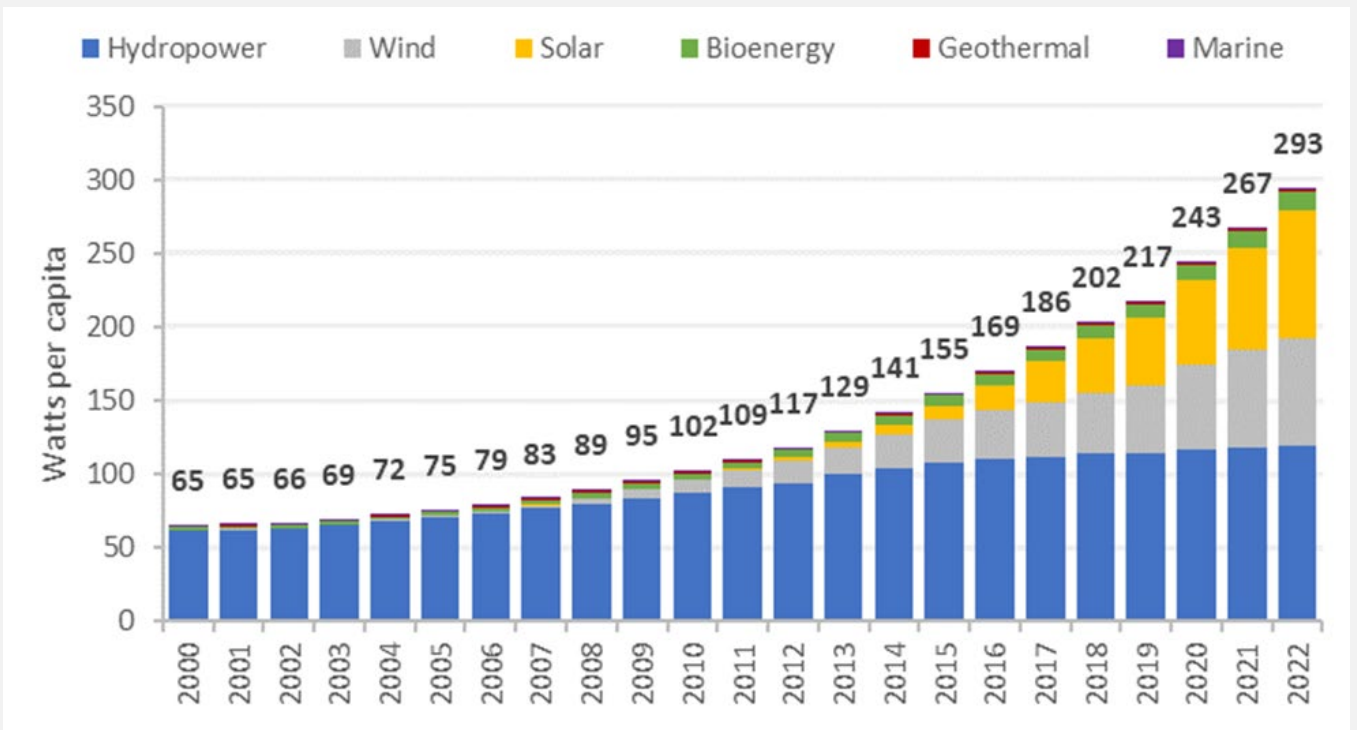
In 2022, the share of installed renewable energy–generating capacity reached its peak, at 40.3 percent, with 424 watts per capita of installed renewable capacity. This value has reached parity across developing groups, with developed countries reaching 40.1 percent and developing countries at 40.4 percent. While the share of renewables is equal across these groups, the story for renewable wattage per capita is vastly different.

Developing countries only had 293 renewable watts per person in 2022, close to the global average of 424 watts per person, but developed countries stood 3.7 times larger, at 1,073 watts per person, indicating large disparities in how renewable electricity covers the population in developing countries. In fact, it was not until 2015 that developing countries reached the same level of renewable electricity per person that developed countries had at the turn of the century.

Over the past decade, growth in renewable energy–generating capacity varied across regions. The greatest capacity growth was 13.2 CAGR seen in Eastern and South-eastern Asia, from 178 to 612 watts per person between 2012 and 2022, primarily due to additions of wind and solar power. The second largest growth rate also corresponds with the best performing region in 2022: 8.2 percent in Oceania, moving from 582 to 1,283 watts per person – larger than the developed world average. Other regions grew below the global average of 7.7 CAGR over the decade, with Latin America and the Caribbean showing the slowest growth rates at 4.8 CAGR and Sub-Saharan Africa with the lowest average values of 39 watts per person in 2022.

Meanwhile, growth rates across country groups reveal concerning disparities, with small island developing states (SIDS), least-developed countries (LDCs), and landlocked developing countries (LLDCs) lagging even behind other developing countries. In 2022, SIDS and LLDCs reached 101 watts per person, while LDCs stayed at 39 watts per person of renewable electricity. These regions represent a widening gap compared with the rest of the world. At current rates, LDCs would need almost 41 years, LLDCs would need 38 years, and SIDS would need 11 years to reach a level of deployment similar to the average levels in developing countries in 2022.

Renewable installed capacity per capita in developing countries by technology (2000-2022)



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Storyline authors(s)/contributor(s): Gerardo Escamilla, IRENA; Julian Prime, IRENA

Custodian agency(ies): IRENA