7 AFFORDABLE AND CLEAN ENERGY

The Sustainable Development Goals Extended Report 2022

Note: The Statistics Division of the United Nations Department of Economic and Social Affairs (UNSD) prepares the annual The Sustainable Development Goals Report, also known as the glossy report, based on storyline inputs submitted by UN international agencies in their capacity as mandated custodian agencies for the SDG indicators. However, due to space constraints, not all information received from custodian agencies is able to be included in the final glossy report. Therefore, in order to provide the general public with all information regarding the indicators, this 'Extended Report' has been prepared by UNSD. It includes all storyline contents for each indicator as provided by the custodian agencies and is unedited. For instances where the custodian agency has not submitted a storyline for an indicator, please see the custodian agency focal point information linked for further information.

Contents

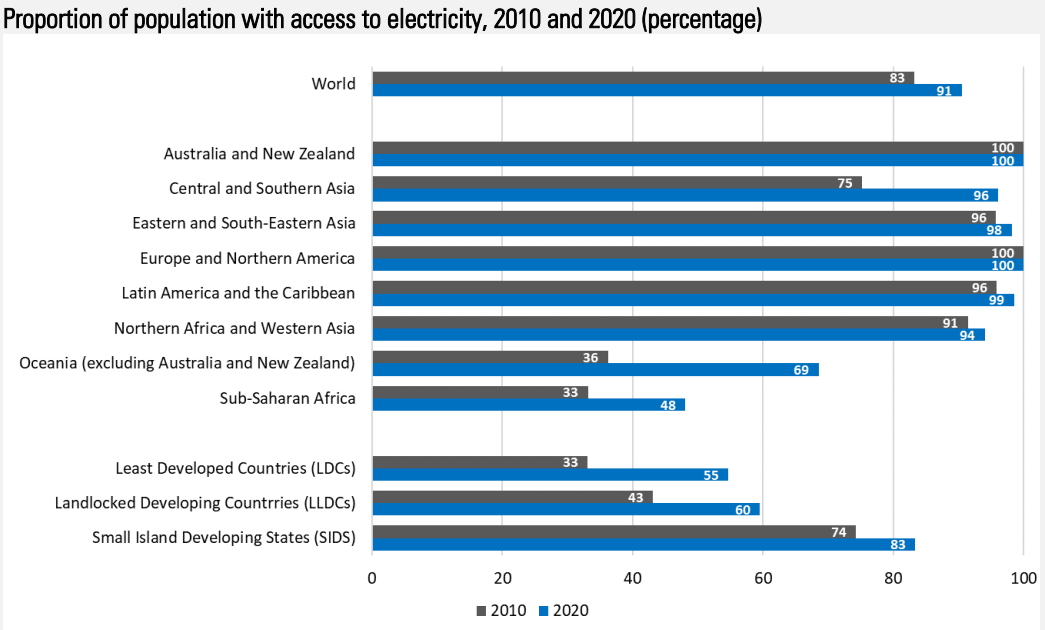
Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services

Indicator 7.1.1: Proportion of population with access to electricity

To address access gap across the world, the pace of electrification should accelerate, putting the most vulnerable on the trajectory for universal access by 2030.

The global electrification rate has grown significantly from 83 percent in 2010 to 91 percent in 2020, increasing the number of connected people by 1.3 billion. Accordingly, the number of unelectrified people has diminished from 1.2 billion to 733 million people in the period 2010-20. The progress has been mainly driven by large access deficit countries such as India and Bangladesh. However, the pace of access growth slowed down in recent years between 2018 and 2020, due to the expected impacts of COVID-19 as well as rising complexity of expanding access to the vulnerable. In 2018-20, the electricity access rate increased by an average of 0.5 percentage points a year compared to 0.8 percentage points between 2010 and 2018. Likewise, 109 million people were electrified each year in the period 2018-20, while 130 million people annually gained access in 2010-18. If the current pace of access growth continues, some 670 million people are expected to live without access in2030 (IEA 2021). To meet universal access by 2030, the access growth should speed up to 0.9 percentage points.

Proportion of population with access to electricity, 2010 and 2020 (percentage)



The progress in electrification was uneven across regions over the last decade. Sub-Saharan Africa was the least-electrified region in the world in 2020. 77 percent of the global population lacking access (568 million people) lived in Sub-Saharan Africa in 2020. Despite the COVID-19 impacts on the SDG 7.1 target trajectory, the access rate in the region increased from 46 percent in 2018 to 48 percent in 2020. However, the slowdown of electrification in the period, possibly caused by COVID-19 crisis, weakened the pace of progress in the region. Under the pressure of COVID-19, up to 90 million people connected to electricity in Africa and developing countries in Asia could not afford to have an extended bundle of services in 2020 (IEA 2021). Meanwhile, during the same period, as of 2020, other regions, including Central and Southern Asia, Eastern and South-Eastern Asia, and Latin America and the Caribbean, have been approaching universal access. Particularly, Central and Southern Asia showed a significant drop in the number of unelectrified people in the period 2010-20.

Electrification trends differed by socioeconomic segments. The electricity access rate of the Least Developed Countries (LDCs) remained at low level of 55 percent in 2020, leaving 479 million unserved people, equivalent to more than half of the world population without access. For urban-rural disaggregation in electrification in the LDCs, the global rural access rate has grown faster than urban rate since 2010. However, in 2020, 44 percent of people living in rural areas had access to electricity while it increased to 78 percent in urban settings. Therefore, further efforts to scale up access in the LDCs and remote areas are necessary to meet the target by 2030.

HUMAN IMPACT STORY

Universal access to electricity is a recognized goal for developing countries. However, measuring electricity access using a simple binary metric—whether or not a household has a connection—fails to capture its multidimensional nature. Multi-tier energy access Tracking Framework (MTF) has been conceptualized and applied to measure the energy access in more comprehensive way. The World Bank has carried out the MTF global survey in more than 20 countries. This impact evaluation study utilizes the MTF survey data in Nepal which was conducted between July and December 2017.

This study empirically tests whether the tiers are a better measure of electricity access and whether being in the upper tiers results in higher level of socio-economic development. The findings reveal that simple grid access improves household welfare. For households with electricity, nonfood expenditure is 43–47 percent higher than for households without electricity. However, households in the higher tiers experience additional development benefits. The per capita expenditures of Tier-5 households improve by 249 percent compared to those without electricity. For nonfood expenditures, the benefits are 160 percent higher. The likelihood of using clean cooking methods also increases for households in the higher electricity tiers. Compared to households without electricity, the likelihood of using clean energy for cooking increases by about 28 percentage points for households with simple access to electricity and by 49 percentage points for households in Tiers 1–4. This figure increases even further to 89 percentage points for those in Tier 5.

This study shows that gaining electricity access and attaining higher tiers of service—particularly Tier 5—have a significant impact on household welfare. Therefore, it is also critical for the government to continue its efforts toward improving the quality of power supply and the affordability of electricity. The promotion of greater appliance adoption among households with access to electricity is also a good idea. Higher rates of appliance adoption would not only increase the welfare benefits for the country but would also improve electricity sales, which are so important for electricity companies. To monitor progress, policy makers may wish to complement the standard MTF household survey with more frequent tier monitoring, combined with simple household appliance surveys.

Reference Info: Khandker, Shahidur R.; Barnes, Douglas F.; Samad, Hussain A.; Koo, Bonsuk. 2022. Does Quality of Electricity Supply Matter for Development?: An Evaluation of Service Level Benefits in Nepal. World Bank

Author: Bonsuk Koo, World Bank

Additional resources, press releases, etc. with links:

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

Storyline author(s)/contributor(s): Elisa Portale, World Bank; Juliette Besnard, World Bank; Jiyun Park, World Bank

Custodian agency(ies): World Bank

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

In 2020, around 1/3 of the population still lacks access to clean and safe fuels and technologies

Access to clean fuels and technologies is distributed unevenly across the globe. During the period 2010-2020, the rate of access to clean cooking fuels and technologies increased at annual rate of 1.0% per year. In 2020, 69% of the global population, had access to clean cooking fuels and technologies. In contrast, 2.4 billion people remain without access to clean cooking, and rely primarily on inefficient and polluting cooking systems. For the period 2010-2020, much of the increase in access to clean fuels and technologies was dominated by the 5 most populous low- and middle-income countries, Brazil, China, India, Indonesia and Pakistan. Over the same period, these countries increased their combined access rate by 5 percentage points. While these countries made steady progress, the global access rate excluding these countries was remained unchanged between 2010 and 2020 (Figure 1). 19 of the 20 countries with the lowest percentage of the population having access were least-developed countries in Africa (Figure 2).

Around the world, urban-rural differences in access to clean cooking fuels and technologies are large. In 2020, 86 percent of people living in urban areas and just 48 percent of the rural population had access to clean fuels and technologies. Urban areas still have greater access to clean cooking than rural areas, but the gap is narrowing.

In low- and middle-income countries, the overall use of clean gaseous fuels (liquid petroleum gas, natural gas and biogas) continues to increase, having overtaken biomass fuels as the dominant fuel type since 2010. In urban areas, the use of electricity for cooking has risen, but gaseous fuels remain the most common cooking fuel. In rural areas, meanwhile, a decline is seen in the use of polluting fuels, particularly biomass and coal. This trend has been accompanied by an increase in the use of cleaner gaseous fuels, however biomass fuels continue to be the dominant form of cooking energy in rural areas. The global proportion using charcoal is low, but in urban Sub-Saharan Africa it has overtaken other biomass as the most popular fuel.

In line with the 'leaving no one behind' paradigm accelerating access to clean cooking is an important step at minimizing the poorest households' vulnerability to the pandemic. The adoption of clean cooking solutions can reduce health risk from household air pollution, support a green and healthy recovery and support economic growth in low and middle-income countries. National governments with the support of international organizations and civil society and with strong engagement of the private sector must harness recovery efforts to develop and implement regulatory and financial policies that can better enable and drive the adoption of clean cooking by the most vulnerable populations.

Figure 1. • Change over time in the absolute number of people (left axis) and percentage of the global population (right axis) with access to clean cooking.

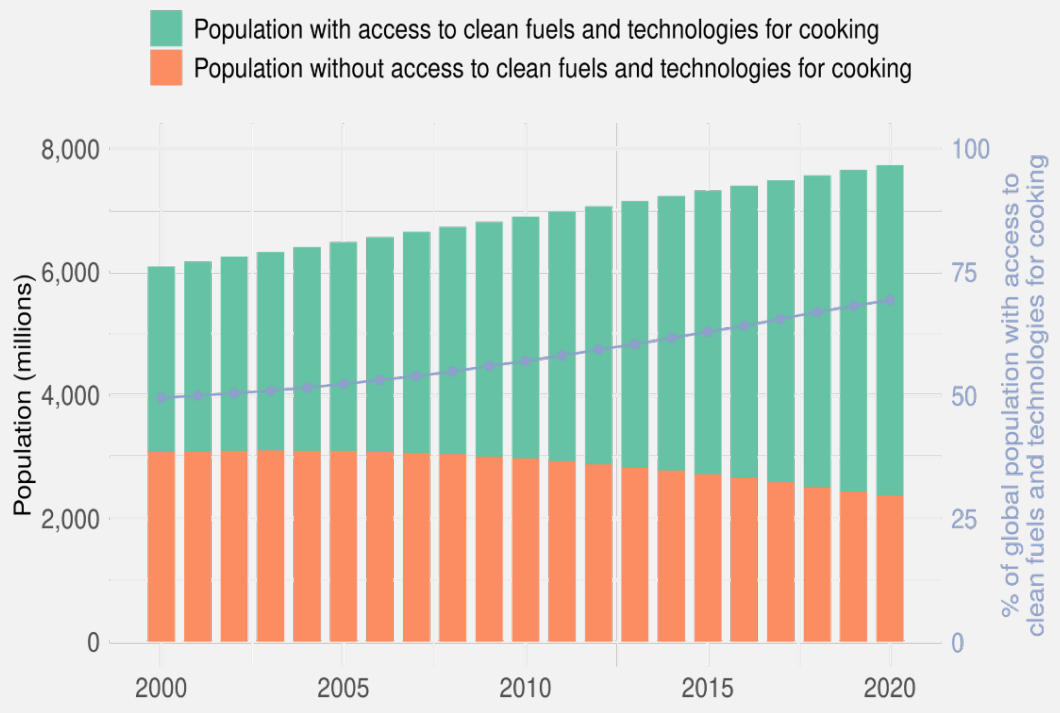
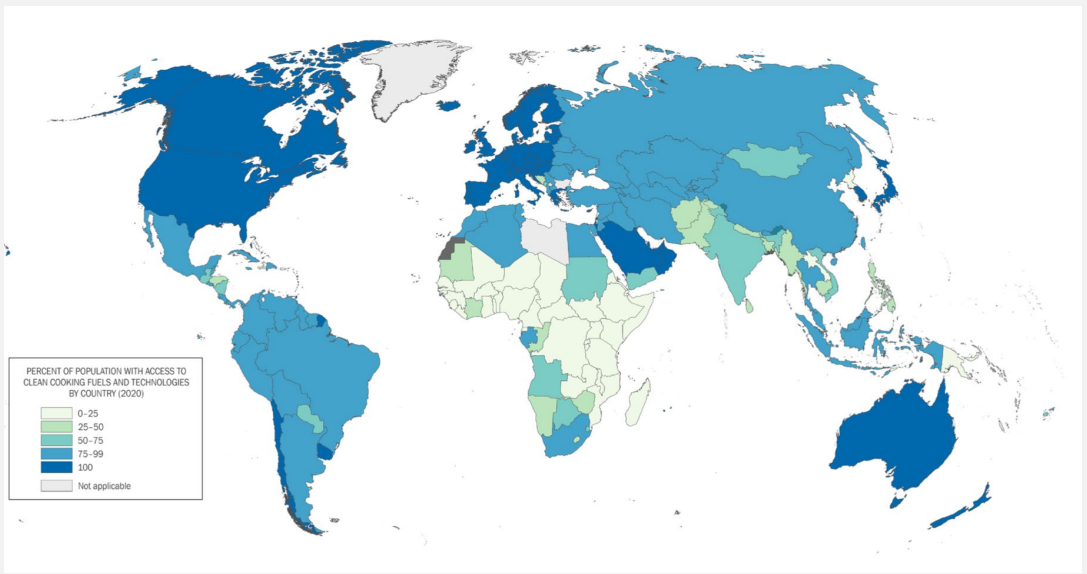


Figure 2 - Sub-Saharan Africa bears the largest burden from lack of access to clean cooking in 2020.



Additional resources, press releases, etc. with links:

- IEA, IRENA, UNSD, World Bank, World Health Organization. 2022. Tracking SDG 7: The Energy Progress Report: https://trackingsdg7.esmap.org/downloads
- Global Health Observatory. Geneva: World Health Organization. 2022: https://www.who.int/data/gho/data/indicators/indicator-details/GHO/gho-phe-primary-reliance-on-clean-fuels-and-technologies-proportion

Storyline author(s)/contributor(s): Heather Adair-Rohani, WHO; Alina Cherkas, WHO consultant; Oliver Stoner, University of Glasgow

Custodian agency(ies): WHO

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

Progress in renewable energy deployment varies significantly across end-use sectors, but more efforts are needed in all of them to meet global energy and climate objectives.

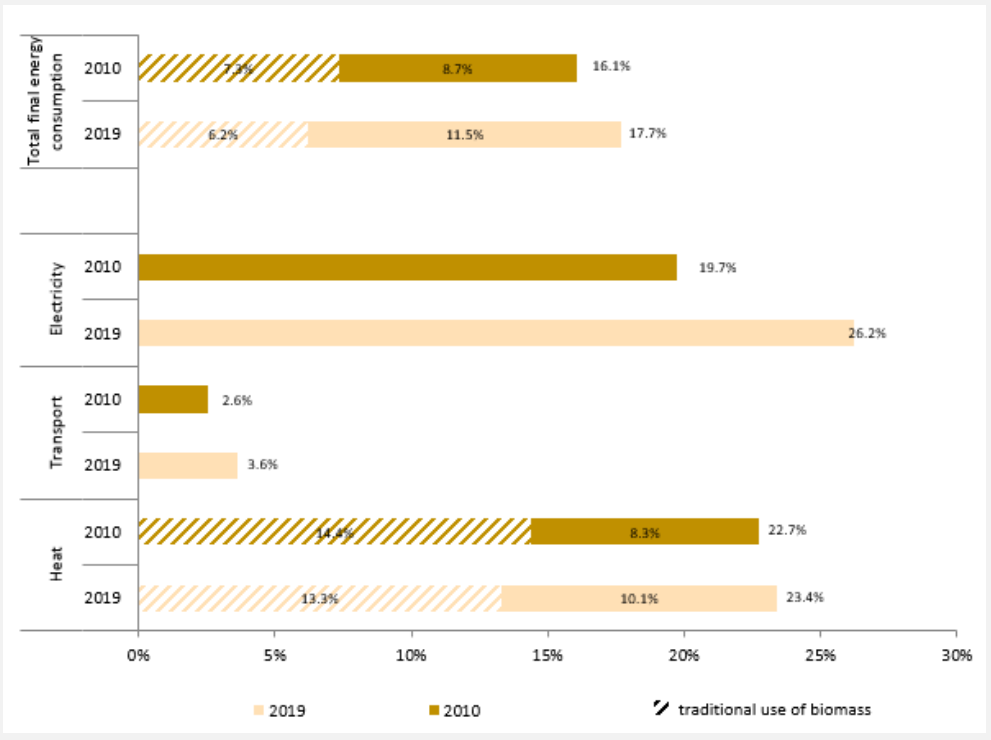
The share of renewable sources in total final energy consumption (TFEC) increased slightly by 0.4 percentage points to 17.7 percent globally in 2019. This is less than one percentage point higher than in 2015, despite total renewable energy consumption increasing by more than 11 percent since then. This emphasizes the importance of containing energy consumption through energy efficiency, material efficiency and sufficiency in order 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 2019, although their share in TFEC is slightly declining. Excluding traditional uses of biomass, the share of modern renewable sources in TFEC is slowly expanding, from 10.1 percent in 2015 to 11.5 percent in 2019.

Trends differ across end-use sectors. The electricity sector continues to see the fastest progression in both renewable energy consumption and the share of renewables in TFEC – the latter amounting to 26.2 percent globally in 2019 and being the largest amongst all end-use sectors. Hydropower remains by far the largest source of renewable electricity globally, followed by wind and solar photovoltaics, with the two latter representing 58 percent of the increase in renewable electricity consumption observed over the last 10 years.

In the heat sector, excluding ambient heat and electricity used for heat for which limited data are available, renewable sources met 23.4 percent of global demand in 2019. Traditional uses of biomass, essentially occurring in Sub-Saharan Africa and Asia, accounted for more than half of renewable heat consumed in 2019.

Share of renewable sources in final energy consumption, by end-use sector, 2010 and 2019, world



In 2019, renewable energy used in transport grew by 7 percent, bringing the total share of renewable energy to 3.6 percent, up from 3.4 percent in 2018. Biofuels, primarily crop based ethanol and biodiesel, supplied 91 percent of renewable energy used in transport. Nevertheless, renewable electricity expansion and electric vehicles sales have led to record increases in renewable electricity use in transport in the past two years.

Excluding traditional uses of biomass, Latin America and the Caribbean show the highest share of modern renewable energy uses in TFEC, owing to significant hydropower generation, and to the consumption of bioenergy in industrial processes and biofuels for transport. In 2019, 44 percent of the global year-on-year increase in modern renewable energy consumption took place in Eastern Asia – essentially in China – where hydropower, solar photovoltaics (PV) and wind dominated the growth.

Despite continued disruptions in economic activity and supply chains following responses to the Covid-19 pandemic across the world, renewable energy developments have shown resilience. This is especially the case for the electricity sector, which saw record-high renewable capacity additions in 2021. However, in 2021, rising commodity, energy and shipping prices have increased the cost of producing and transporting solar PV modules, wind turbines and biofuels worldwide, increasing uncertainties for future renewable energy projects.

Keeping up with SDG7 and Paris agreement ambitions implies much faster progress. This requires strengthening policy support in all sectors and implementing effective tools to further mobilize private capital, in particular for developing countries.

Additional resources, press releases, etc. with links:

- IEA. 2021. Renewables 2021, IEA, Paris https://www.iea.org/reports/renewables-2021
- IEA, IRENA, UNSD, World Bank, World Health Organization. 2022. Tracking SDG7: The Energy progress Report 2022 (forthcoming)
- United Nations. 2021. Theme Report on Energy Transition. Towards the Achievement of SDG 7 and Net-zero Emissions. (https://www.un.org/sites/un2.un.org/files/2021-twg_2-062321.pdf)

Storyline author(s)/contributor(s): François Briens, IEA; Jeremy Moorhouse, IEA; Pouya Taghavi, IEA; Mirjam Reiner, IRENA; Gerardo Escamilla, IRENA

Custodian agency(ies): UNSD,IEA,IRENA

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

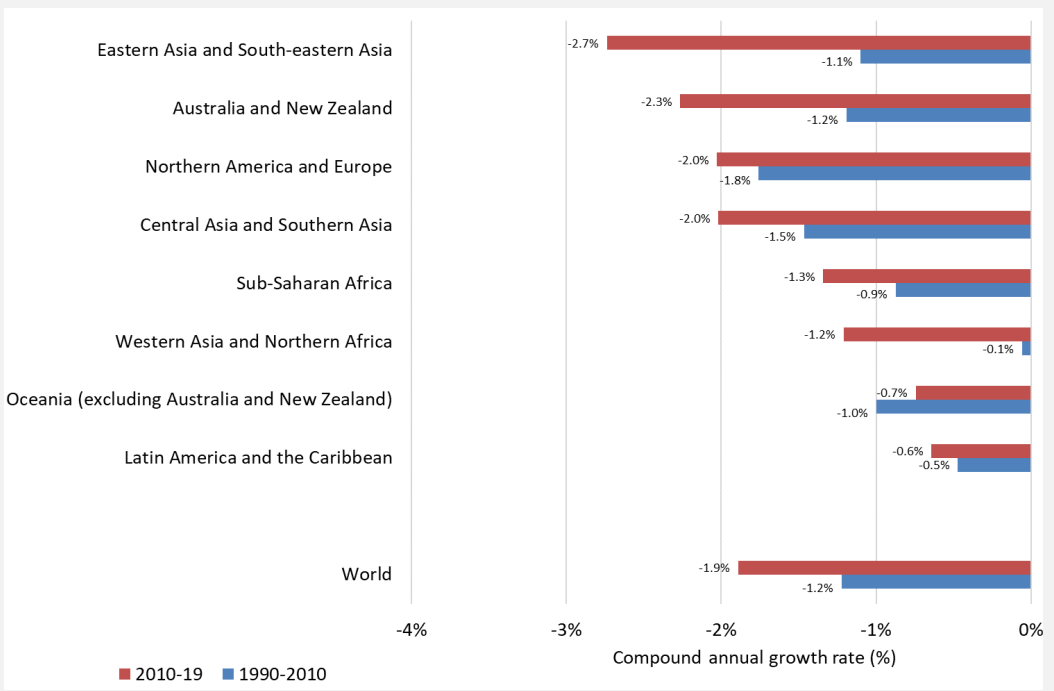
Indicator 7.3.1: Energy intensity measured in terms of primary energy and GDP

Energy efficiency continues to improve, but more action will be needed to reach global targets

Improving energy efficiency—along with increasing energy access and affordability—is central to the global goal of reducing greenhouse gas emissions. Primary energy intensity, defined as total energy supply per unit of GDP, improved by 1.5 percent in 2019. This was the second lowest rate of improvement since the global financial crisis, but still higher than the energy intensity improvement rate in the previous year. Between 2010 and 2019, the average annual rate of improvement in global primary energy intensity was 1.9 percent. Although better than the rate of 1.2 percent between 1990 and 2010, it is well below the SDG 7.3 target of 2.6 percent. Eastern Asia and South-eastern Asia was the only region that overachieved the target of SDG 7.3 between 2010 and 2019, with primary energy intensity improving by an annual average rate of 2.7 percent driven by strong economic growth. Globally, energy intensity improvements until 2030 will now need to average 3.2 percent if the world is to meet the target set in SDG 7.3. This rate would need to be even higher, consistently over 4 percent for the rest of this decade, if the world were to be on track to reach net zero emissions from the energy sector by 2050, as envisioned in the IEA's Net Zero by 2050 Scenario.

Nonetheless, these targets remain within reach, provided there is significant investment in cost-effective energy efficiency improvements on a systematic scale. Given the multiple benefits of energy efficiency, it is an obvious choice of government support, which has been reflected in a range of recent stimulus packages throughout the world.

Growth rate of primary energy intensity at a regional level, 1990-2019



One of these benefits is that improved efficiency at scale would be a key factor in achieving affordable, sustainable energy access for all. Continued low levels intensity improvements, the significant potential opportunities for investment and economic recovery, and the pressing need for expanded access all point to the need for urgent action by governments to enact policies that would foster rapid progress toward an annual intensity improvement of at least 3 percent. As underlined by the recommendations of the High-level Dialogue on Energy in September 2021, efficiency measures and strategies need to address the main barriers to the adoption of such measures and promote structural and behavioral changes to support the achievement of the target.

Additional resources, press releases, etc. with links:

- IEA, IRENA, UNSD, World Bank, World Health Organization. 2022. Tracking SDG7: The Energy progress Report 2022 (forthcoming)
- IEA 2021. Energy Efficiency 2021. (https://www.iea.org/reports/energy-efficiency-2021)
- IEA 2021. Energy Efficiency Indicators. (https://www.iea.org/reports/energy-efficiency-indicators-overview)
- United Nations. 2021. Theme Report on Energy Transition. Towards the Achievement of SDG 7 and Net-zero Emissions. (https://www.un.org/sites/un2.un.org/files/2021-twg_2-062321.pdf)

Storyline author(s)/contributor(s): Yannick Monschauer, 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 financial flows to developing countries in support of clean and renewable energy reached USD 10.9 billion in 2019, 23.6% lower than in 2018, showing a contraction even before the COVID-19 pandemic.

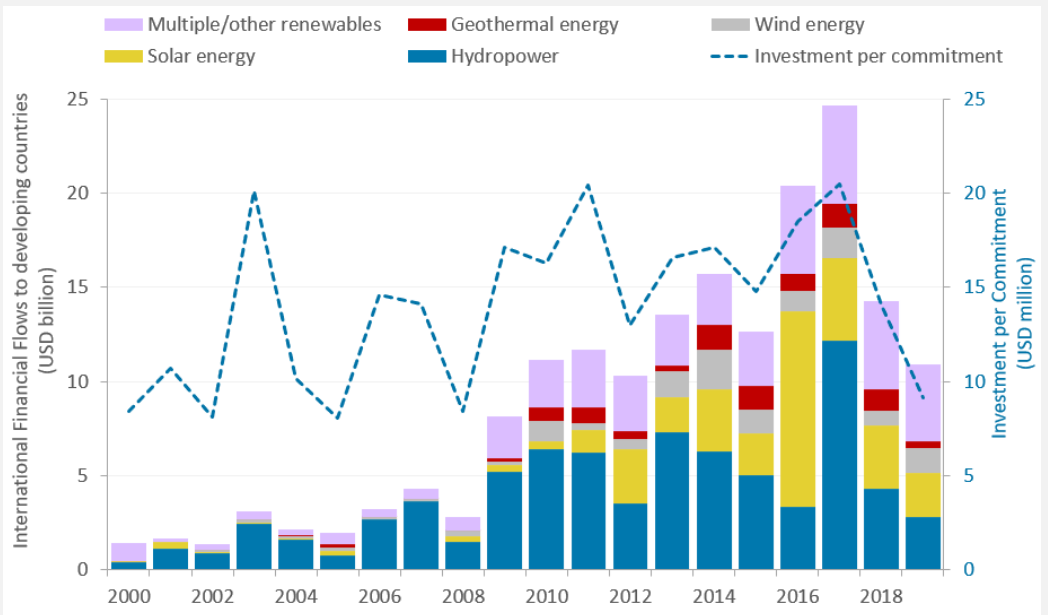
The USD 10.9 billion public international flows in 2019 were as low as they were in 2012, down by 23.6% or USD 3.4 billion compared to 2018. Except for heavy fluctuations in 2016 for solar energy and 2017 for hydropower, the flows remain in the range of USD 10-16 billion per year.

A longer five-year moving average (MA5) trend shows that average annual commitments decreased for the first time since 2008 by 5.5% from USD 17.5 billion in 2014-18 to USD 16.6 billion in 2015-19.The decrease is shared across all technologies, except for multiple/other renewables, which increased by 6.9%. The recent trends indicate a slowdown in international public flows. However, during 2010-19, average annual commitments continuously increased from USD 5.9 billion, almost tripling in value. Even with the 2019 deceleration, this decade-long growth shows an enhanced collaboration to support clean energy in developing countries.

The impacts of COVID-19 might show yet another decrease in international public flows during 2020. That combined with the lack of billionaire investments in 2018 and 2019 would bring down the MA5 for 2020 and potentially for 2021. It may take a few years of increased investments to recover from the lower commitments of 2018 and 2019.

Loans, at USD 5.7 billion and despite a 29% decrease from 2018, captured over 52% of commitments in 2019. These loans at market terms are useful for developers in emerging economies but might indicate a lack of attention to countries with riskier financial environments. In terms of growth, grants reached a record of USD 1.8 billion, taking up almost 17% of the financial instrument mix in 2019 and signalling an increase of debt-free instruments to support developing countries. Another up-and-coming instrument is shares in collective investment vehicles, such as investment funds, which grew to USD 191 million in 2019, up by 91% from 2018.

(LEFT) International public financial flows (commitments) to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems, by technology between 2000 and 2019 (at 2019 prices and exchange rates), and (RIGHT) average investment amount per commitment in USD millions.



Geographically, most regions saw a decrease in international public flows in 2019. Only Oceania and "Unspecified, developing countries" had an increase in flows by 72% (USD 55.1 million) and 27% (USD 123.9 million), respectively. Two regions had a lesser degree of decrease. Sub-Saharan Africa only saw a decrease of 1.7% to USD 4.0 billion, sustaining the interest of public donors. Similarly, Western Asia and Northern Africa decreased by 22.3% to USD 1.8 billion. The bulk of the decrease was concentrated on Eastern and South-eastern Asia by 66.2%, Latin America and the Caribbean by 29.8% and Central and Southern Asia by 24.5%.

Public financial flows continue to be concentrated in a few countries. Excluding those commitments that could not be allocated to specific countries, 80% of the 2019 flows were directed to 22 countries, regional Sub-Saharan Africa and "Unspecified, developing countries".

Least Developed Countries (LDCs) received 25.2% of commitments in 2019, an increase from the 21% in 2018 but masking a 9% decrease from USD 3.0 billion to USD 2.7 billion. Land-locked Developing Countries (LLDCs) increased marginally from receiving 14.1% of flows in 2018 to 14.7% in 2019, while decreasing in amount by 20% from USD 2.0 billion to USD 1.6 billion. Small Island Developing States (SIDS) recovered from attracting 1.5% of commitments in 2018 to 2.9% in 2019, also amounting to a 45% increase in flows from USD 214 million to USD 312 million.

Storyline author(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)

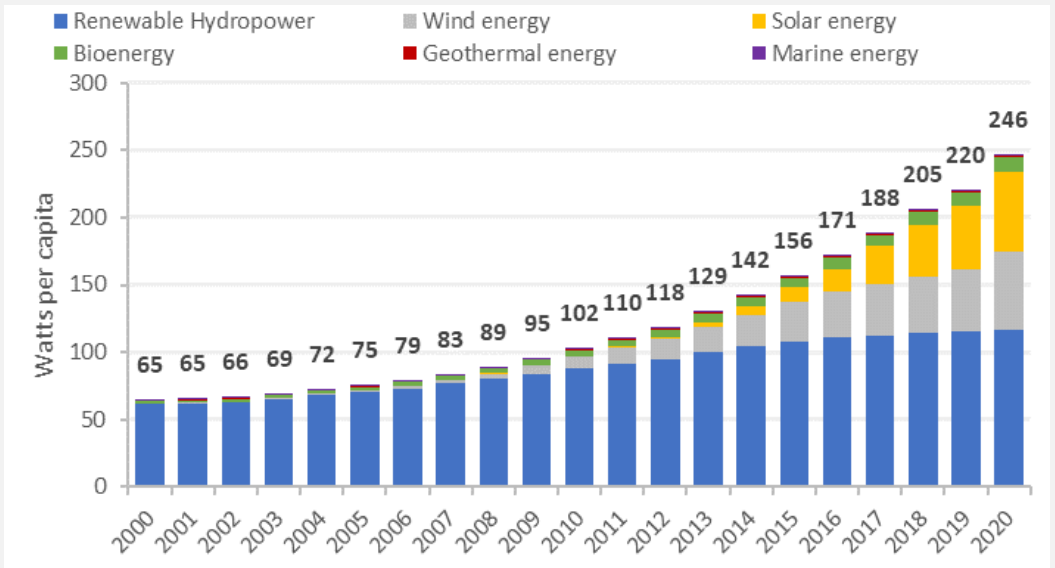
Renewables are covering a larger share of capacity, reaching a record 245.7 Watts per capita of renewable capacity in 2020. Yet, developing countries still cover less than half their total capacity with renewables and continued efforts are needed, especially for LDCs, LLDCs and SIDS

Developing countries reached a record-high of 245.7 Watts per capita of renewable capacity in 2020, also accomplishing the largest share of renewables to date at 36.1% of total capacity, close to the world average of 36.5% and the 37% of developed countries. This share of renewables contracted from 27.2% in 2000 to a low of 24.8% in 2007, during which non-renewables dominated capacity additions.

Positively, renewable capacity per capita is increasing faster for developing countries and outpacing population growth. In fact, the first decade of the century saw a compound annual growth rate (CAGR) of 4.7%, which was surpassed by an 8.9% CAGR during 2010-15. Most recently, in the 2015-20 period, the CAGR of renewable capacity per capita stood at 9.5% and just in 2020, the annual growth rate jumped to 11.6%, despite the world going through the COVID-19 pandemic.

The impact of COVID-19 has been negligible for 2020 and it might be reflected in the coming years due to lengthy processes to commission new capacity. Green recovery efforts and resilient investment in energy infrastructure could also dampen the impact of COVID-19 in developing countries.

Installed renewable energy-generating capacity in developing countries (in Watts per capita), by technology between 2000 and 2020



Most of the renewable capacity per capita in 2020 corresponds to renewable hydropower (around 40%) and the rest is equally divided between wind and solar power. In fact, wind and solar power accounted for most of the 2020 increase of renewable capacity per capita, where wind broke a downward trend, increasing by 26% from 46.3 to 58.2 Watts per capita; and solar by 25% from 47.4 to 59.0 Watts per capita.

Eastern and South-Eastern Asia grew from 134 to 460 Watts per capita at a CAGR of 13.2% from 2010 to 2020. Latin America & the Caribbean, at a CAGR of 4.1% did not grow as rapidly yet increased 49% from 285 to 425 Watts per capita. Western Asia & North Africa and Central & Southern Asia almost doubled their capacity per capita, at 99% and 92% overall growth in 2010-2020. During the same period, these regions grew at 7.1% and 6.7% CAGR, respectively. Countries in Oceania and Sub-Saharan Africa are lagging, having grown 25% and 56% at CAGR of 2.3% and 4.5%, respectively.

Global and regional numbers mask that the countries most in need are being left behind even within the group of developing countries. While developing countries grew their renewable capacity per capita by 9.5% annually in the last five years, SIDS, LDCs and LLDCs had lower CAGRs of 8.3%, 5.2% and 2.4% respectively. At current annual growth rates, it would take LDCs and LLDCs almost 40 years and SIDS almost 15 years to reach the same progress as the developing countries reached on average in 2020.

Storyline author(s)/contributor(s): Gerardo Escamilla, IRENA; Arvydas Lebedys, IRENA; Mirjam Reiner, IRENA

Custodian agency(ies): IRENA