EXECUTIVE SUMMARY

OVERVIEW

This 2022 edition of Tracking SDG 7: The Energy Progress Report assesses achievements in the global quest for universal access to affordable, reliable, sustainable, and modern energy by 2030. At today's rate of progress, the world is still not on track to achieve the SDG 7 goals by 2030. Advances have been impeded, particularly in the most vulnerable countries and those that were already lagging. Figure ES.1 offers an updated snapshot of the primary indicators.

This edition was prepared as the COVID-19 pandemic and its broad social and economic disruptions entered their third year. Some degree of economic recovery has taken place, but the pace of progress on the SDG 7 target is expected to slow down because of new challenges from evolving COVID variants and an energy crisis provoked by the Russian invasion of Ukraine. The report considers the consequences of the evolving pandemic, along with results from global modeling, to determine whether current policy ambitions can meet the SDG 7 targets and to identify the additional actions that may be needed. The report also examines the investments required to achieve the goals. It presents scenarios drawn from the International Energy Agency's (IEA) flagship publication, the World Energy Outlook 2020 (IEA 2021b), and the International Renewable Energy Agency's (IRENA) World Energy Transitions Outlook: 1.5°C Pathway (IRENA 2021c).

From the outset of the pandemic, governments mobilized an unprecedented level of fiscal support to manage the impacts of the pandemic on citizens and the global economy. Appropriations of recovery funds in areas relevant to SDG 7 reached USD 710 billion, but 90 percent of that came in the advanced economies. Emerging markets and developing countries, with their much more limited fiscal leeway, mobilized far less. Increasing clean energy and access investments in these regions requires greater support from international actors.

With oil and gas prices spiking in 2021, aggravated by the war in Ukraine, recovery plans in key economies focused heavily on renewables and efficiency, making the outlook for renewables and energy efficiency stronger than it was a year ago. The rising uncertainty in global oil and gas markets has placed enormous pressure on net importers to reduce their exposure. How the world gets on track toward meeting SDG 7 depends in part on how governments respond to the economic crisis and the role of recovery packages in shaping a more sustainable future.

Although renewable energy demonstrated remarkable resilience during the pandemic, the pace of electrification slowed in recent years. In addition, the pandemic's impact on household incomes made basic energy services unaffordable for around 90 million people in Asia and Africa who had previously enjoyed access. The COVID-19 crisis and another year of extreme weather events and climate change were projected to exacerbate the stark worldwide inequalities in access to reliable energy and health care, especially in rural and peri-urban areas, and highlighted the importance of expanding access to clean, efficient energy to help populations mitigate the effects of both the health and environmental crises.

The September 2021 UN High-Level Dialogue on Energy encouraged governments and the international community to take more action to achieve a sustainable energy future that leaves no one behind. In this context, the SDG 7 custodian agencies—IEA, IRENA, the United Nations Statistics Division (UNSD), the World Bank, and the World Health Organization (WHO)—urge the international community and policy makers to safeguard the gains made toward achieving SDG 7; to remain committed to the need for continued action on affordable, reliable, sustainable, and modern energy for all; and to maintain a strategic focus on the vulnerable countries needing the most support.

The following highlights introduce the key energy indicators.

FIGURE ES.1 • Primary indicators of global progress toward the SDG 7 targets

	INDICATOR	2010	LATEST YEAR
	**7.1.1 proportion of population with access to electricity**	**1.2 billion** people without access to electricity	**733 million** people without access to electricity (2020)
	**7.1.2 Proportion of population with primary reliance on clean fuels and technology for cooking**	**3 billion** people without access to clean cooking	**2.4 billion** people without access to clean cooking (2020)
	**7.2.1 Renewable energy share in total final energy consumption**	**16.1%** share of total final energy consumption from renewables	**17.7%** share of total final energy consumption from renewables (2019)
	**7.3.1 Energy intensity measured as a ratio of primary**	**5.6 MJ/USD** primary energy intensity	**4.7 MJ/USD** primary energy intensity (2019)
	**7.a.1 International financial flows to developing countries in support of clean energy research and development and renewable energy**	**11.2 USD billion** international financial flows to developing countries in support of clean energy	**10.9 USD billion** international financial flows to developing countries in support of clean energy (2019)

Access to electricity. SDG target 7.1 is universal access to affordable, reliable, sustainable, and modern energy services; indicator 7.1.1 focuses on access to electricity. Recent progress in access to electricity was mixed, as is the outlook for 2030. The global electricity access rate rose markedly between 2010 and 2020, from 83 percent to 91 percent. The number of unserved people fell from 1.2 billion in 2010 to 733 billion in 2020. The pace of annual access growth was faster than in previous years, as access infrastructure projects were finalized, but the annual rate of growth in access slowed from 0.8 percentage points in 2010–18 to 0.5 percentage points in 2018–20, because of the complexity of reaching the remaining unserved populations and the potential impacts of COVID-19. Meeting the 2030 target requires increasing the number of new connections to 100 million a year. At current rates of progress, the world will reach only 92 percent electrification by 2030.

Clean cooking solutions. Universal access to clean cooking is the goal for SDG 7.1.2. On a global scale, the number of people gaining access to clean cooking increased significantly. More than 65 countries have already included household energy or clean cooking related goals in their Nationally Determined Contributions (NDCs) in the lead-up to the 2021 UN Climate Change Summit, COP26 (Clean Cooking Alliance 2021). However, as in previous years, population growth outpaced these improvements, particularly in Sub-Saharan Africa. As a result, the total number of people lacking access to clean cooking—referred to here as the "access deficit" in some regions—has stagnated for decades. In 2000–10, this number was close to 3 billion people. It dropped to 2.4 billion people (2.1–2.7) in 2020.[1] Improvements occurred in Eastern Asia and South-eastern Asia since 2000 and in Central Asia and Southern Asia since 2010. In contrast, the access deficit in Sub-Saharan Africa has nearly doubled since 1990. It rose by more than 50 percent since 2000, reaching a total of 923 million (898–946) people in 2020. A multisectoral, coordinated effort is needed to achieve the SDG 7 target of universal access to clean cooking by 2030. Without increased effort, 2.1 billion people will still lack access to clean cooking in 2030. Learning from the successes and challenges faced by countries that have attempted to design and implement clean household energy policies is critical.

Renewable energy. Ensuring access to affordable, reliable, sustainable, and modern energy for all implies an accelerated deployment of renewable energy sources in electricity, heat, and transport. Although there is no quantitative milestone for SDG 7.2, custodian agencies assess that the current pace of renewable energy uptake needs to rise significantly, to increase the share of renewable energy in total final energy consumption (TFEC), the primary indicator for SDG 7.2. Despite continued disruptions in economic activity and supply chains, renewable energy consumption grew through the pandemic, in contrast with other energy sources. Electricity saw record shares of renewables in new capacity additions in 2021. The positive global and regional trajectories masks the fact that the countries most in need of increased access lag others, however, including in terms of installed capacity to generate renewable electricity. Moreover, rising commodity, energy and shipping prices, as well as restrictive trade measures, have increased the cost of producing and transporting solar photovoltaic (PV) modules, wind turbines, and biofuels worldwide, adding uncertainties for future renewable energy projects. Renewable shares would need to reach well over 30 percent of TFEC by 2030 to be on track for reaching net-zero energy emissions by 2050. Achieving this milestone would require strengthening policy support in all sectors and implementing effective tools to further mobilize private capital, especially in least-developed countries, landlocked developing countries, and small island developing countries.

Energy efficiency. SDG target 7.3 aims to double the annual global rate of improvement in primary energy intensity in 2010–30 versus 1990–2010 to 2.6 percent.[2] In 2010–19, global annual improvements in energy intensity averaged around 1.9 percent, well below the levels needed. To make up for lost ground, the average annual rate of improvement now has to reach 3.2 percent to reach SDG 7.3's target. This rate would need to be even higher—consistently over 4 percent for the rest of this decade—if the world is to reach net-zero emissions from the energy sector by 2050, as envisioned in the IEA's Net Zero Emissions by 2050 Scenario.

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1 Parenthetical figures appearing after estimates throughout the executive summary are 95 percent uncertainty intervals, as defined in the methodology section at the end of the access to clean cooking chapter.

2 Revisions of underlying statistical data and methodological improvements explain the slight changes in historical growth rates from previous editions. The SDG 7.3 target of improving energy intensity by 2.6 percent per year in 2010–30 remains the same, although the latest data for the period 1990–2010 show a rate of improvement in energy intensity of 1.2 percent per year.

Early estimates for 2020 point to a substantial decrease in intensity because of the COVID-19 crisis, partly as a result in the slowdown in real energy efficiency. The outlook for 2021 suggests a return to a 1.9 percent rate of improvement, a return to the average rate during the previous decade, thanks to a sharper focus on energy efficiency policies, particularly in COVID-19 recovery packages. However, to bring the SDG 7.3 target within reach, energy efficiency policies and investment need to be scaled up significantly.

International public financial flows. Although the private sector finances most renewable energy investments, the public sector remains a critical source of finance, particularly for many developing countries. Tracking of SDG 7.a.1 indicator shows that international public financial flows to developing countries in support of clean energy decreased for the second year in a row, falling to USD 10.9 billion in 2019. This level represents a 23 percent decrease from the USD 14.2 billion provided in 2018, a 25 percent decline from the 2010–19 average, and a more than 50 percent drop from the peak of USD 24.7 billion in 2017. Although there is no quantitative target for international public financial flows to developing countries under indicator 7.a.1, the overarching target of SDG 7.a points to the continued importance of enhancing international cooperation. Flows need to be increased to realize SDG 7 as well as enable the achievement of related SDGs including SDG 13 (on climate), especially in light of the reduced fiscal space in many developing countries and the imperatives to ensure a rapid and sustainable recovery from the COVID-19 pandemic.

Indicators and data for tracking progress. Tracking global progress for SDG 7 targets requires high-quality and reliable data for informed and effective policymaking at the global, regional, and country levels. This report introduces a set of global indicators for SDG7 targets to be used along with common frameworks for surveys and standardized methodologies. The quality of data is being improved through national and international cooperation and solid statistical capacity. National data systems are increasing the quality of global tracking, as countries establish legal frameworks and institutional arrangements[3] for comprehensive data collection for energy supply and demand balances; implement end-user surveys (e.g., households, businesses, etc.); and develop quality-assurance frameworks.[4] The global tracking in this report is a collaboration by the several custodian agencies responsible for the SDG 7 targets, considering national data across the regions.[5] The purpose of this joint effort is to disseminate comparable datasets worldwide to improve the quality of global tracking.

The remainder of this summary is devoted to each of the major SDG 7 target areas: access to electricity, access to clean fuels and technologies for cooking, renewable energy, energy efficiency, and international public financial flows to developing countries in support of clean energy. The summary concludes with a word on the indicators and data used to track progress across targets.

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3 Institutional arrangements are set up to optimize data production, exchange, and governance across organizations and government agencies (statistical offices, energy ministries) responsible for implementing energy policies.

4 Quality-assurance frameworks should be consistent with the United Nations' International Recommendations for Energy Statistics. Under IRES (United Nations 2018), data quality is marked by relevance, accuracy, and reliability; timeliness and punctuality; coherence and comparability; and accessibility and clarity. For quality assurance frameworks, see IRES chapter 9.

5 The World Bank and the WHO are responsible for tracking progress toward SDG target 7.1 (universal access); the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), and the UN Statistics Division (UNSD) are responsible for SDG target 7.2 (renewables); IEA and UNSD are responsible for SDG target 7.3 (energy efficiency); IRENA and the Organisation for Economic Co-operation and Development (OECD) jointly tracked target 7.a (international cooperation); and IRENA is responsible for target 7.b (infrastructure and technology).

ACCESS TO ELECTRICITY

Summary of outlook chapter. IEA's Stated Policies Scenario projects that 670 million people would still lack access to electricity in 2030—10 million more than last year's projection. The COVID 19 pandemic is projected to slow the rate of new access, particularly for stand-alone systems. In contrast, grid and mini-grid connections are projected to remain resilient during the pandemic in some regions. The outlook for countries without institutions in place to address access thus appears unpromising. Between 2020 and 2030, the connection rate needs to reach an average of 100 million a year, including 80 million in Africa, where the rate of new connections needs to triple.

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The share of the world's population with access to electricity (SDG 7.1.1) rose from 83 percent in 2010 to 91 percent in 2020, an increase of approximately 1.3 billion people globally.[6] The number of people without access to electricity dropped from 1.2 billion people in 2010 to 733 million in 2020.

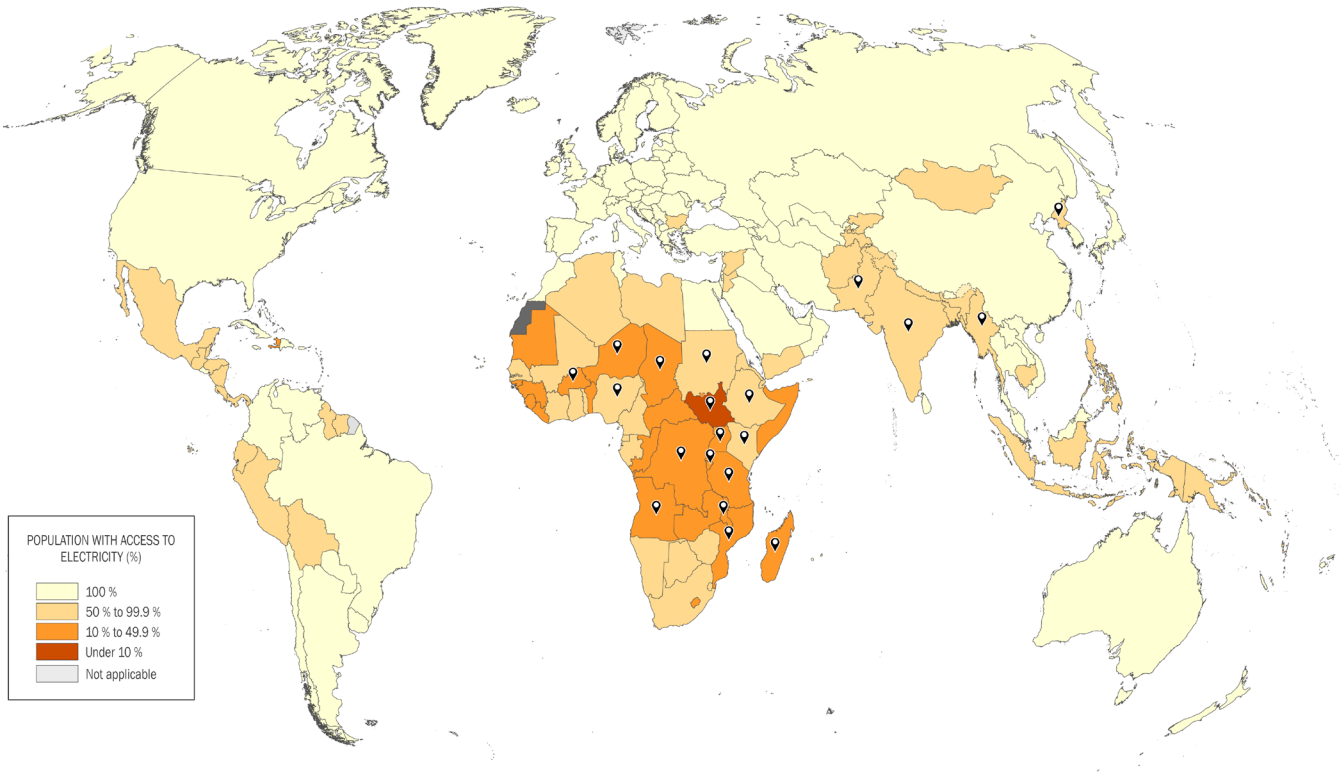
The pace of progress in electrification slowed in recent years, however, because of the increasing complexity of reaching more remote and poorer unserved populations and the expected impact of the COVID-19 pandemic. Between 2010 and 2018, an average of 130 million people gained access to electricity each year. That figure fell to 109 million between 2018 and 2020. The annual rate of increase was 0.8 percentage points between 2010 and 2018. It shrank to just 0.5 percentage points in 2018–20. Even so, the increase in electrification outpaced population growth at a global scale. The COVID-19 crisis has also increased concerns about the affordability of electricity. Under its weight, 90 million connected people in Africa and developing countries in Asia lost the ability to afford an extended bundle of energy services in 2020 (IEA 2021c).

Global access to electricity has increased since 2010, but regional disparities remain wide (figure ES.2). Between 2010 and 2020, every region in the developing world showed consistent progress in electrification.[7] Sub-Saharan Africa remained the least electrified region. Among people without access to electricity, 77 percent—about 568 million people—lived in Sub-Saharan Africa in 2020. Electricity access in that region rose from 46 percent in 2018 to 48 percent in 2020, an annual growth rate of 1 percentage point. However, COVID-19 was anticipated to undermine the pace of progress in the region. Other regions, such as Central and Southern Asia, witnessed declines in their access deficits, despite COVID-19.

6 In this report, access to electricity (also referred to as electrification or the electrification rate) refers to the share of the population with access to electricity over a specified time period or geographic area. It is defined as the ability of the end user to consume electricity for desired services.

7 UN classifications are used for the country groupings in this report (see https://unstats.un.org/unsd/methodology/m49/).

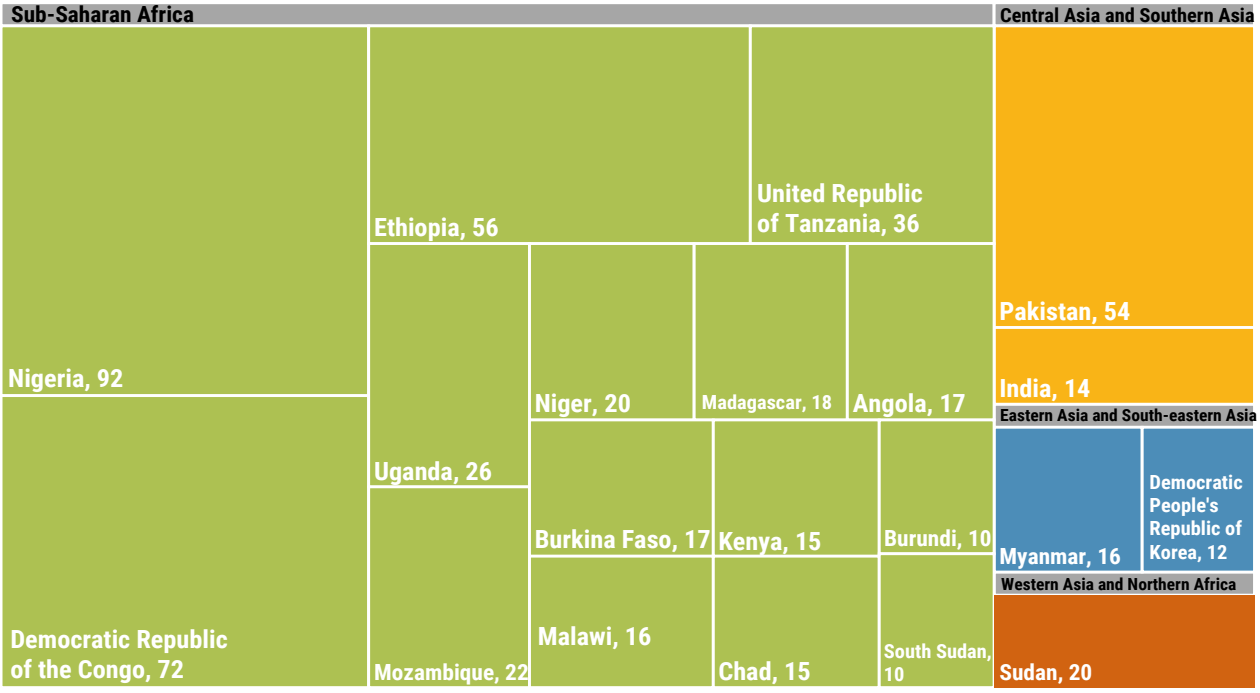
FIGURE ES.2 • Share of population with access to electricity in 2020



Source: World Bank 2022.

The 20 countries with the largest access deficits were home to 76 percent of the entire global population living without access to electricity in 2020 (figure ES.3). Closing the access gap by 2030 hangs on electrification efforts in these 20 countries. Most of the top 20 were in Sub-Saharan Africa. The largest unserved populations are in Nigeria (92 million people), the Democratic Republic of Congo (72 million), and Ethiopia (56 million). Access growth outpaced population growth in Ethiopia between 2010 and 2020; it did not do so in Nigeria and the Democratic Republic of Congo, where electrification failed to keep pace with population growth. In contrast, Kenya and Uganda made the fastest progress in electrification among the top 20, with annualized increases of more than 3.0 percentage points between 2010 and 2020.

FIGURE ES.3 • Number of people without access to electricity in top 20 access-deficit countries, 2020 (millions)



Source: World Bank 2022.
Note: A country's access deficit is the number of people in the country that lack access to electricity.

Differences are also observable in terms of urban versus rural access to electricity. Around 80 percent of the world's people without access to electricity lived in rural areas in 2020, limiting their opportunities to access quality public services (e.g., healthcare), rise out of poverty, and improve their livelihoods. About 75 percent of the world's rural population without access lived in Sub-Saharan Africa. Starting from this low base of access, the pace of electrification was faster in rural areas than in urban areas over the past decade. Access in rural areas increased from 72 percent in 2010 to 83 percent in 2020, outpacing population growth. Globally, the urban access rate has been much higher: 97 percent since 2016. The urban access rate grew faster in Sub-Saharan Africa than in any other region, with annual growth of 1 percentage point between 2010 and 2020, though starting from a significantly lower rate than other regions.

The least-developed countries significantly lag the rest of the world in access to electricity, with an average access rate of 55 percent—a gap of 36 percentage points compared with the global average of 91 percent.[8] More than half of the global population without access (479 million people) lived in least-developed countries in 2020. Only 44 percent of people living in rural areas of least-developed countries had access to electricity. In fragile and conflict-affected countries, where the overall access rate was 55 percent in 2020, gains in electrification kept pace with population growth in 2018–20, leaving 417 million people without access to electricity.[9]

Because of the continuing socioeconomic impact of the COVID-19 pandemic, additional dynamics from climate change and weather events, and the complexities of reaching the "last mile" (that is, rural populations far from the grid), closing the access gap will become increasingly challenging. The global electricity access rate needs to increase by 0.9 percentage points each year to achieve universal access by 2030. If the current growth trend of 0.5 percentage points persists, it will derail progress toward the target of universal

8 The least-developed countries are a subset of low-income countries identified by the United Nations based on per capita gross national income, the Human Asset Index, and economic and Environmental Vulnerability Index.

9 The list of countries affected by violent conflict is based on the World Bank classification published in July 2021 (see https://thedocs.worldbank.org/en/doc/bb52765f38156924d682486726f422d4-0090082021/original/FCSList-FY22.pdf).

electricity access across the world. Robust policies and public financial support are critical to boost growth in electrification fast enough and far enough to leave no one behind, especially the most vulnerable.

Decentralized energy systems are vital to expanding access, especially in rural areas. The use of such solutions grew handily between 2010 and 2019. The number of people with access to decentralized solutions in Tier 1 and above (Tier 1+), including solar home systems and mini-grids, more than tripled, rising from 12 million in 2010 to 39 million in 2019 (IRENA 2021a).[10] In 2019, the main Tier 1+ systems were solar home systems, with mini-grids expanding fast. Off-grid solar markets came under pressure from the COVID-19 pandemic in early 2020. Although the industry has yet to fully recover to pre-COVID-19 levels, it has overall shown resilience since the disruptions, partly because relief funding was made available (GOGLA 2021).

Strong political commitments, better-targeted policies, disruptive technology and business models, and innovative financing tools have helped connect 1.3 billion people to power since 2010. But with only eight years left to achieve SDG target 7.1, governments and the international community face the challenge of drastically increasing the pace of progress in a context of high uncertainty and transition toward net-zero energy systems. Achievement of SDG 7.1 should be an integral part of the just energy transition and embedded in countries' socioeconomic development and climate commitments. The approaches best suited to achieve universal access are also advantageous for reaching net-zero emissions in a just and inclusive way and should be tailored to meet the needs of the least-developed countries. In the context of "building back better," access to electricity is essential not only for more inclusive, sustainable, and resilient growth, but for fully exploiting synergies with other SDGs.

10 According to IRENA, below Tier 1 indicates solar lights (< 11W). Tier 1 access includes solar home systems (11–50W), and small PV mini-grid access. Tier 2 access or higher includes large solar home systems (> 50W), large PV mini-grid access, and non-PV mini-grids.

ACCESS TO CLEAN FUELS AND TECHNOLOGIES FOR COOKING

Summary of outlook chapter. Unless clean cooking finds a lasting place on the global political agenda, more than 2.1 billion people will continue to rely on traditional uses of biomass, kerosene, or coal for cooking in 2030. This will have dramatic consequences for the environment, economic development, and health, particularly of women and children. As global fuel prices spiked during the recovery period, many governments intervened to maintain affordability of liquefied petroleum gas (LPG), but mounting subsidy burdens from before the pandemic are driving countries to phase out LPG fuel subsidies and contemplate fuel taxes to shore up accounts.

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Increasing access to clean cooking must remain a top priority in the coming years. In 2020, 69 percent (64–73) of the global population had access to clean cooking fuels and technologies. Clean fuels as defined by WHO (2014) are electricity, liquefied petroleum gas, natural gas, biogas, and solar. Clean technologies are those fueled by clean fuels, as well as alcohol-fuel stoves. The remaining 31 percent, some 2.4 billion (2.1–2.7) people, are still cooking primarily with polluting fuels and technologies, such as charcoal, coal, crop waste, dung, kerosene, and wood. (Because of data limitations, this report refers to types of cooking fuel rather than cookstove and fuel combinations).

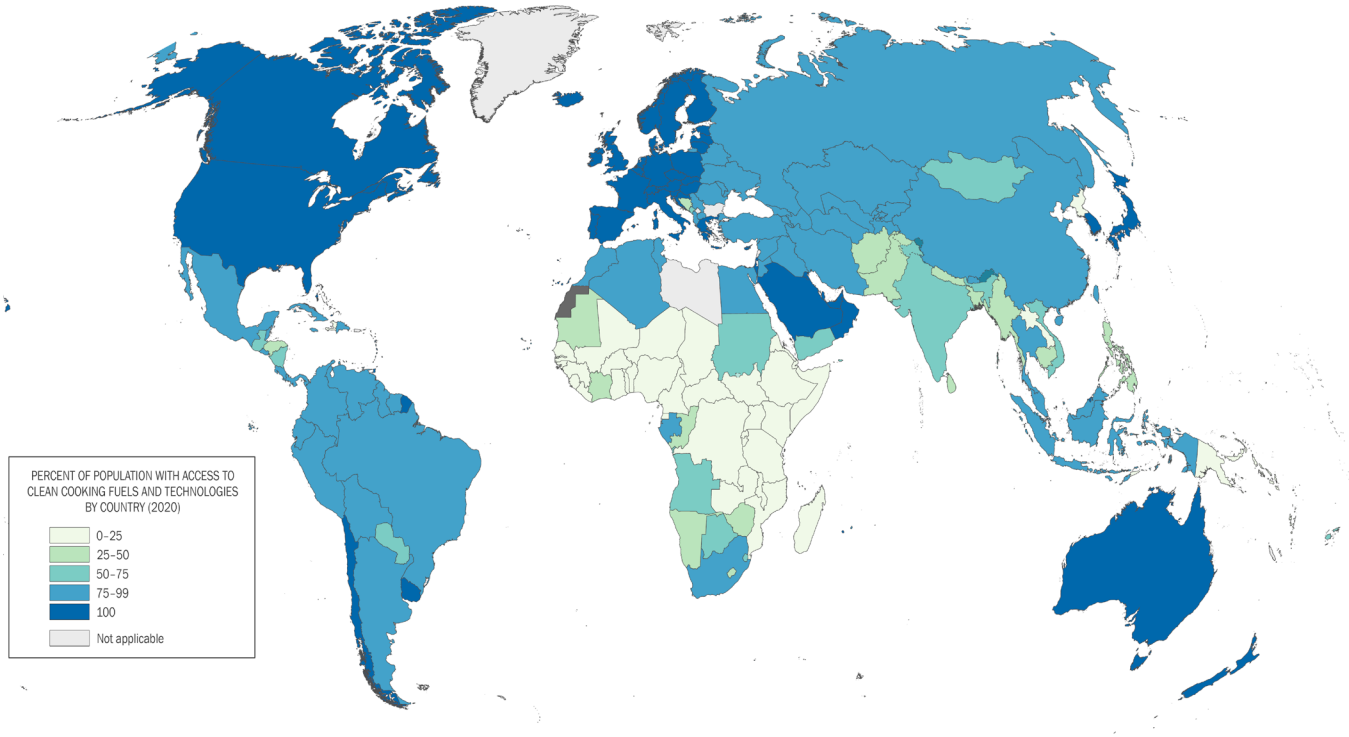
Use of inefficient fuels produces a range of health risks and climate-damaging effects. Greenhouse gas emissions from incomplete combustion of wood fuels for cooking paired with unsustainable harvesting amount to 1 gigaton of carbon dioxide per year, representing about 2 percent of global emissions, on par with emissions from aviation and shipping (Bailis, Broekhoff, and Lee 2016). Use of inefficient stoves and fuels also produces a range of short-lived climate pollutants, such as black carbon, which has a warming effect that is 460–1,500 times stronger than carbon dioxide (Climate and Clean Air Coalition 2020). New estimates of disease burdens indicate that 3.2 million deaths from diseases—including ischemic heart disease, stroke, pneumonia, chronic obstructive pulmonary disease, and cancers—were caused by household air pollution in 2019. Household air pollution accounted for the loss of an estimated 86 million healthy life years, with the largest burden falling on women living in low- and middle-income countries.

Global access to clean cooking is measured by identifying the proportions of the population who rely primarily on clean fuels and technologies. Some progress in the global access rate was made over the last two decades, but current trends indicate that, at present rates of progress, only around 75 percent of the population will have access to clean cooking fuels and technologies by 2030. These estimates are similar to those of the IEA Stated Policies Scenario[11], which suggests that 2.1 billion people will lack access in 2030.

From 2010 to 2020, global access to clean cooking fuels and technologies increased by 1 percentage point (0.5–1.8) a year. The increase was primarily driven by advances in large, populous countries in Asia (figure ES.4). From 2016 to 2020, the top 20 countries with the largest populations lacking access to clean cooking fuels and technologies accounted for more than 80 percent of the global population without access. In 16 of these 20 countries, less than half the population had access to clean cooking.

11 More details about the scenario are available here: https://www.iea.org/reports/sdg7-data-and-projections/access-to-clean-cooking

FIGURE ES.4 • Share of population with access to clean cooking fuels and technologies, by country, 2020



Source: WHO 2022.

Most of these countries have made little progress, with only five—India, China, Indonesia, Myanmar, and Nigeria—showing average access gains of 2 or more percentage points between 2016 and 2020. Central Asia and Southern Asia—along with Eastern Asia and South-eastern Asia—account for most of the gains in 2010–20. The annualized increase in access to clean cooking was 2.5 percentage points (0.5–4.3) in Central Asia and Southern Asia and 2.1 percentage points (0.8–2.1) in Eastern Asia and South-eastern Asia. Progress in Latin America and the Caribbean remained stable, at around 88 percent (85–91), with an average annual increase of 0.3 percentage points (–0.1–0.3) for the period 2010–20. Nineteen of the 20 countries with the lowest share of the population with access to clean cooking fuels and technologies were least-developed countries in Africa (the one country outside of Africa was Haiti). Marginal increases in access were seen in Sub-Saharan Africa, with annualized increases of 0.48 percentage points (0.2–0.5) over the period.

Large urban-rural discrepancies in access to clean cooking fuels and technologies exist worldwide. In 2020, 86 percent of people in urban areas have access to clean fuels and technologies compared with only 48 percent of the rural population.

In low- and middle-income countries, the use of gaseous fuels for cooking increased from 1.8 billion people (36 percent [31–41]) in 2000) to 3.4 billion people (52 percent [46–58]) in 2020, overtaking unprocessed biomass fuels as the dominant cooking fuel. Use of electricity for cooking also rose, from 140 million people (3 percent (2–4]) in 2000 to 690 million people (11 percent [7–15]) in 2020. In Eastern Asia and South-eastern Asia, 530 million people (25 percent of the population [15–37]) relied on electricity for cooking; in Central and Southern Asia, the number was just 24 million (1 percent of the population [0.7–2.5]).

Between 2000 and 2010, increases in the use of clean fuels were accompanied by steep declines in the use of coal, particularly in rural areas, where the use of coal dropped from 11 percent (7–17) in 2000 to 1 percent (0.1–2) in 2020, and kerosene, particularly in urban areas, where its use dropped from 8 percent (7–10) in 2000

to 2 percent (1–3) in 2020. The use of unprocessed biomass fuels (wood, crop waste, and dung) declined, primarily in rural areas, where use of such fuels dropped from 68 percent (63–72) in 2010 to 52 percent (45–59) in 2020.

These improvements notwithstanding, the pace of movement toward universal access to clean fuels and technologies has been slow. Business as usual is no longer possible. Clean cooking fuels must be made a top political priority with targeted policies. The COVID-19 pandemic has exacerbated the vulnerability of people lacking access to clean fuels and technologies. The economic crisis caused by the pandemic will undoubtedly have a further impact on household fuel use; in some countries it threatens to reverse the progress made thus far. However, the same crisis provides opportunities to advance joint efforts to ensure universal access to clean cooking by 2030.

RENEWABLE ENERGY

Summary of outlook chapter. Although the COVID-19 pandemic stalled many energy projects in 2020, the use of renewables continued to grow, accounting for more than 80 percent of all new electricity capacity added in 2020. Intensified policy support and cost reductions could push the share of modern renewables in TFEC to 32–38 percent by 2030, and renewables could account for 60–65 percent of electricity generation. However, much greater efforts will have to be made to increase the use of renewables for transport and heating if internationally agreed goals are to be met.

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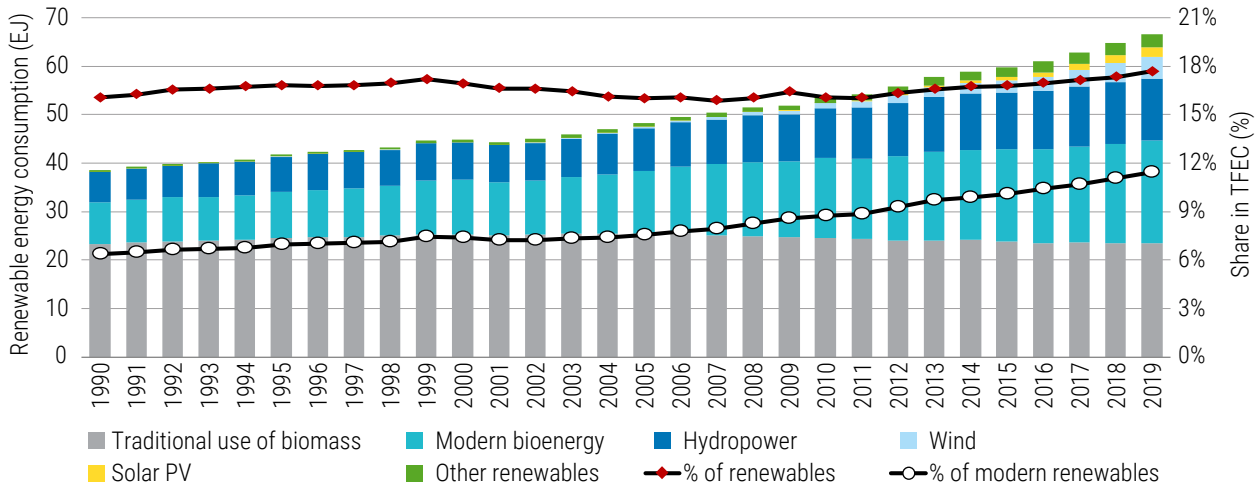
Ensuring access to affordable, reliable, sustainable, and modern energy for all requires accelerated deployment of renewable energy sources in electricity, heat, and transport. SDG target 7.2 for 2030 calls for "increasing substantially the share of renewable energy in the global energy mix." The main indicator used to assess progress toward SDG 7.2 is the share of renewable energy in TFEC. Current trends in renewable energy uptake need to scale up substantially to be in line with the ambition of SDG 7.

In 2019, the share of renewable energy sources in TFEC amounted to 17.7 percent—only 0.4 percentage points higher than the year before. Renewable energy consumption increased by 2.8 percent from the year before, as TFEC expanded by 0.7 percent. This suboptimal result underlines the importance of reducing energy consumption through energy efficiency and conservation if rapid progress is to be made toward SDG target 7.2. The largest increase in the share of renewables continues to be observed for electricity; the transport and heat sectors saw much slower progress.

Continuing its upward trend since 1990, renewable electricity use grew more than 5 percent year-on-year in 2019 (up from 3 percent in 2018), bringing the share of renewables in global electricity consumption to 26.2 percent (up from 25.3 percent in 2018). To meet the growing global demand for electricity, which rose 1.6 percent in 2019, nonrenewable electricity consumption grew as well, rising 0.4 percent, more slowly than renewables but from a significantly larger base, so that it accounted for 18 percent of the global annual increase in electricity consumption. Hydropower remains by far the largest source of renewable electricity globally, followed by wind, then solar PV, which recorded the fastest growth rate (figure ES.5). Together, wind and solar PV are responsible for 58 percent of the increase in renewable electricity consumption observed over the last 10 years.

FIGURE ES.5 • Renewable energy consumption by technology and share in total energy consumption, 1990–2019



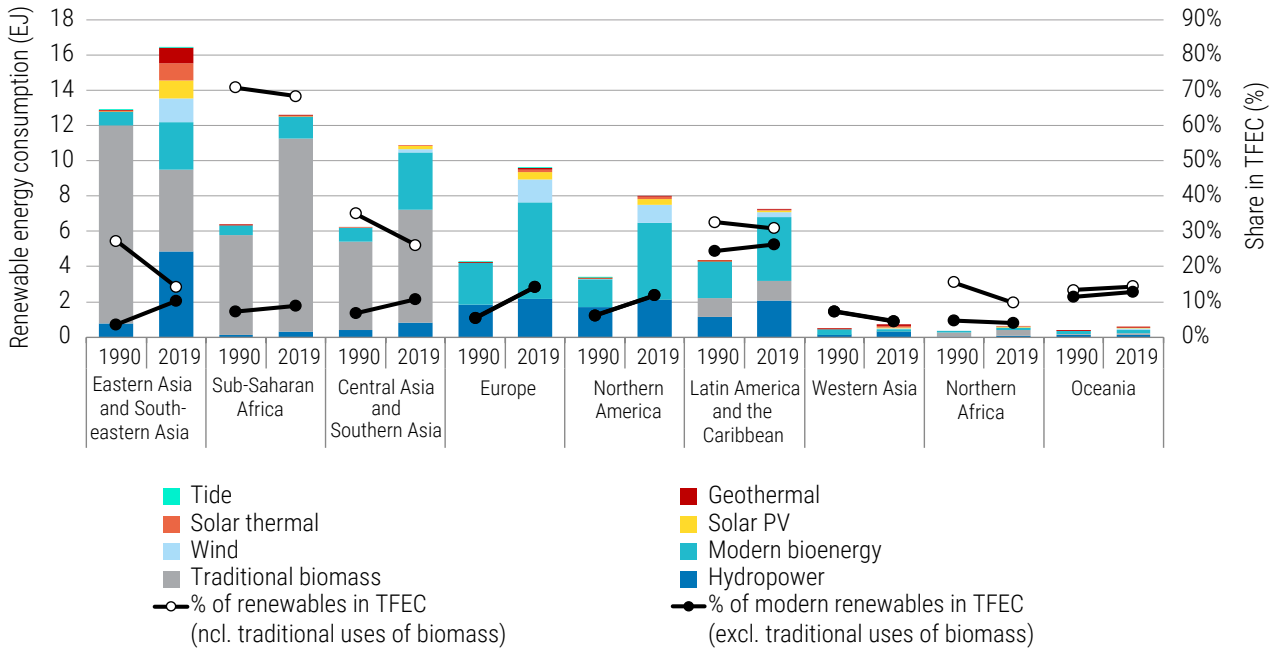
Source: IEA 2021a and UNSD 2021.

Renewable energy used for heating increased by 2.4 percent to 17.8 exajoules (EJ) in 2019, excluding traditional uses of biomass.[12] Traditional uses of biomass in 2019 remained roughly stable globally, accounting for over 13 percent (23.5 EJ) of global heat consumption. Overall, as global heat demand continued to increase (rising 0.3 percent year-on-year), the share of modern renewables in global heat consumption reached just 10.1 percent, an improvement of less than 2 percentage points in 10 years.

As in 2018, renewable energy used in transport grew, rising 7 percent to 4.4 EJ in 2019, the largest increase in absolute terms since 2012. The increase brought 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 the renewable energy used in transport. The expansion of renewable electricity and sales of electric vehicles are pushing up the use of renewable electricity in transport, which grew to 0.03 EJ in 2019, the second-largest increase in a single year after 2018.

Significant regional disparities lie behind these global improvements (figure ES.6). Sub-Saharan Africa has the largest share of renewable sources in its energy supply, though traditional uses of biomass represent more than 85 percent of the renewable total. Excluding traditional uses of biomass, Latin America and the Caribbean is the region with the largest share of modern renewables in TFEC, thanks to significant hydropower generation, the consumption of bioenergy in industrial processes, and the use 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 PV, and wind dominated growth.

FIGURE ES.6 • Renewable energy consumption and share in total final energy consumption, by region, 1990 and 2019



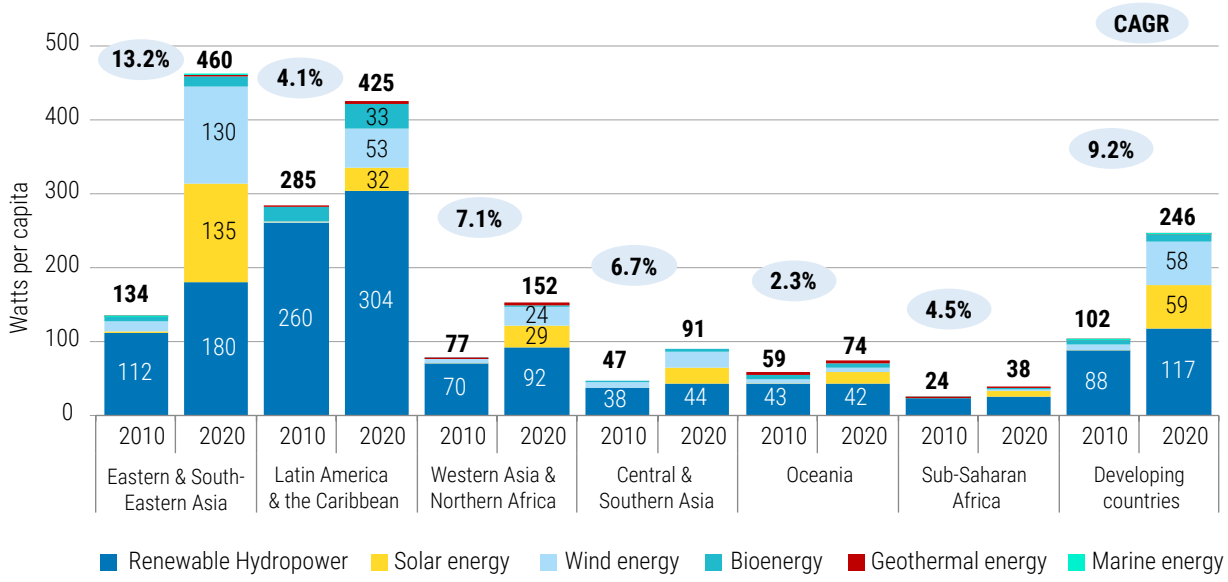
Source: IEA 2021a and UNSD 2021.

12 Owing to limited data availability at the global scale and the difficulty of quantifying the fraction of electricity consumption used to produce heat, this calculation does not account for renewable electricity used for heating and ambient heat harnessed by heat pumps.

Across countries, the share of renewable energy in TFEC varied widely. Between 2000 and 2019, the share of modern renewables in TFEC declined in 4 of the top 20 energy consuming countries—despite growing use of modern renewable energy in all of them—owing to increases in nonrenewable energy use. In 2019, Turkey showed the greatest progress in the share of modern renewables (2.3 percentage points), thanks to its increased hydropower generation, followed by the United Kingdom (1.3 percentage point), where wind power developments and the uptake of biofuels for transport played a leading role.

Indicator 7.B.1 tracks progress in enhancing installed renewables-based generating capacity in developing countries (figure ES.7). In 2020, a record 246 watts per capita of renewable capacity was installed in these countries, an annual growth rate of 11.6 percent. However, positive global and regional trajectories mask the fact that the countries most in need are being left behind. In developing countries as a whole, renewable capacity per capita rose by 9.5 percent a year in the last five years. Growth was much slower in landlocked developing countries (2.4 percent), the least-developed countries (5.2 percent), and small-island developing states (8.3 percent).

Figure ES.7 Capacity per capita, by technology for developing countries, 2000-20, and compound annual growth rate for selected years



Source: IRENA 2021b.

Despite continued disruptions in economic activity and supply chains following responses to the COVID-19 pandemic across the world, renewable energy has shown resilience, especially in the electricity sector. However, in 2021, rising commodity, energy, and shipping prices, in addition to restrictive trade measures, have increased the cost of producing and transporting solar PV modules, wind turbines, and biofuels, increasing uncertainty about renewable energy projects. Getting renewable deployment on track with SDG 7.2 and 7.B.1, as well as with the Paris Agreement, will require stronger policies in all sectors and more effective mobilization of private capital and the strategic use of public financing, particularly in developing countries.

ENERGY EFFICIENCY

Summary of outlook chapter. The rate of improvement in global primary energy intensity[13] has slowed in recent years, as work to replace China's most inefficient industrial facilities reached completion and the pandemic cut household and business spending on energy efficiency. New programs to encourage retrofits and upgrades and to strengthen appliance and building codes may overcome the slump. But to achieve SDG 7 by 2030 the annual rate of improvement in energy intensity will need to exceed 3.2 percent.

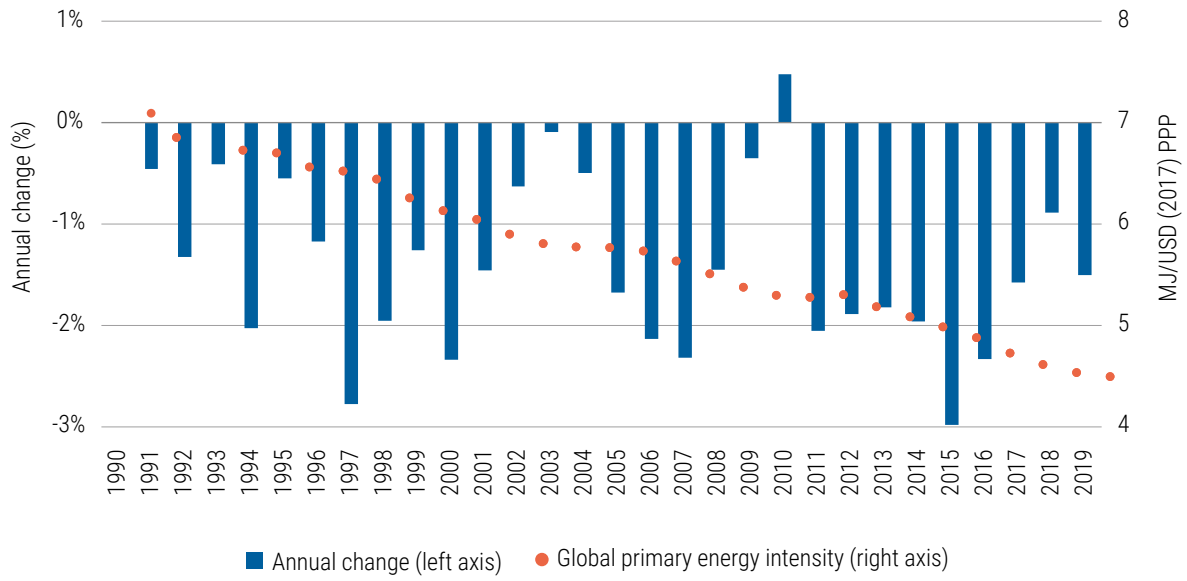
* * *

Achieving SDG target 7.3—doubling the global rate of energy intensity improvement by 2030—would support the other targets of SDG 7. Energy intensity is the ratio of total energy supply to the annual GDP created—in essence, the amount of energy used per unit of wealth created. It drops as energy efficiency improves.

Progress toward SDG target 7.3 is measured by tracking the year-on-year percentage change in energy intensity. Initially, the United Nations recommended an annual improvement rate of 2.6 percent to achieve the target. [14] But as global progress has been slower than it needed to be in all years except 2015, the annual average improvement rate now required to achieve the target of SDG 7.3 by 2030 is now 3.2 percent.

Energy intensity has increased since 1990 (figure ES.8).[15] Globally, it rose 1.5 percent in 2019, to 4.69 megajoules (MJ)/USD (2017 purchasing power parity). This rate of improvement was the second lowest since the global financial crisis, but it was still higher than the rate the previous year. Over 2010–19, annual energy intensity improvements averaged 1.9 percent.

Figure ES.8 • Global primary energy intensity and its annual change, 1990–2019



Source: IEA, UN, and World Bank (see footnote 15).
Note: MJ = megajoule; PPP = purchasing power parity.

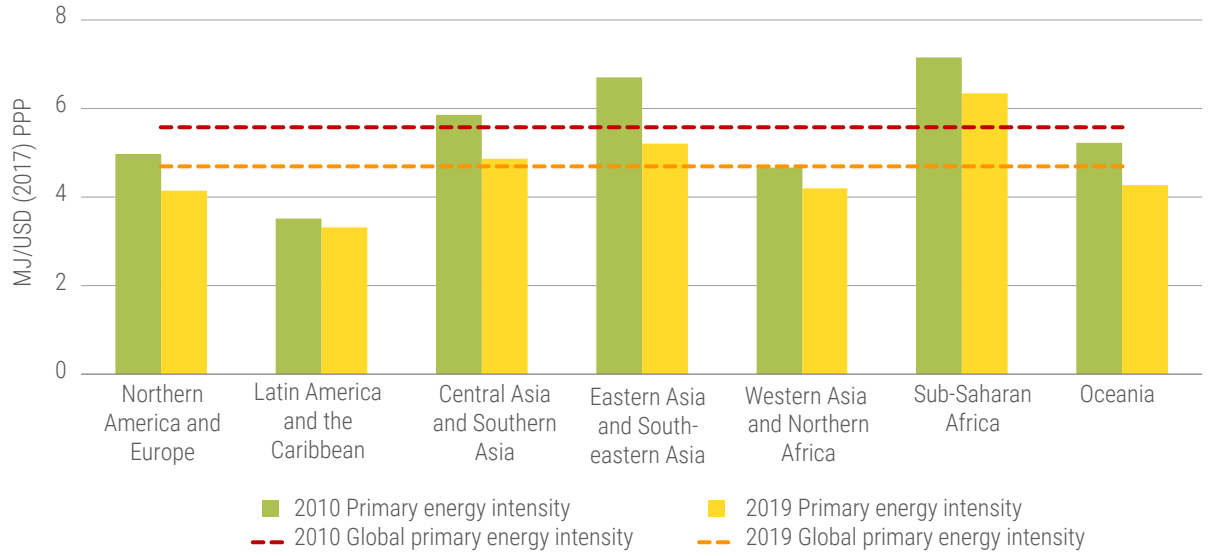
13 Hereafter referred to as "energy intensity". See note to figure ES.10 for the definition of energy intensity by sector.

14 Revisions of underlying statistical data and methodological improvements explain the slight changes in historical growth rates from previous editions. The SDG 7.3 target of improving energy intensity by 2.6 percent per year in 2010–30 remains the same, although the latest data for 1990–2010 show a rate of improvement in energy intensity of 1.2 percent per year.

15 Most of the energy data in this section come from a joint dataset built by the IEA (https://www.iea.org/data-and-statistics/) and the UNSD (https://unstats.un.org/unsd/energystats/). GDP data are sourced from the World Bank's World Development Indicators database (http://datatopics.worldbank.org/world-development-indicators/).

Although energy intensity has improved, stark differences are observable across regions (figure ES.9). The region of Eastern Asia and South-eastern Asia was the only one that overachieved the target of SDG 7.3 between 2010 and 2019, with energy intensity improving by an annual average rate of 2.7 percent, driven by strong economic growth. Average annual improvement rates in Oceania (2.2 percent), Northern America and Europe (2.0 percent), and Central Asia and Southern Asia (2.0 percent) were also above the global average and historical trends. The lowest rates of improvement were in Latin America and the Caribbean (0.6 percent), followed by Western Asia and Northern Africa (1.2 percent) and Sub-Saharan Africa (1.3 percent). Energy intensity in Sub-Saharan Africa is almost double the level in Latin America and the Caribbean, mirroring differences in economic structure, energy supply, and access rather than energy efficiency.

FIGURE ES.9 • Primary energy intensity, by region, 2010 and 2019



Source: IEA, UN, and World Bank (see footnote 15).
Note: MJ = megajoule; PPP = purchasing power parity.

Between 2000–10 and 2010–19, energy intensity increased in 13 of the 20 countries with the largest total energy supply. However, less than half of the top energy-consuming countries performed better than the global average. China continued to improve its primary energy intensity at the fastest rate (3.8 percent between 2010 and 2019), followed by the United Kingdom (3.7 percent). Japan and Germany also continued to improve their energy intensity at rates beyond the SDG 7.3 target, thanks to decades of work on energy efficiency and a shift in their economies toward producing high-value, low-energy goods and services. Indonesia is the only emerging economy other than China with an average energy intensity rate exceeding the SDG 7.3 target.

Using different intensity metrics,[16] the rate of improvement accelerated across all sectors between 2010 and 2019, except for residential buildings (figure ES.10). The freight transport sector experienced the highest rate of improvement, followed by the industry sector. Mitigating the effects of the growing demand for cooling, heating, and appliances in residential buildings requires better enforcement of building energy codes, especially in emerging economies, where a large share of new housing is being built.

16 See note to figure ES.10 for details.

Figure ES.10 • Compound annual growth rate of energy intensity by sector, 2000–10 and 2010–19

Source: IEA, UN, and World Bank (see footnote 15).
Note: The measures for energy intensity used here differ from those applied to global primary energy intensity. Here, energy intensity for freight transport is defined as final energy use per metric ton-kilometer; for passenger transport, it is final energy use per passenger-kilometer; for residential use, it is final energy use per square meter of floor area; for services, industry, and agriculture, energy intensity is defined as final energy use per unit of gross value added (in 2017 U.S. dollar purchasing power parity). Over time, it would be desirable to develop more refined sectoral and end-use level energy intensity indicators that make it possible to look at energy intensity by industry or end-use. Doing so will not be possible without more disaggregated data and statistical collaboration with the relevant energy-consuming sectors.

The impact of improvements in energy intensity is revealed by trends in its components. Between 1990 and 2019, global GDP increased by a factor of 2.5, while global total energy supply grew by two-thirds.[17] Consistent improvements in global energy intensity, which fell by more than a third between 1990 and 2019, signal trends in the decoupling of energy use from economic growth.

Improving energy efficiency at scale will be a key factor in achieving affordable, sustainable energy access for all. Stronger government policies on energy efficiency are needed to bring the target within reach.

17 "Total primary energy supply" has been renamed "total energy supply," in accordance with the International Recommendations for Energy Statistics (UN 2018).

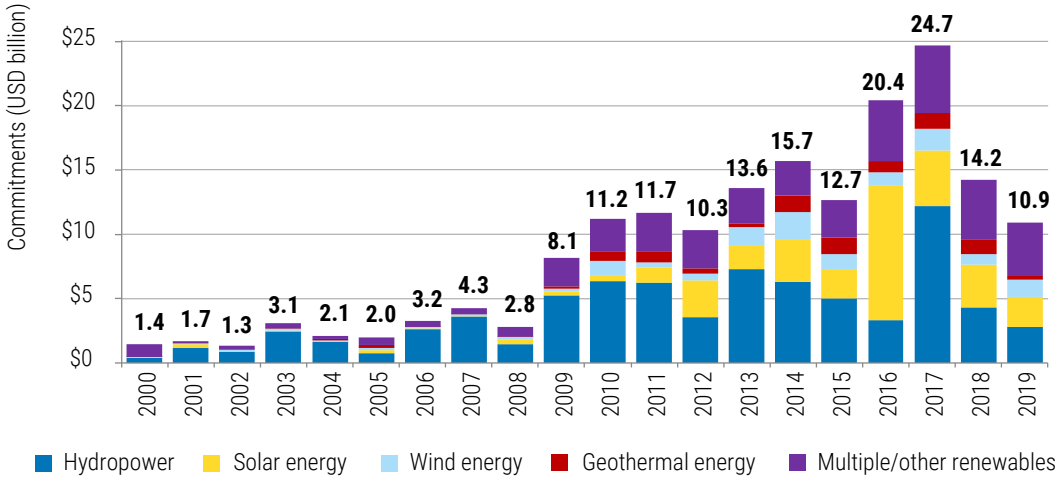
INTERNATIONAL PUBLIC FINANCIAL FLOWS TO DEVELOPING COUNTRIES IN SUPPORT OF CLEAN ENERGY

Summary of outlook chapter. The level of international public financing available for energy projects supporting the realisation of SDG 7 in developing countries is still insufficient to mobilize the larger volumes of investment needed to reach the target. Enhancing international flows, leveraging public funds strategically, using concessional finance to de-risk investments and mobilize more private capital into climate solutions are key area for action. Clean energy investment worldwide will need to ramp up significantly according to IEA's Net Zero Emissions by 2050 Scenario and IRENA's 1.5°C Scenario, with much of the investment being directed to renewables and efficiency.

* * *

Although the private sector finances most renewable energy investments, the public sector remains a critical source of finance, particularly for many developing countries. International public financial flows to developing countries in support of clean energy decreased in 2019 for the second year in a row, falling to USD 10.9 billion. This level of support was 23 percent less than the USD 14.2 billion provided in 2018, 25 percent less than the 2010–19 average, and less than half of the peak of USD 24.7 billion in 2017. Except for large fluctuations in 2016 for solar energy and 2017 for hydropower, the flows remain within the range of USD 10–16 billion per year since 2010 (figure ES.11). A five-year moving average trend shows that average annual commitments decreased for the first time since 2008 by 5.5 percent from USD 17.5 billion in 2014–18 to USD 16.6 billion in 2015–19. The level of financing remains below what is needed to reach SDG 7, in particular for the least-developed countries, landlocked developing countries, and small-island developing states.

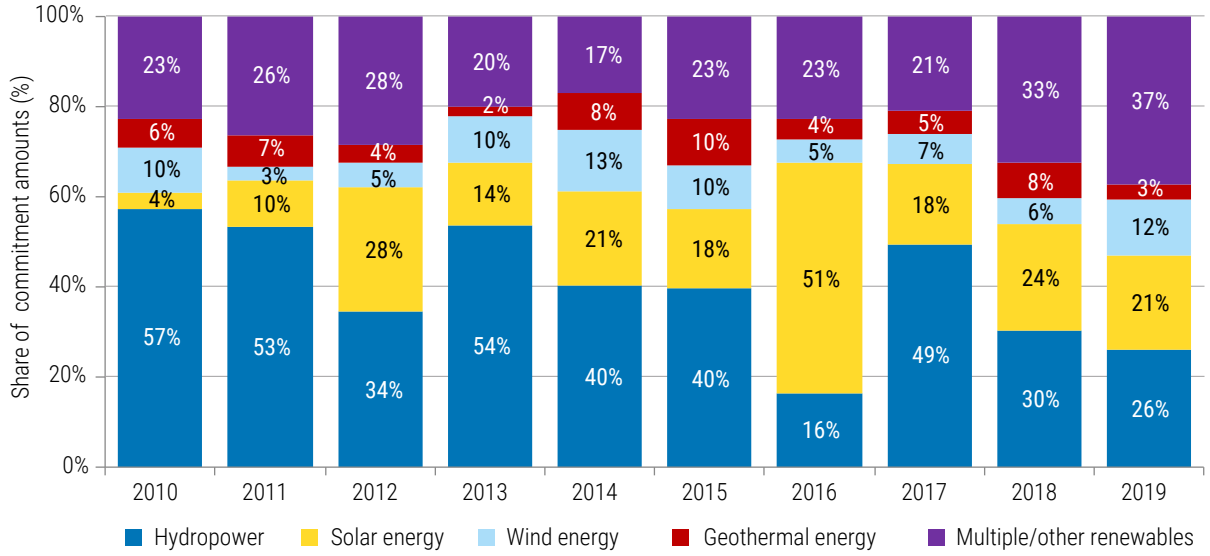
FIGURE ES.11 • Annual international public financial commitments to developing countries in support of clean energy research and development and renewable energy production, by technology, 2000–19



Source: IRENA and OECD 2022.
Note: Multiple/other renewables includes commitments whose descriptions are unclear in the financial databases; commitments that target more than one technology with no details specifying the financial breakdown for each; bioenergy commitments, which are almost negligible; multipurpose financial instruments such as green bonds and investment funds; and commitments targeting a broad range of technologies. Examples of the latter include renewable energy and electrification programs, technical assistance activities, energy efficiency programs, and other infrastructure supporting renewable energy.

The distribution of flows by technology in 2019 is similar to those in 2018 (figure ES.12). Hydropower attracted the bulk of flows (26 percent), followed by solar energy (21 percent) and wind energy (12 percent). Geothermal energy received a little over 3 percent of commitments in 2019. Compared with 2018, the share of wind energy commitments increased by 6 percentage points, while the share of commitments to the other technologies saw a decrease, as commitments increasingly fall into the "multiple/other renewables" category (see note to figure ES.11), reflecting growing interest in energy funds, green bonds, and other government-led programs to support renewables, energy efficiency and electricity access.

FIGURE ES.12 • Shares of annual commitments, by technology,2010–19



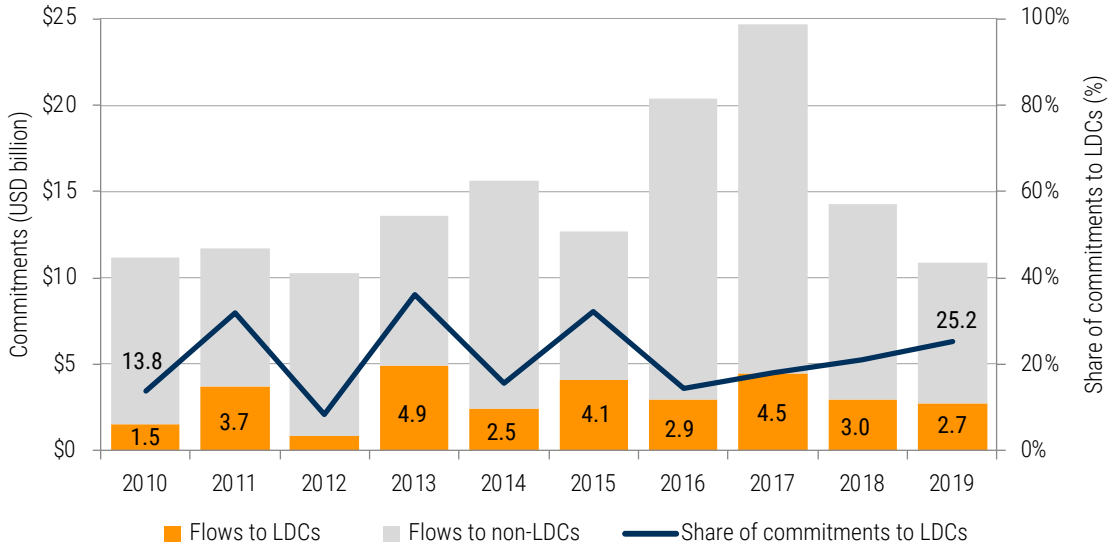
Source: IRENA and OECD 2022.

Geographically, most regions saw a decrease in international public flows in 2019. Flows increased only in Oceania, where they rose by 72 percent (USD 55.1 million). Decreases were less significant in Sub-Saharan Africa, where they fell 1.7 percent to USD 4.0 billion. Flows to Western Asia and Northern Africa decreased by 22 percent to USD 1.8 billion. The bulk of decreases were concentrated in Eastern and South-eastern Asia, where they fell 66.2 percent; Latin America and the Caribbean, where they dropped by 29.8 percent; and Central and Southern Asia, where they declined by 24.5 percent.

In 2019, 24 countries received 80 percent of all commitments. Nigeria, Guinea, and India were the top recipients, attracting a quarter of commitments. Guinea was also a top recipient in 2018, thanks to a USD 1.1 billion commitment to the Souapiti Hydro Project.

Last year's report highlighted the difference in flows directed to emerging markets in developing countries and those farthest behind, as categorized by the United Nations. In 2021, the same countries belonged to the groups of least-developed countries, landlocked developing countries, and small-island developing states, but commitments directed to these countries varied widely by group (figure ES.13). The least-developed countries received 25.2 percent of commitments in 2019, an increase from the 21 percent in 2018, continuing an upward trend since 2016 but masking a 9 percent decrease from USD 3.0 billion to USD 2.7 billion in absolute amounts. Among the 46 least-developed countries, São Tomé and Príncipe, Eritrea, and Kiribati were the only ones that did not receive any flows in 2019. Chad and Timor-Leste did receive funding in 2019, after receiving no commitments in 2018.

FIGURE ES.13 • Annual commitments to least-developed countries and non-LDCs in support of clean energy, 2010–19



Source: IRENA and OECD 2022.
LDCs = least-developed countries.

Models show a significant gap between current investment levels and the levels needed to achieve an energy transition commensurate with the imperatives of sustainable development and abating climate change. Global investments in renewable power generation need to reach USD 1 trillion a year by 2030 (IEA 2021b; IRENA 2021)—about three times the USD 367 billion estimated to have been invested in 2021 (IEA 2021d).[18] Private investors provided more than 85 percent of investments in new renewable energy projects between 2013 and 2018. They will likely continue to provide most of the increased funding.

Governments and international donors will continue to play major roles in encouraging investments in renewable assets, especially in developing countries, where real or perceived risks contribute to the high cost of financing or prevent projects from seeing the light of day. The strategic use of public finance remains key for creating an enabling environment for private investments, developing the needed infrastructure, and addressing perceived risks and barriers to attracting private capital. In addition, funding will be needed to implement policies—capacity-building, education, retraining, and industrial policies—that ensure just and inclusive energy transitions.

18 For more on the investment needed to reach SDG 7, see chapter 6.

TRACKING PROGRESS ACROSS TARGETS: INDICATORS AND DATA

Enhanced energy statistics help countries monitor their progress. The global tracking in this report comes from collaboration among the custodian agencies responsible for the SDG 7 targets. The purpose of this joint effort is to compile and disseminate comparable datasets worldwide.[19] The last section of each chapter of this report includes additional information on the methodologies and approaches used to assess progress on SDG 7.

These statistical tools and methods make it possible to track global progress toward SDG 7 based on collaboration between national statistical offices and relevant international or regional organizations using optimized and standardized data-collection resources. For example, household surveys can be designed to support tracking across SDG 7 targets and even other SDG targets, such as health, air pollution, and quality of life. The World Bank and the WHO have prepared a guidebook to integrate energy access questions into existing national household surveys.[20]

This will be a long-term process. Much more support is needed to develop statistical capacity in countries and regions.

19 The United Nations' metadata repository for SDG 7 indicators is available at https://unstats.un.org/sdgs/metadata/.

20 The Living Standards Measurement Study guidebook for measuring energy access is available at https://documents.worldbank.org/en/publication/documents-reports/documentdetail/557341633679857128/measuring-energy-access-a-guide-to-collecting-data-using-the-core-questions-on-household-energy-use.

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