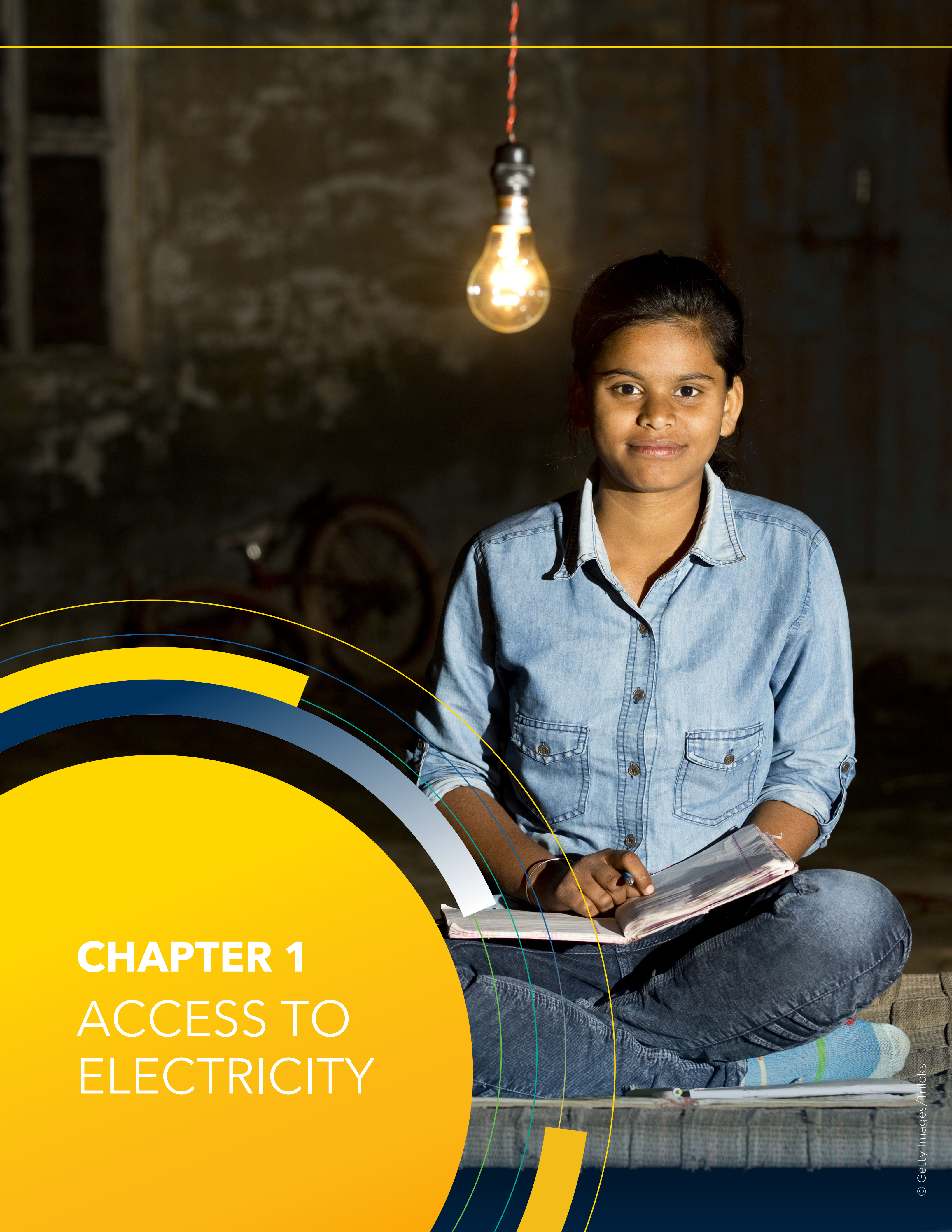

CHAPTER 1
ACCESS TO ELECTRICITY

MAIN MESSAGES

- **Global trend:** The share of the world's population with access to electricity rose from 83 percent in 2010 to 91 percent in 2020,[1] increasing the number of people with access by 1.3 billion globally. The number without access declined from 1.2 billion people in 2010 to 733 million in 2020. However, the pace of progress in electrification has slowed in recent years because of the increasing complexity of reaching more remote and poorer unserved populations and because of the expected impact of the COVID-19 pandemic. From 2010 to 2018, 130 million people gained access to electricity each year, on average; that figure fell to 109 million between 2018 and 2020. The annual rate of growth in access was 0.8 percentage points between 2010 and 2018 but fell to 0.5 percentage points in 2018–20.
- **Target for 2030:** To meet the target of Sustainable Development Goal (SDG) 7.1 to achieve universal electricity access by 2030, the pace of electrification needs to accelerate significantly, especially given the slowdown observed in 2018–20. Without further efforts to reach the poorest and most remote, 670 million people are projected to remain without access in 2030 (IEA 2021).[2] To reach universal access by 2030, the annual growth rate in global electrification will have to increase by 0.9 percentage points. Especially, the number of customers connected each year in the least-developed countries (LDCs) will have to triple from 23 million in 2000–18 to 63 million in 2019–30 (RMI and OHRLLS 2021). The interplay of robust policies and financial support is critical to boosting growth in electrification to leave no one behind, especially the most vulnerable.
- **Regional highlights:** Between 2010 and 2020, every region of the world showed consistent progress in electrification, but with wide disparities.[3] Despite the effects of COVID-19 on the SDG 7 trajectory, electricity access in Sub-Saharan Africa rose from 46 percent in 2018 to 48 percent in 2020, an annual growth rate of 1 percentage point. However, the slowdown of improvements in the period, possibly owing to COVID-19, undermined the pace of progress. Sub-Saharan Africa accounted for more than three-quarters of the people (568 million people) who remained without access in 2020. The region's share of the global access deficit rose from 71 percent in 2018 to 77 percent in 2020, whereas most other regions, including Central and Southern Asia (the second-largest access-deficit region), saw declines in their share of the access deficits.[4]
- **Urban-rural divide in electricity access:** Although rural areas have much larger access deficits than urban areas, the pace of rural electrification was faster than that of urban electrification over the past decade. Access in rural areas increased from 72 percent in 2010 to 83 percent in 2020, outpacing population growth. However, about 80 percent of the world's people without access to electricity lived in rural areas in 2020, three-quarters of them in Sub-Saharan Africa. For them, lack of access limits the ability to improve livelihoods, secure high-quality public services (e.g., healthcare), and rise out of poverty. Globally, the urban access rate has plateaued at 97 percent since 2016. The urban electrification grew faster in

1 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.

2 Because data through the end of 2020 are included in this edition, in cases where the access trend could be affected by the COVID-19 impact the projection has been revised upward compared with the 2021 the Tracking SDG 7 report.

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

4 In this chapter, "access deficit" is defined as the number of people without access to electricity.

Sub-Saharan Africa than in any other region, with annual growth of 1 percentage point between 2010 and 2020, although from a much lower base than in other regions. But the electrification rate in urban areas of the region has been lower than in other regions since 2010, and it stood at 78 percent in 2020. At the current pace, global rural access will fall short of the 2030 target, while urban access will be close to universal.

- **Top 20 access-deficit countries:** The 20 countries with the largest access deficits were home to 76 percent of the global population living without access to electricity (or 560 million people) in 2020. Most of the top 20 deficit countries are 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). The gains in the electrified population outpaced population growth in Ethiopia between 2010 and 2020; the same cannot be said of the Democratic Republic of Congo and Nigeria, where electrification advances failed to keep pace with population growth. Meanwhile, Kenya and Uganda made the fastest progress in electrification, with annualized increases of more than 3 percentage points between 2010 and 2020.[5]
- **Electrification patterns across socioeconomic segments:** Reversing poverty in its multi-dimensional aspects will depend on improving access to electricity. Access deficits are heavily concentrated in vulnerable countries. LDCs faced challenges in accelerating their pace of electrification, with an average access rate of 55 percent in 2020, representing more than half of the global population still without access (or 479 million people).[6] Likewise, countries suffering from fragility, conflict, and violence managed to electrify only 55 percent of their population, leaving 417 million people unserved in 2020.[7]
- **Decentralized renewable energy:** The number of people enjoying access to electricity through decentralized renewable energy increased between 2010 and 2019. Those with access to decentralized solutions in Tier 1 or 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 2021).[8] Off-grid solar markets came under pressure from the COVID-19 pandemic in early 2020. Although the industry has yet to return to pre-COVID-19 levels, it has shown overall resilience since the disruptions (GOGLA 2021a).
- **Affordability of electricity:** The COVID-19 crisis has increased concerns about the affordability of electricity. Before the pandemic, almost half of people without access in Sub-Saharan Africa did not have the ability to pay for an essential bundle of services, and 700 million people with access in Africa and developing countries in Asia could not afford an extended bundle of services (IEA 2021).[9] Under the weight of COVID-19, an additional 90 million connected people in Africa and developing countries in Asia were unable to afford an extended bundle of energy services in 2020. Addressing affordability challenges requires tailored end-user financing to both expand and keep household electricity connections.

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5 In Kenya and Uganda, 15 million and 26 million people lacked access to electricity in 2020.

6 LDCs 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 the Environmental Vulnerability Index.

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

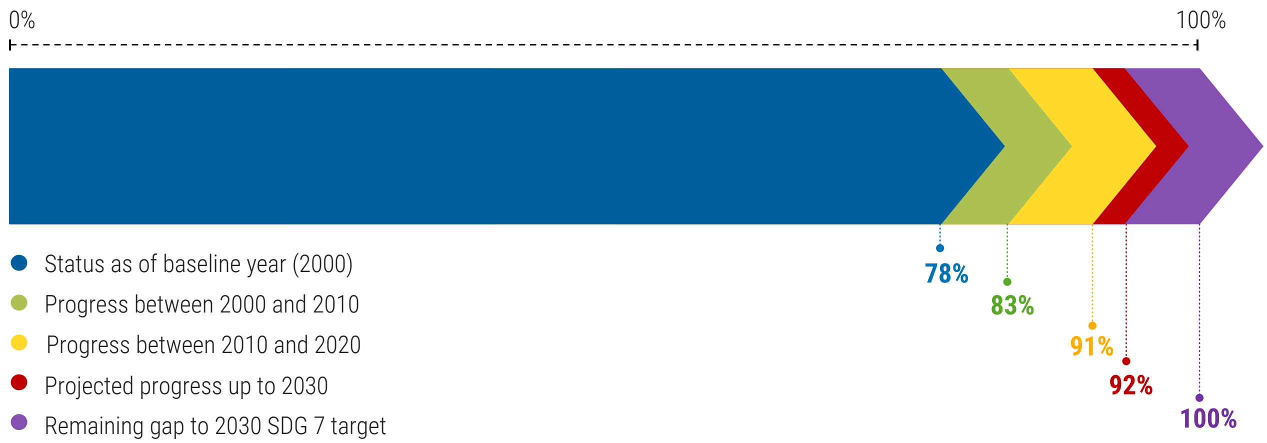
8 According to IRENA (2018), below Tier 1 indicates solar lights (<11W). Tier 1 access for the whole household includes small solar home systems (11–50W), and small PV mini-grid access. Tier 2 access or better includes large solar home systems (>50W), large PV mini-grid access, and non-PV mini-grids.

9 An essential bundle includes four lightbulbs operating for four hours per day, a television for two hours and a fan for three hours. An extended bundle of services includes four light bulbs operating for four hours per day, a fan for six hours per day, a radio or television for four hours per day, and a refrigerator.

ARE WE ON TRACK?

In 2020, 91 percent of the global population had access to electricity, leaving 733 million people still unserved (figure 1.1). Given the sluggish pace of growth in access over the past two years considering the COVID-19 crisis, the share of the population having universal access in 2030 is expected to be just 92 percent, leaving some 670 million people without access (IEA 2021). The shortfall in reaching the SDG target of universal access is driven mainly by the complexities of bringing service to very vulnerable and poor populations. Between 2010 and 2020, 1.3 billion people became connected—an average of 125 million people a year. This progress outpaced annual population growth of 83 million people. Between 2018 and 2020, the access rate rose from 90 percent to 91 percent. During this period, gains in access still outpaced annual population growth of 80 million, but only 109 million people became connected each year, against an annual average of 130 million people in 2010–18.

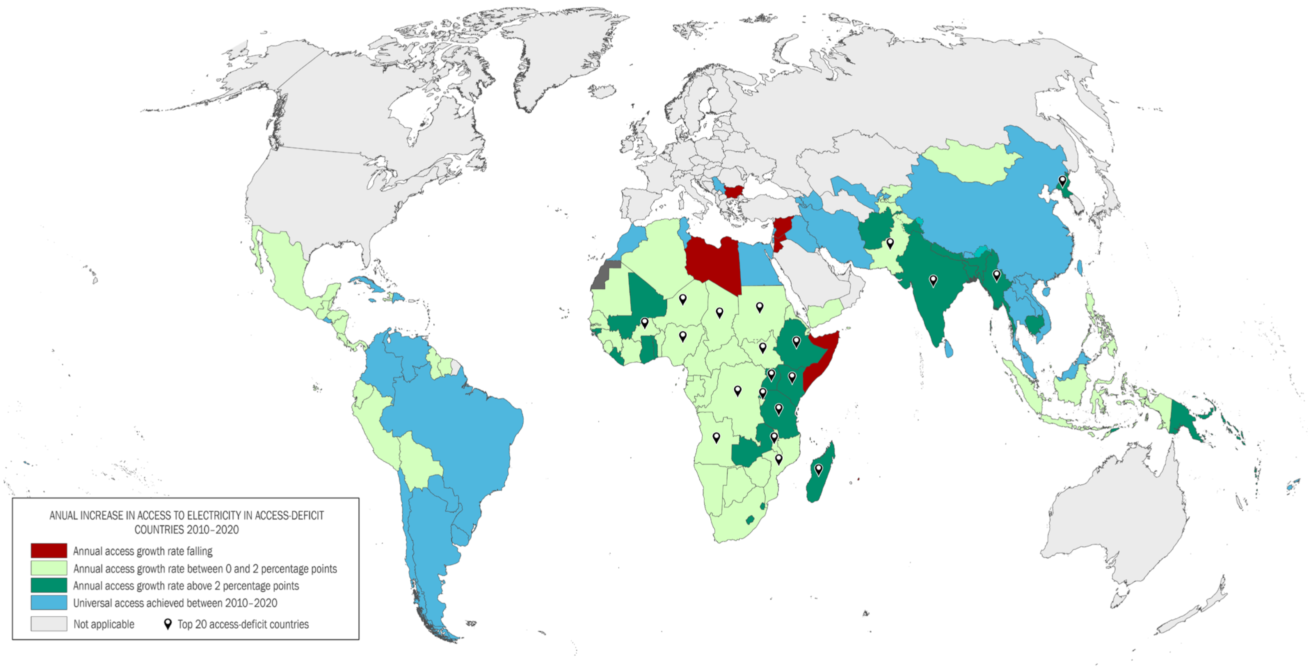
Figure 1.1 • Percentage of population with access to electricity



Source: World Bank 2022; IEA 2021.

Between 2010 and 2020, 45 countries reached universal access; 19 of them in Latin America and the Caribbean (figure 1.2). As of 2020, 91 countries still had not reached universal access. Sub-Saharan Africa comprised a large proportion of the world's unelectrified population. There, an average of 25 million people gained access to electricity each year between 2010 and 2020, keeping pace with the annual population increase of 26 million. During this period, about a third of access-deficit countries, including 8 of the 20 with the largest numbers of underserved people, had annual access growth rates of more than 2 percentage points. Over this period, 71 percent of access-deficit countries had annual access growth rates of less than 2 percentage points, including 7 countries in which access declined.

Figure 1.2 • Annual change in electricity access rate in access-deficit countries, 2010–20



Source: World Bank 2022.

LOOKING BEYOND THE MAIN INDICATORS

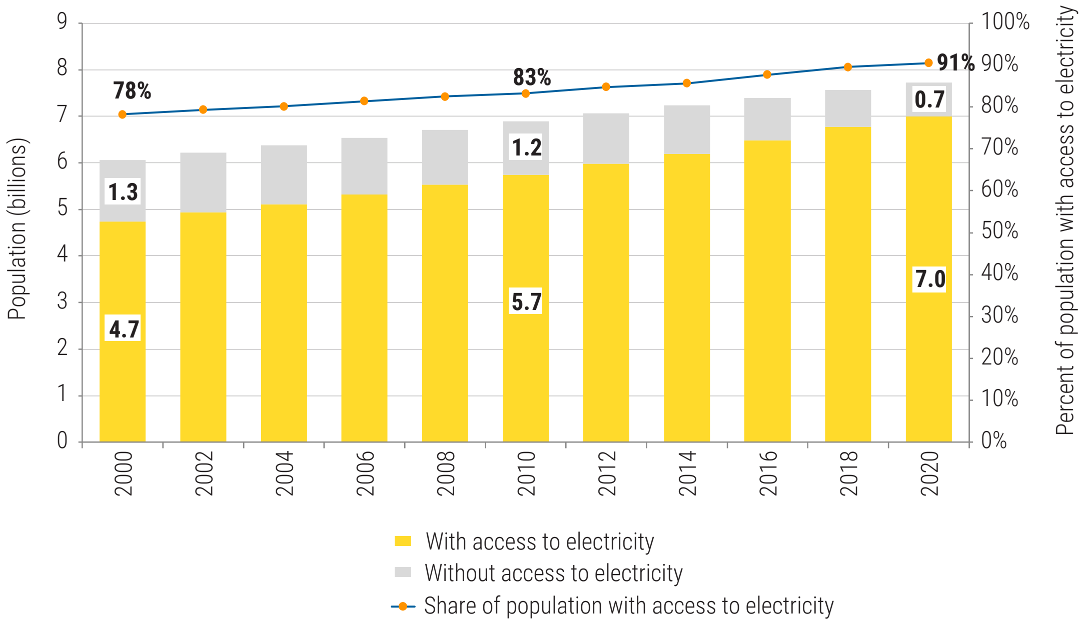
This chapter reviews progress in access to electricity by considering socioeconomic electrification patterns across regions and countries, using data for 2000–20. The purpose of the analysis is to examine global efforts to reach the target of universal access by 2030 and to ensure continuous gains in electrification worldwide. In addition to the analytical findings, the chapter provides policy insights into electrification efforts and their contribution to a sustainable recovery from the COVID-19 pandemic. The methodology used to compile the database is presented at the end of the chapter.

ACCESS AND POPULATION

The global electricity access rate rose continuously between 2010 and 2020, from 83 percent to 91 percent (figure 1.3). During the period, the pace of annual growth in access was faster than in the previous decade (figure 1.4). However, the pace slowed in 2018–20 because of the difficulty of reaching the remaining unserved populations and the potential impacts of COVID-19. Between 2018 and 2020, the access rate rose from 90 percent to 91 percent. Although the pandemic hit the global economy and slowed electrification, some progress was made between 2019 and 2020 as planned infrastructure was finalized. However, the current pace of access growth is still not sufficient to reach the 2030 target. Doing so would require raising the share of people connected to electricity each year by 0.9 percentage points. For example, LDCs would have to triple their pace of electrification, speeding up the annual increase in new customers from 23 million in 2000–18 to 63 million in 2019–30 (RMI and OHRLLS 2021). But at the current growth rate, the share of the world's population with access will reach only 92 percent by 2030. Accelerating progress in electrification from 2020 onwards requires strong policy support, innovative financing instruments, and government action to electrify the poor and most vulnerable and to recover from the pandemic.

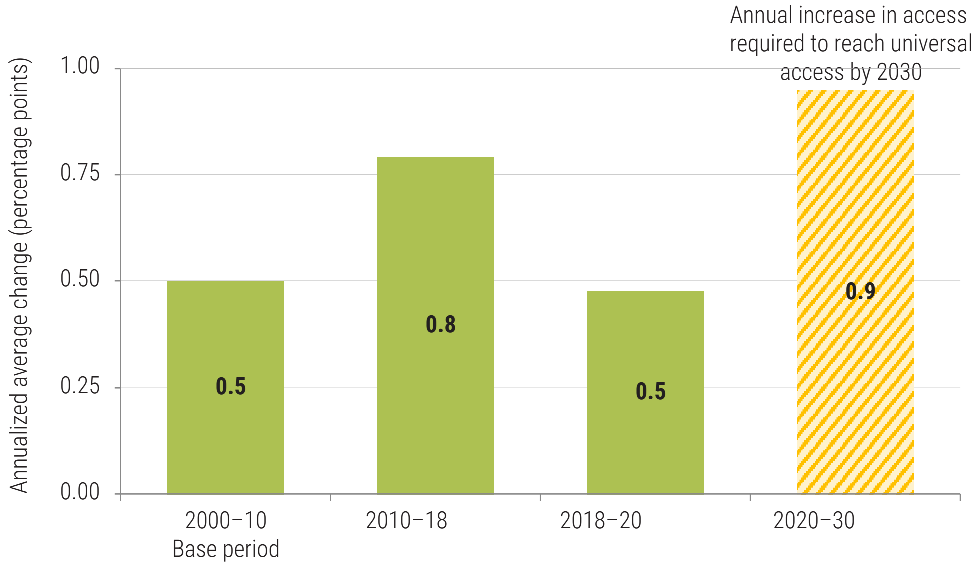
The impact of the COVID-19 crisis on household incomes made electricity less affordable. Before the pandemic, almost half of the unserved population in Sub-Saharan Africa lost its ability to pay for an essential bundle of services, and 700 million people with access in Africa and developing Asia could not afford an extended bundle of services (IEA 2021). Under the pressure of the pandemic, an additional 90 million connected people in Africa and developing Asia could not afford an extended bundle of services in 2020. Under the circumstances, households may opt for cheaper and smaller systems that deliver fewer energy services than they did before the COVID crisis.

Figure 1.3 • Global electricity access and population growth, 2000–20



Source: World Bank 2022.

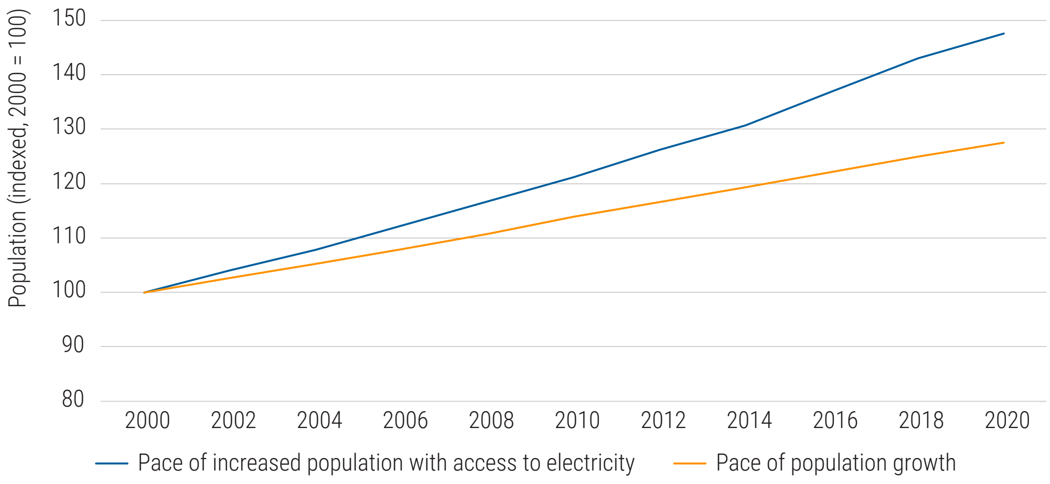
Figure 1.4 • Average annual increase in access to electricity



Source: World Bank 2022.

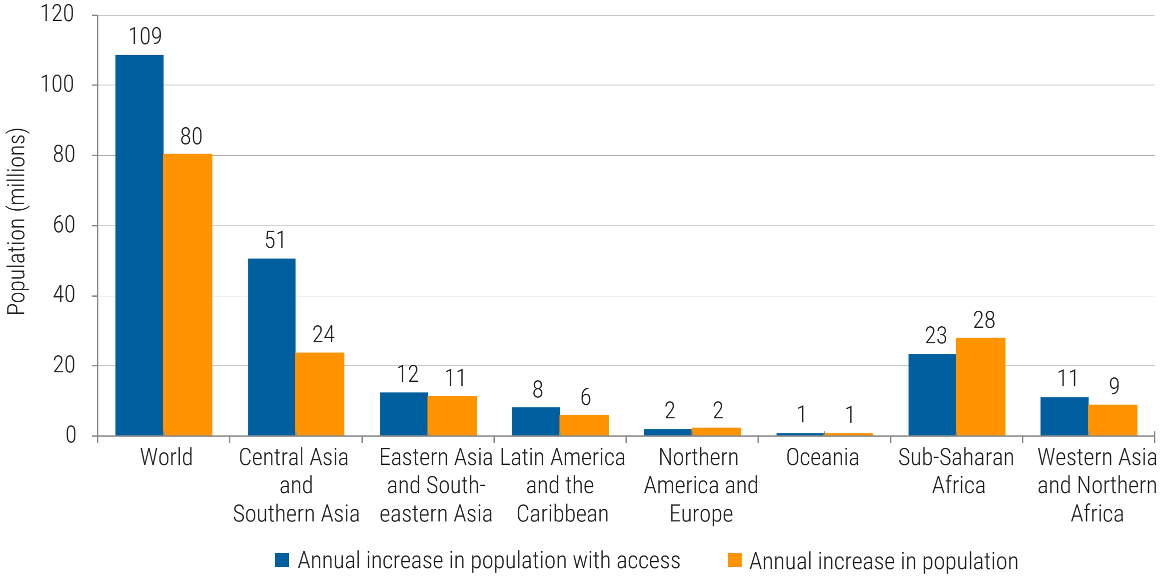
Between 2000 and 2020, the increase in the number of people with access to electricity continuously outpaced population growth (figure 1.5). The difference widened after 2010, as the pace of electrification increased. Even in 2018–20, growth in access outpaced population growth by 29 million people a year. Most of the increase was in Central Asia and Southern Asia, where 51 million were connected annually during the period (figure 1.6). Within this region, the fastest advances in electrification were in Bangladesh and India, each of which saw annual access growth of close to 2 percentage points. By contrast, the pace of electrification slackened over the same period in Sub-Saharan Africa, where annual population growth of 28 million outpaced 23 million people electrified each year. This trend increased the number of unserved people by about 4 million a year in the region.

Figure 1.5 • Pace of global population with electricity access and total population growth, 2000–20



Source: World Bank 2022.

Figure 1.6 • Annual increases in access to electricity and population, by region, 2018–20

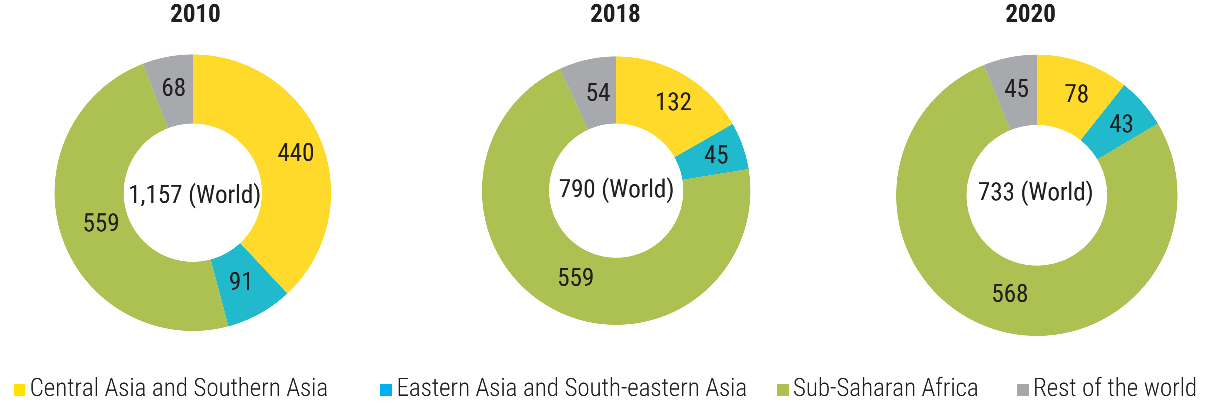


Source: World Bank 2022.

THE ACCESS DEFICIT

In 2020, 733 million of the world's people lived without access to electricity, down from 1.2 billion in 2010. Progress varied across regions (figure 1.7). Although Central Asia and Southern Asia remained the second-largest access-deficit region in 2020, it exhibited a substantial drop in the number of people without access, from 440 million in 2010 to 78 million in 2020, an annual decrease of 36 million. Among the countries in the region, India showed the largest annual drop in the access deficit (28 million). The global access deficit remains concentrated in Sub-Saharan Africa, where it increased from 559 million people in 2010 to 568 million people in 2020, with fluctuations over the decade. As a result, 77 percent of the world's population lacking access to electricity were in Sub-Saharan Africa in 2020. In Sub-Saharan Africa, Eastern Africa accounted for the biggest share of the unserved population due to Ethiopia, the third-largest access deficit country in the world. However, some countries in the region, including Kenya, Rwanda, and Uganda, showed fast advances with more than 3 percentage points of annual access growth in 2010–20. Meanwhile, access deficits declined steadily in the rest of the world.

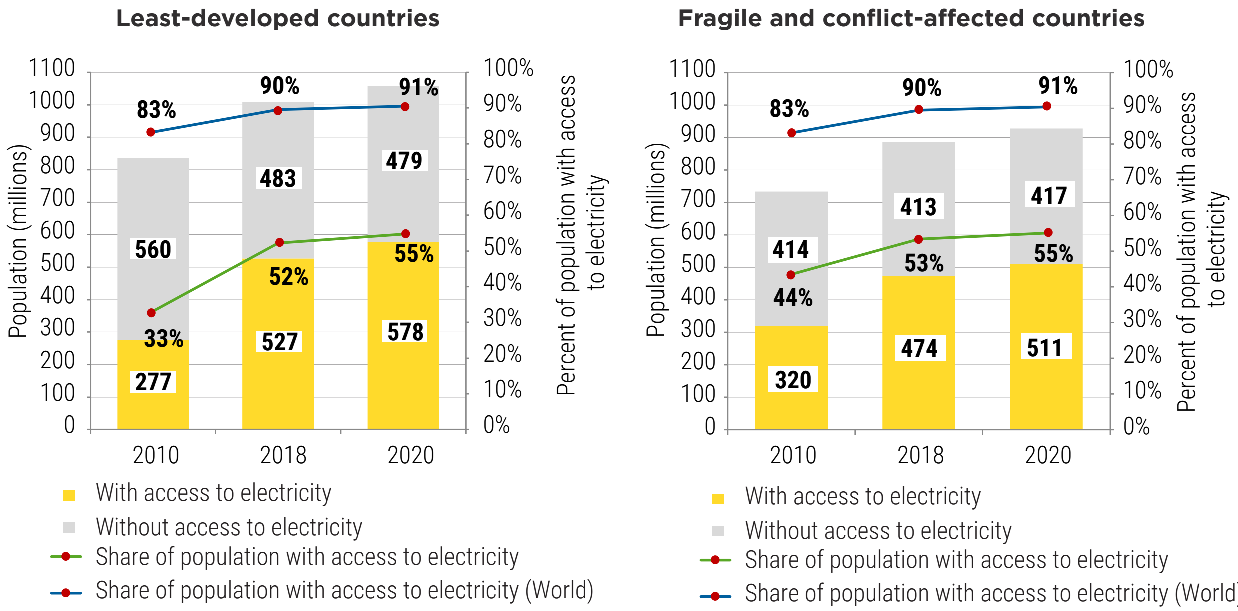
Figure 1.7 • Number of people without access to electricity, in selected regions, 2010, 2018, and 2020 (millions of people)



Source: World Bank 2022.

The access rate in the LDCs soared between 2010 and 2020, from 33 percent to 55 percent, but 479 million people still lacked access at the end of the period (figure 1.8). The 2020 access rate in these countries is almost 36 percentage points below the world average. As access has grown in wealthier countries, the global access deficit has been increasingly concentrated in the LDCs, which accounted for 48 percent of the world's unserved people in 2010 and 65 percent in 2020. The access rate is particularly low in rural areas of these countries, where just 44 percent of the population has access (versus 83 percent in rural areas globally). Between 2018 and 2020, although progress in electrified population outpaced population growth, the annual growth rate in access slowed to 1.3 percentage points, down from 2.4 percentage points in 2010–18. To reach the 2030 target, annual growth in access in the LDCs will have to increase to 4.5 percentage points.

Figure 1.8 • Gains in electricity access in least-developed and fragile and conflict-affected countries, 2010, 2018, and 2020



Source: World Bank 2022.

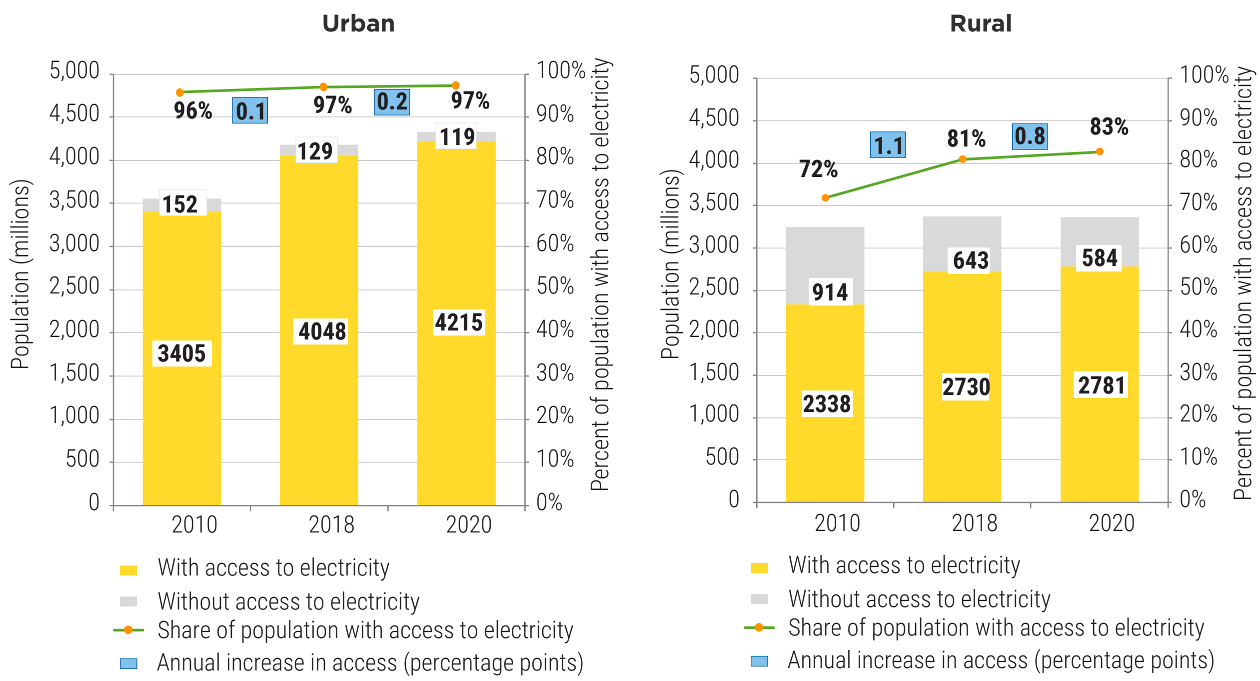
In fragile and conflict-affected settings, the access rate increased from 44 percent in 2010 to 55 percent in 2020 (see figure 1.8). Progress was driven mostly by lower-middle-income countries. During the same period, owing to population growth, the number of underserved people in fragile settings increased marginally from 414 million in 2010 to 417 million in 2020. These countries accounted for 57 percent of the global access deficit in 2020. In their rural areas, the number of people without access rose from 295 million in 2010 to 331 million in 2020. Between 2018 and 2020, the annual access growth of 0.8 percentage points was slower than the 1.2 percentage points recorded in 2010–18. The annual access gains of 19 million people fell behind the population growth of 21 million in 2018–20. Timor-Leste and Yemen made the most progress between 2018 and 2020, with annual growth in access of more than 5 percentage points. At the current speed, the access deficit will be concentrated in fragile and conflict-affected countries in 2030.

THE URBAN-RURAL DIVIDE

As of 2020, global rates of access to electricity were 97 percent in urban areas and 83 percent in rural areas. In 2020, 119 million people in urban areas and 584 million in rural areas still lacked access (figure 1.9). If the current trend continues, the global rural access rate will fall short of the target in 2030, whereas urban access is expected to be nearly universal.

Over the 2010–20 period, the average annual increase in access was 44 million in rural areas and 81 million in urban areas. The annual increase in rural access would have to climb to 1.7 percentage points (from 1.1 on average in 2010–20) to reach universal access in 2030. Although the annual rate of increase in urban areas (0.2 percentage points) was lower than the 1.1 percentage points in rural areas, the net increase in the number of electrified people in urban areas (810 million) was much larger than in rural areas (443 million) because of the rapid increase in urbanization. In Sub-Saharan Africa, the urban access rate rose from 68 percent in 2010 to 78 percent in 2020, the fastest growth of any region. The phenomenon can be ascribed to the very low urban electrification in the region at the start of the period. In rural areas of Sub-Saharan Africa, access rose from 17 percent to 28 percent over 2010–20, but it remains far lower than the global rural rate of 83 percent. In 2020, the number of people in Sub-Saharan Africa without access to electricity was 99 million in urban areas and 440 million in rural areas.

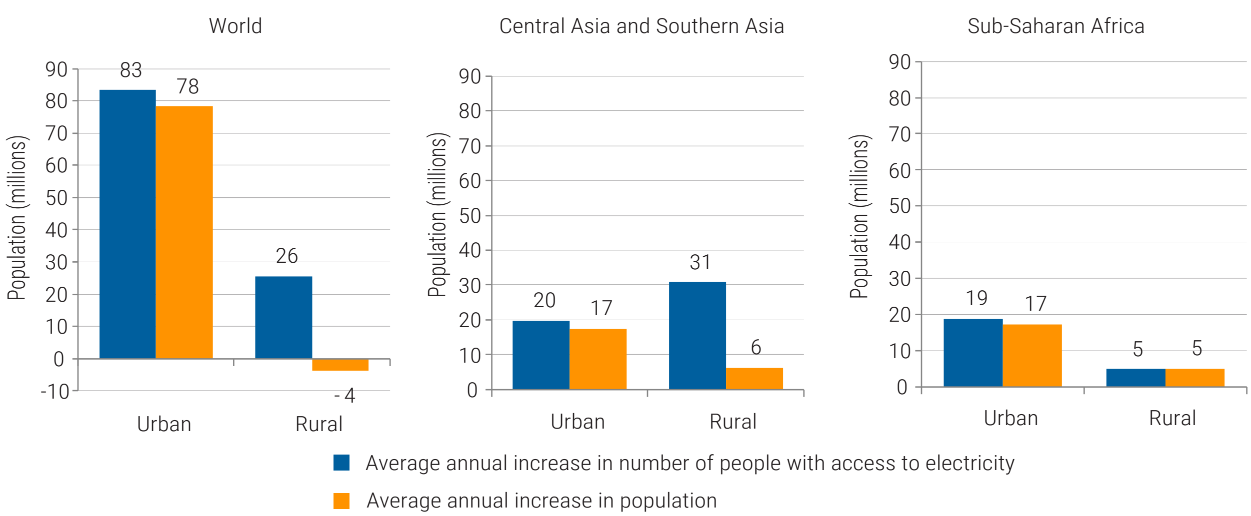
Figure 1.9 • Gains in electricity access in urban and rural areas, 2010, 2018, and 2020



Source: World Bank 2022.

Globally, the pace of annual electrification growth slowed between 2018 and 2020, which can be explained by the complexity of last-mile connectivity, aggravated by the pandemic. Nevertheless, global growth in electrification surpassed population growth in urban and rural areas alike (figure 1.10). The average annual increase in the number of people connected was 83 million in urban areas and 26 million in rural areas. In Central Asia and Southern Asia, the annual increase of 31 million people in rural areas significantly exceeded population growth of 6 million between 2018 and 2020. In Sub-Saharan Africa, rural electrification just kept pace with rural population growth. The modest pace should increase substantially to electrify the 75 percent of the rural population without access in the region.

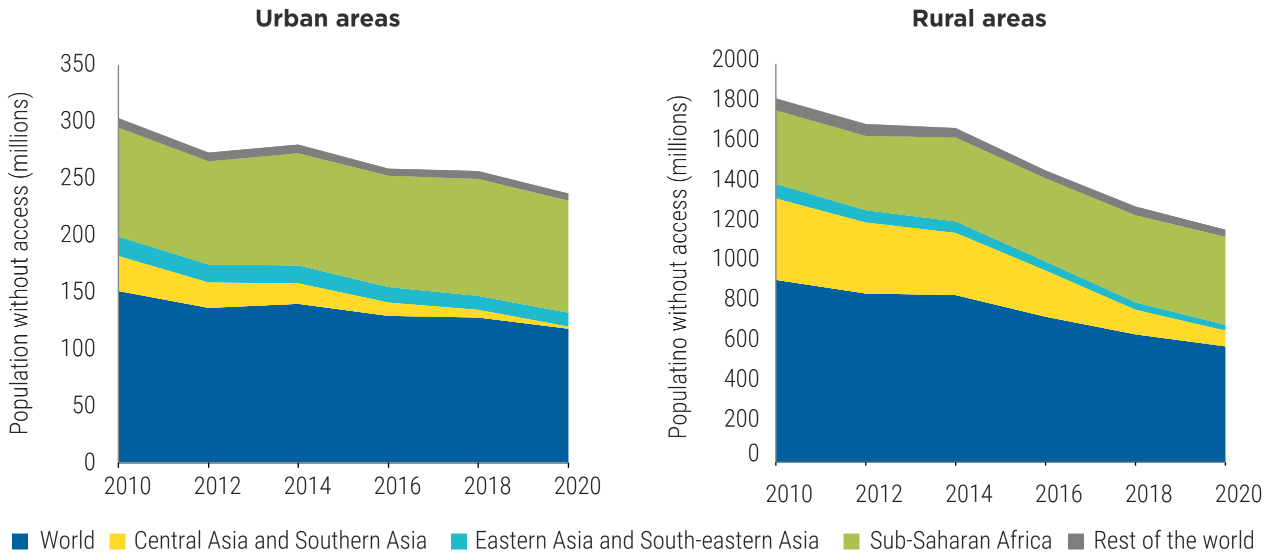
Figure 1.10 • Annual change in number of people with electricity and population in urban and rural areas, globally and in selected regions, 2018–20



Source: World Bank 2022.

Between 2010 and 2020, growth in access was brisk in Central Asia and Southern Asia (figure 1.11). In rural parts of the region, the access deficit plummeted from 409 million people in 2010 to 76 million in 2020, an annual average decline of 33 million people. In urban areas, the number of people without access plunged from 31 million in 2010 to 2 million in 2020, an annual decrease of 3 million. In 2018–20, Central Asia and Southern Asia also showed the world's largest decrease in the access deficit in both urban and rural areas. Meanwhile, as noted, the access deficit grew in Sub-Saharan Africa, where a majority of the world's least-developed and fragile and conflicted-affected countries are located. The increase was slight in urban areas (annually less than 1 million people), but greater in rural areas (7 million annually) in 2010–20. As a result, the region accounted for the world's largest access deficits in both urban and rural areas.

Figure 1.11 • Access deficits in urban and rural areas, globally and in selected regions, 2010–20

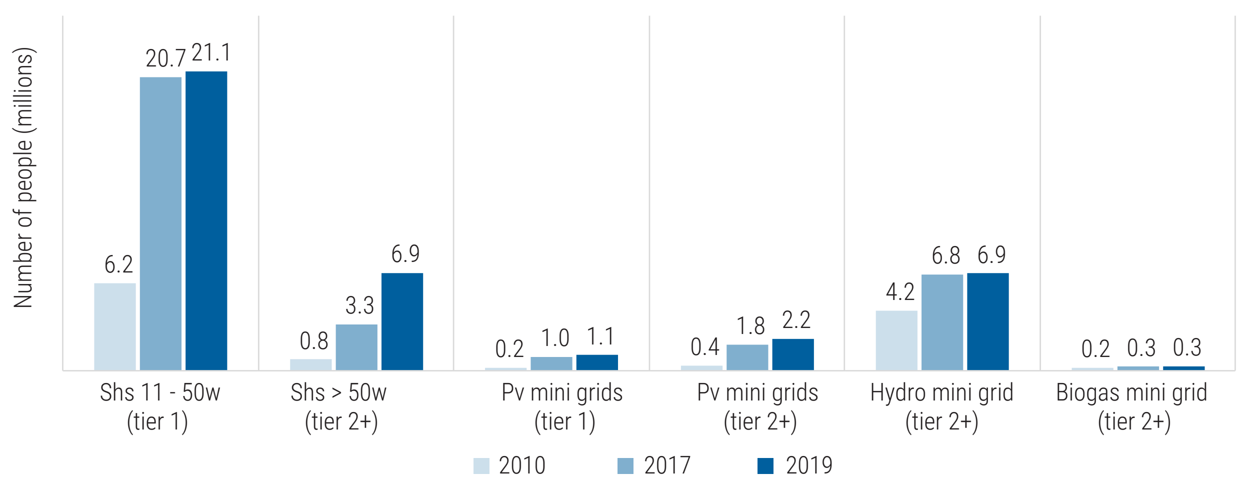


Source: World Bank 2022.

DECENTRALIZED RENEWABLE ELECTRIFICATION

About 39 million people had access to electricity through a Tier 1+ decentralized renewables-based system in 2019, including solar home systems and mini-grids based on solar, hydropower, and biogas (IRENA 2021), up from 12 million in 2010 (figure 1.12).[10] The number of people with access to Tier 1+ solar home systems rose by a factor of three between 2010 and 2019, to 28 million. The number connected to Tier1+ solar mini-grids also tripled between 2010 and 2019—to 3 million (figure 1.12). During the 2017–19 period, the largest number of people using solar photovoltaic (PV) Tier 1+ mini-grids was in Sub-Saharan Africa, followed by Central Asia and Southern Asia (figure 1.13). Similarly, the number of people using small and large solar home systems was dominant in Central and Southern Asia, and Sub-Saharan Africa in 2017–19.

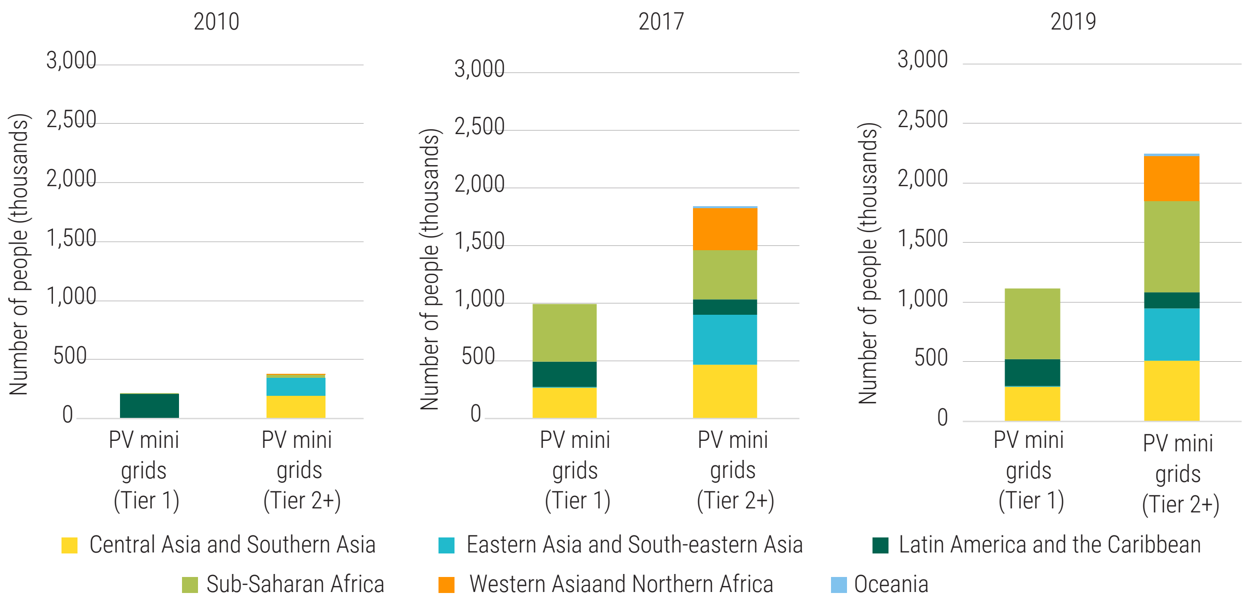
Figure 1.12 • Global number of people with access to Tier 1+ decentralized renewables-based systems, 2010, 2017, and 2019



10 Supply-side data on decentralized energy solutions are provided by the International Renewable Energy Agency (IRENA). Its database of decentralized renewables-based solutions is published with a two-year lag, because of challenges in data availability from several sources. This report reviews and analyzes figures for 2019, which were published in 2021.

Source: IRENA 2021.

Figure 1.13 • Number of PV mini-grid connections, by region, 2010, 2017, and 2019

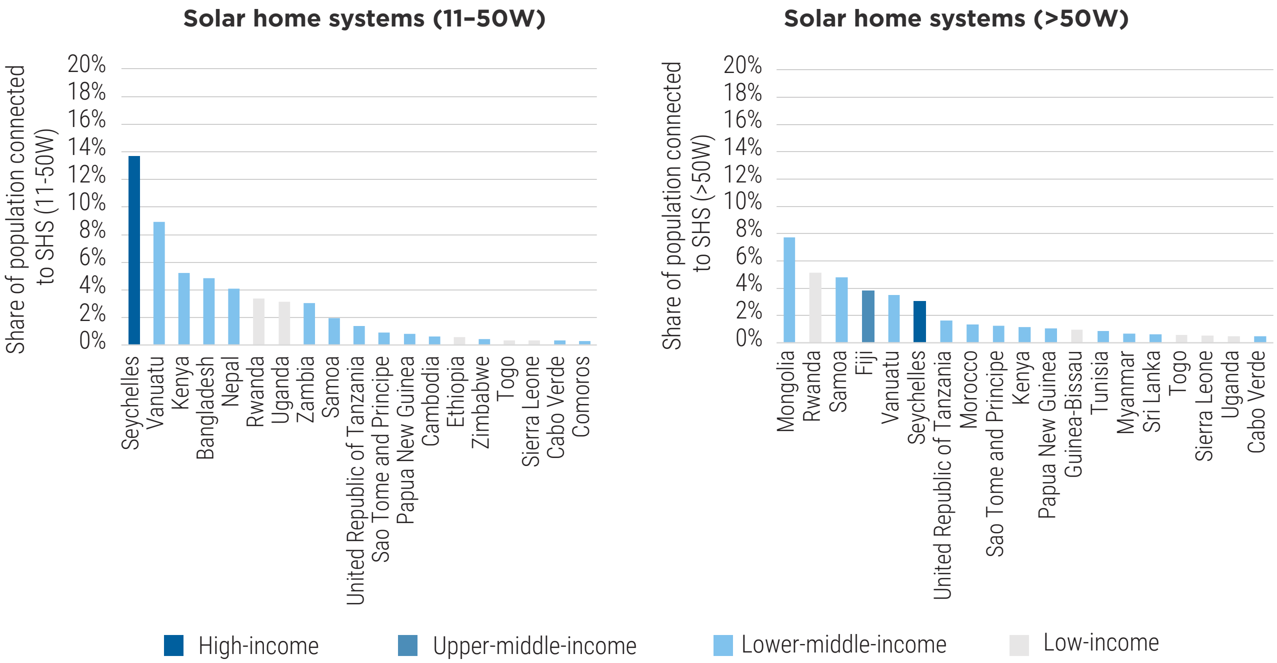


Source: IRENA 2021.

Among the 20 countries with the largest shares of Tier 1+ solar home systems, more than half were in Sub-Saharan Africa in 2019; about 10 million people in the region had access in this form (figure 1.14). Seychelles and Vanuatu had the largest shares of people with access to Tier 1 systems (more than 9 percent). Mongolia, Rwanda, and Samoa showed the largest shares of people using Tier 2+ systems (more than 5 percent). Most of the countries with higher shares of Tier 1+ solar home systems are in lower-middle-income and low-income countries. Tier 1+ solar home systems can engage household members in income-generating activities, such as starting a new business or spending more time working in the home. Tier 1+ solar home systems with monitoring tools can also help them cut their electricity costs.

Meanwhile, Afghanistan, Fiji, Nepal, and Sierra Leone were the countries with the largest shares of the population connected to Tier 1+ mini-grids in 2019. Among regions, Central Asia and Southern Asia accounted for the majority of the world's people (58 percent; 6 million) connected to these systems.

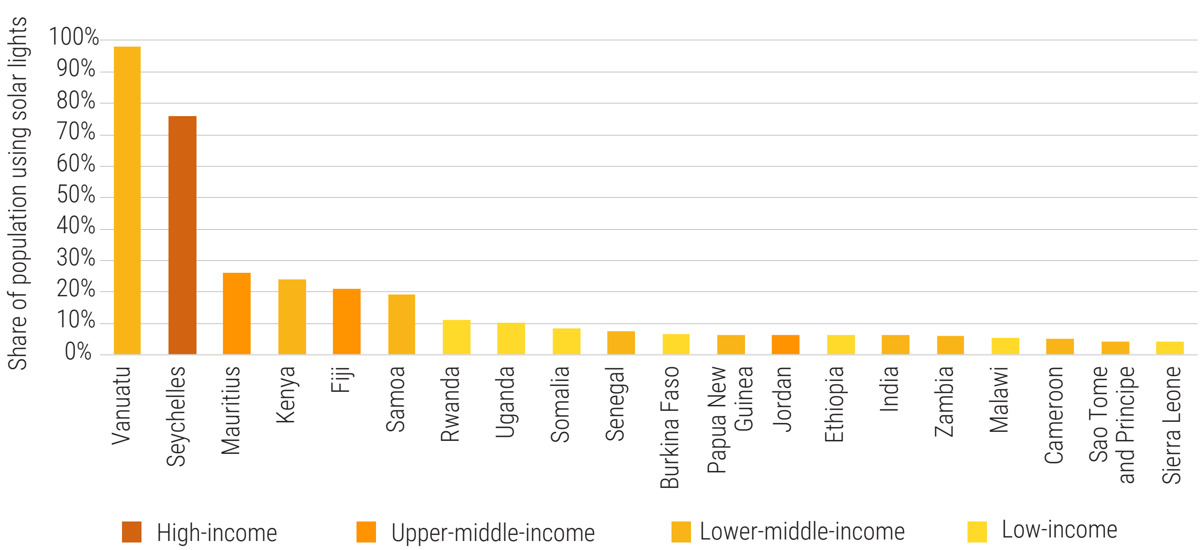
Figure 1.14 • Twenty countries with the largest shares of population enjoying access to solar home systems (Tier 1+), 2019



Source: IRENA 2021.

In 2019, the countries with the largest shares of the population using solar lighting systems below Tier 1[11] were Vanuatu, Seychelles, Mauritius, Kenya, and Fiji (figure 1.15). Between 2017 and 2019, Vanuatu, Fiji, and Mauritius had the fastest growth in the number of people using solar lights, with average annual growth of more than 5 percentage points.

Figure 1.15 • Twenty countries with the largest shares of population enjoying access to solar lights (below Tier 1), 2019



Source: IRENA 2021.

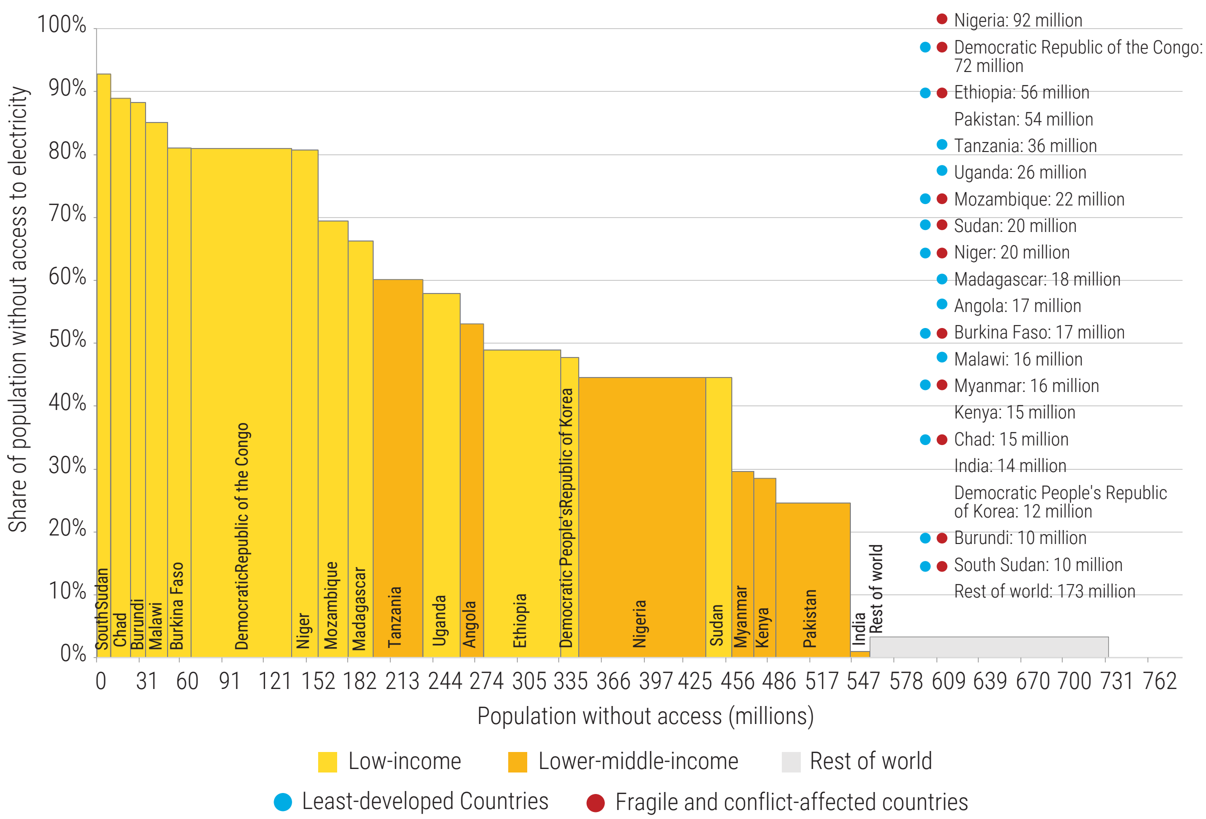
11 Solar lights and lighting kits (<11W) represent access that is below Tier 1, while small and large solar home systems indicate Tier 1+. Although solar lights may not provide Tier 1 access, they can provide that level of access to one or more individuals within the household.

The off-grid solar market faced challenges from the COVID-19 pandemic that began in early 2020. Impacts varied widely across countries, business models, and companies. The industry as a whole is recovering from the disruptions, partly owing to relief funding, although various effects of COVID linger across markets. Between July and December 2020, global sales of off-grid solar lighting products reached 3.6 million, up 19 percent over early 2020. However, global sales of 3.6 million units still showed an 18 percent decline from the second half of 2019 (pre-pandemic) (GOGLA 2021a). In terms of sales volumes, the number of people who gained improved access was expected to rise in the second half of 2020.[12] The upward trend continued in early 2021, and about 101 million people were estimated to have access to off-grid solar products.

COUNTRY TRENDS

The 20 largest access-deficit countries accounted for 76 percent of the global population without access to electricity in 2020, or 560 million people (figure 1.16). Closing the global access gap by 2030 largely depends on electrification efforts in these countries. Fifteen of the top 20 are in Sub-Saharan Africa. In 2020, The top three were Nigeria (92 million), the Democratic Republic of Congo (72 million), and Ethiopia (56 million). Burundi joined the top 20, while Bangladesh[13] exited the list. India's rank fell from third in 2018 to seventeenth in 2020 thanks to a dramatic decrease in the number of people lacking access.

Figure 1.16 • Share and absolute size of population without access to electricity in top 20 access-deficit countries and rest of world, 2020



Source: World Bank 2022.

12 Tracking entire off-grid connections can be difficult, particularly for non-quality-verified products made by non-GOGLA members. According to the 2020 Off-Grid Solar Market Trends report, GOGLA member sales were only about 28 percent of overall sales. Thus, the tracked sales trend may not reliably represent the number of customers.

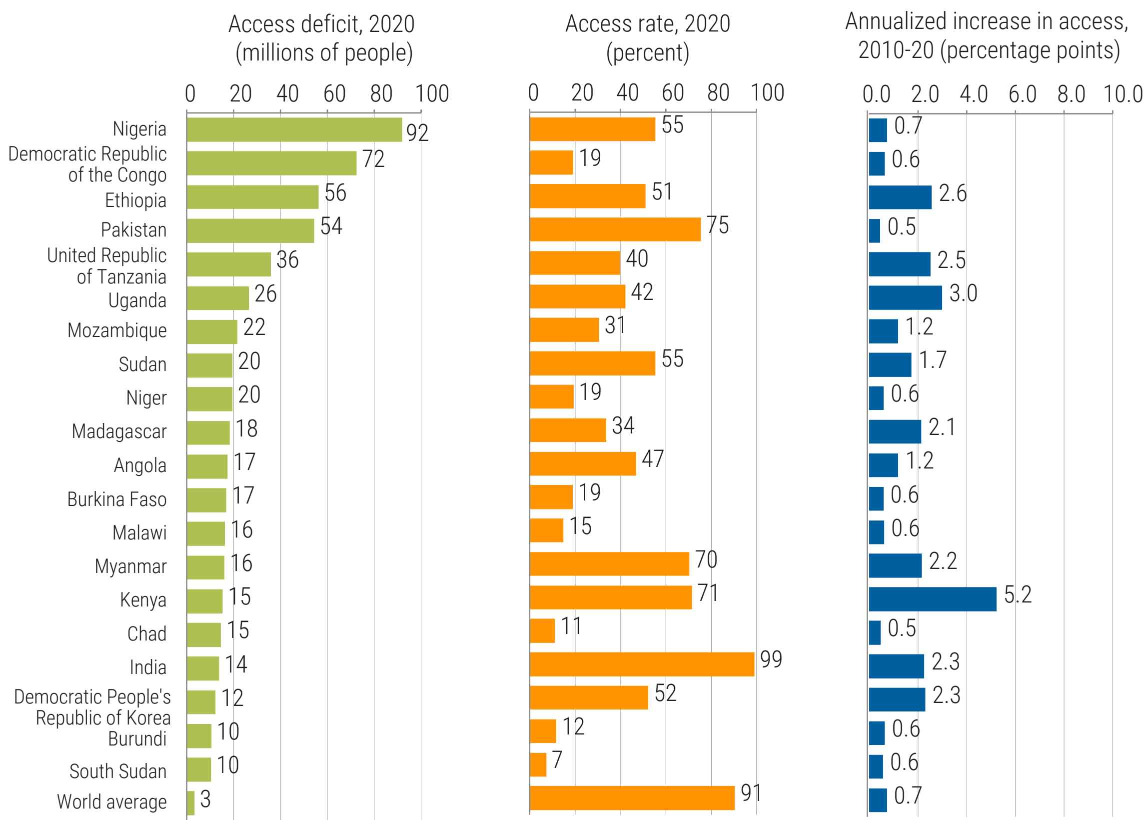
13 In Bangladesh, thanks to the world's largest solar home system program, the number of underserved people was slashed by more than half between 2018 and 2020, falling from 13 million to 6 million. Some 4.13 million solar home systems have been installed under the IDCOL solar home systems program, which benefits 18 million rural people in remote areas (IDCOL 2020). In addition, an enabling environment for designing and implementing effective electricity access policies for both centralized and decentralized solutions contributed to the improvement in access between 2010 and 2019 (ESMAP 2020).

Between 2010 and 2020, access gains in the electrified population outpaced population growth in Ethiopia. During the same period, electrification proceeded slowly in Nigeria and the Democratic Republic of Congo. In Nigeria, the access rate increased by an annual average of just 0.7 percentage points (4 million people) in 2010–20. With population growing at nearly the same pace, the access deficit held steady over the decade. Between 2018 and 2020, as population growth outpaced gains in access in Nigeria, the number of unelectrified people grew by 3 million a year. In the Democratic Republic of Congo, the access deficit widened—from 56 million in 2010 to 72 million in 2020. Between 2018 and 2020, since the pace of electrification slowed to the annual growth rate of 0.3 percentage points, the number of Congolese without access rose by about 2 million people a year. In Ethiopia, the world's third-largest access-deficit country, the deficit narrowed by an average of less than 1 million each year between 2010 and 2020. Recent progress has outstripped population growth, reducing the deficit from 60 million in 2018 to 56 million in 2020.

In Kenya and Uganda, the expansion of the electrified population was faster than population growth between 2010 and 2020. Of the top 20 access-deficit countries, Kenya and Uganda scored the greatest gains between 2010 and 2020, increasing their annual gains in access by 5.2 and 3 percentage points, respectively (figure 1.17). In the period 2018–20, Kenya, along with Ethiopia, showed the fastest growth, with annual gains of more than 3 percentage points. In contrast, progress slowed over the same period in Madagascar, Malawi, Mozambique, and Nigeria.

Fragility and underdevelopment are linked with access deficits. Nearly all of the top 20 access-deficit countries were fragile and conflict-affected or least-developed—or both. Special attention to these countries is essential through prioritized investments and improvements in policy and regulatory frameworks to scale up electricity access toward the SDG 7 targets.

Figure 1.17 • Electricity access in the top 20 access-deficit countries, 2010–20

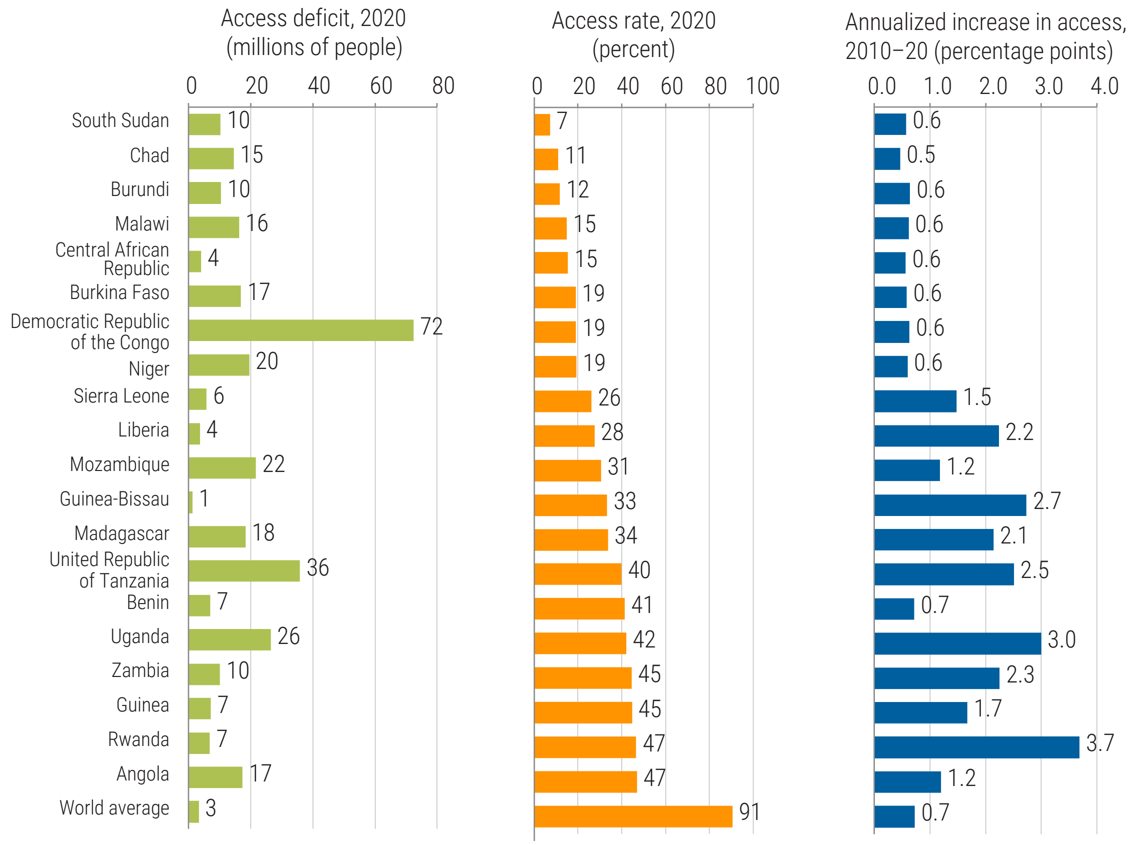


Source: World Bank 2022.

As of 2020, all of the top 20 least-electrified countries, which together account for 45 percent of the global access deficit, were in Sub-Saharan Africa (figure 1.18). In 2020, South Sudan had the lowest access rate (7 percent), followed by Chad (11 percent) and Burundi (12 percent). Between 2010 and 2020, the annual increase in the access rate in 12 of the top 20 was 1 percentage point or less. During the period, Rwanda and Uganda made significant progress, however, increasing electrification by 3.7 and 3 percentage points a year, respectively. Between 2018 and 2020, Rwanda showed the most rapid advance in access, with an annual average gain of 5 percentage points, whereas access in Guinea, Madagascar, Malawi, and Mozambique showed negative growth.

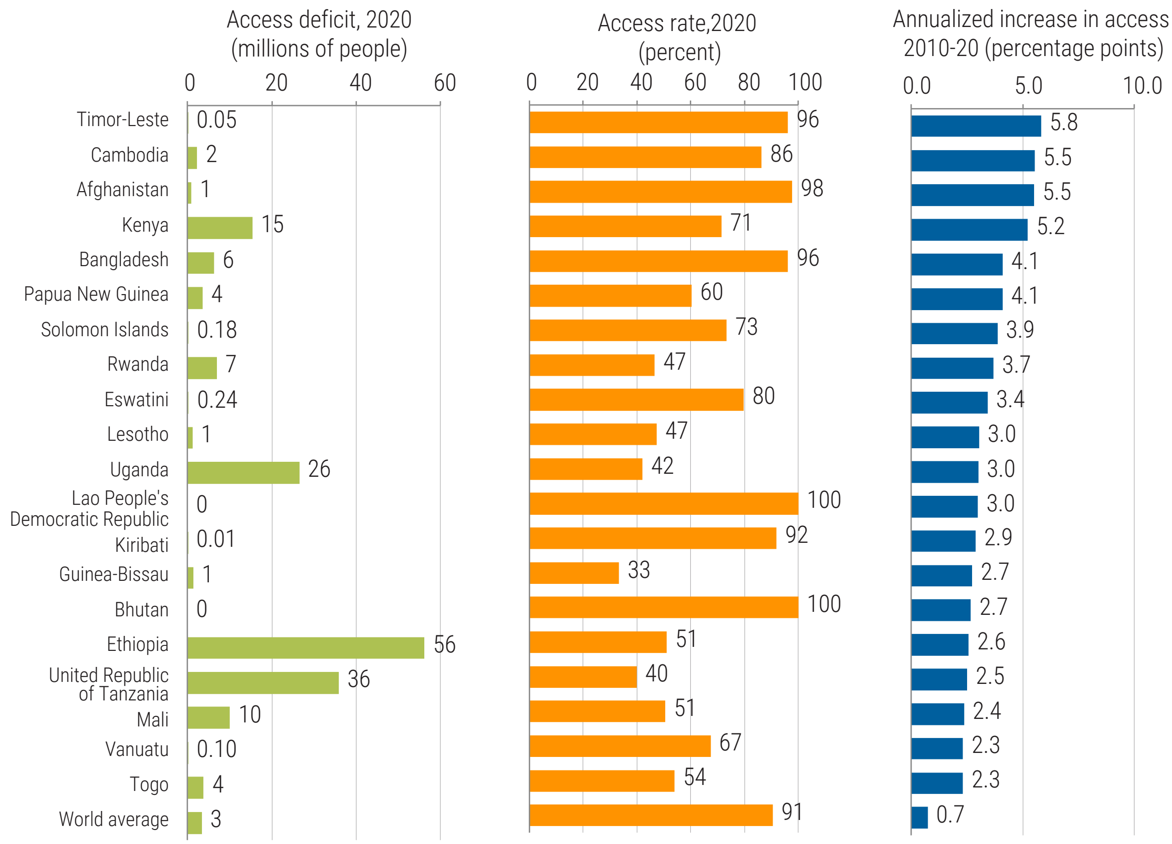
The pace of electrification was highest in Timor-Leste, Cambodia, Afghanistan, and Kenya, where access increased by more than 5 percentage points a year between 2010 and 2020 (figure 1.19). Timor-Leste, Kenya, and Rwanda stood out as the fastest-moving countries in 2018–20, increasing access by more than about 5 percentage points a year on average. In Rwanda, both grid and off-grid efforts have intensified.

Figure 1.18 • Electricity access in the 20 least-electrified countries, 2010–20



Source: World Bank 2022.

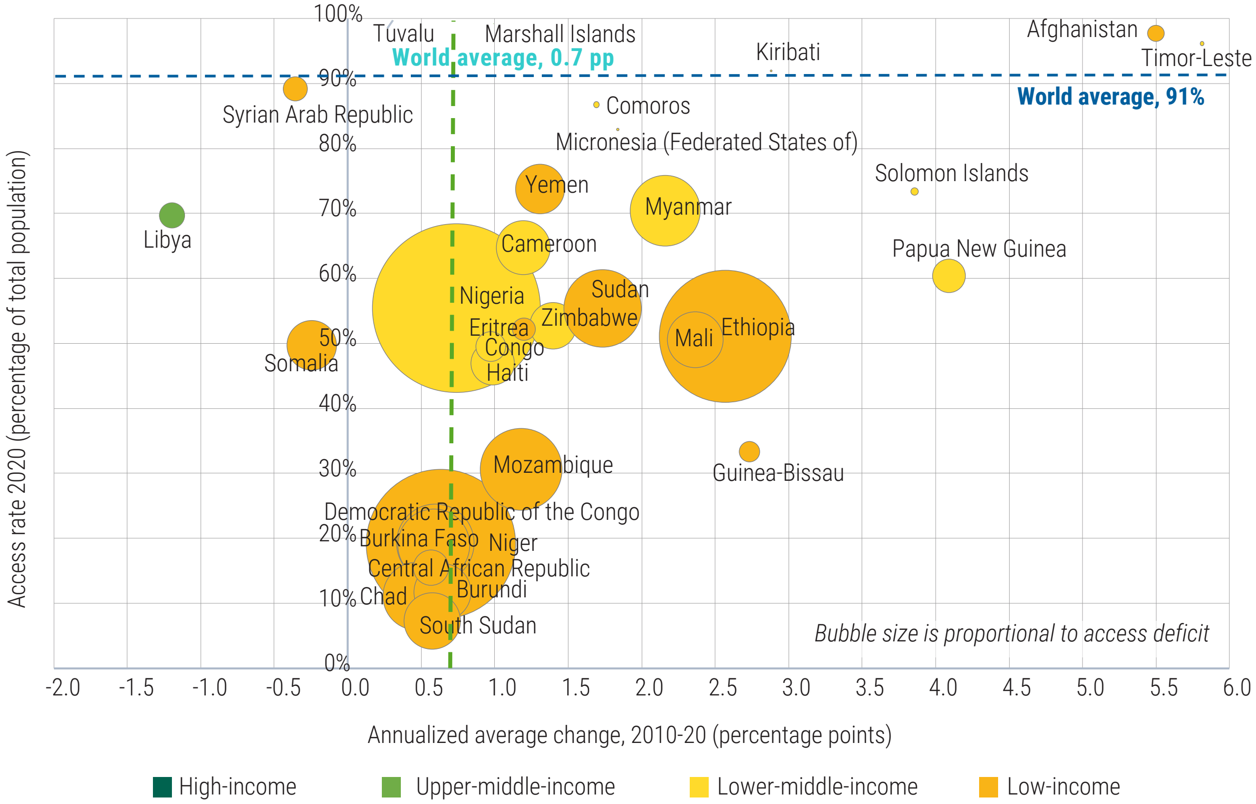
Figure 1.19 • Electricity access in the 20 fastest-electrifying countries, 2010–20



Source: World Bank 2022.

Among countries experiencing fragility, conflict, and violence, Libya, Somalia, and the Syrian Arab Republic saw declines in electrification between 2010 and 2020 (figure 1.20). Meanwhile, the access rate in Timor-Leste and Afghanistan advanced rapidly during the decade, with annual growth of more than 5 percentage points. Through the significant investment in improving the electricity infrastructures, Timor-Leste continues to show fast improvement in electrification, chalking up annual access growth of more than 5 percentage points in 2018–20. Creating an enabling environment adapted to complex situations is critical to improving electricity access in fragile countries.

Figure 1.20 • Share of population with access to electricity in 2020 and average annual growth rate of access in fragile and conflict-affected countries between 2010 and 2020



Source: World Bank 2022.

POLICY INSIGHTS

Strong political commitments, better-targeted policies, disruptive technologies 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 towards net-zero energy systems.

A paradigm shift on how policy and investments are directed is needed if the world is to meet the target. The UN High-Level Dialogue on Energy (box 1.1) has issued recommendations to make universal access to electricity a political, economic, and environmental priority, aligned with an inclusive COVID-19 recovery (UN n.d.).

Box 1.1 • Accelerating the transition to universal access to modern energy services through the High-Level Dialogue on Energy

The UN Secretary-General convened the High-Level Dialogue on Energy in September 2021. The goal of the first leader-level meeting on energy held under the auspices of the UN General Assembly in 40 years was to promote accelerated implementation of SDG 7 and the other targets of the 2030 Agenda for Sustainable Development, as well as the climate objectives of the Paris Agreement. The far-reaching preparatory process included stakeholders representing the public and private sectors, civil society, international organizations, and governments.

The Dialogue had five themes: energy access; the energy transition; enabling the SDGs through an inclusive, just energy transition; innovation, technology, and data; and finance and investment. Thematic technical working groups prepared reports and presented recommendations at a ministerial forum. These recommendations were summarized in a "Global Roadmap for Accelerated SDG 7 Action in Support of the 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change" (UN n.d.).

The World Bank's Energy Sector Management Assistance Program co-led Technical Working Group 1 on energy access. Its report (UN 2021) included recommendations on how to achieve universal access to electricity and clean cooking by 2030, along with intermediate targets. Implementing these recommendations will require accelerated and sustained progress in four areas:

- Reinforcing enabling policy and regulatory frameworks
- Enhancing the social and economic inclusiveness of energy access
- Aligning the costs, reliability, quality, and affordability of energy services
- Catalyzing, harnessing, and redirecting energy-access financing as needed to deliver universal energy access by 2030.

Another outcome of the Dialogue was the formation of more than 200 energy compacts—voluntary commitments from stakeholders to undertake specific actions, with targets and timelines to further enhance progress on SDG 7. The World Bank developed an energy access compact to assist client countries in achieving SDG 7 targets by 2030 as an integral part of a just energy transition. The compact supports actions to provide 50–60 million people with new or improved access to electricity and 20–100 million people with access to clean cooking by 2025 (IISD 2021).

First, the achievement of the SDG 7.1 target should be an integral part of the just energy transition and therefore embedded in countries' socioeconomic development and climate commitments. Reaching universal access to electricity is essential to achieving net-zero emissions in a just and inclusive way and should be tailored to meet low-income countries' needs. In a context of "building back better," access to electricity must be positioned as an enabler for more inclusive, sustainable and resilient growth, exploiting synergies with other SDGs.

Second, to maximize socioeconomic impacts, political commitments and financing with respect to access to electricity should be coordinated with those on access to clean cooking.

Third, communities—their needs and aspirations for energy for households, farms, enterprises, and public facilities—should be at the center of efforts to deliver universal access. Decision-makers should view communities as co-creators of energy systems that meet their needs and align with their practices, affordability, and cultural contexts.

Fourth, the most remote, vulnerable and poorest unserved populations, often described as the last mile to be connected, should be given special attention to ensure no one is left behind. Those population segments include women and girls; communities experiencing fragility, conflict, and displacement; and people living in LDCs. Agendas for gender equality must include empowering women in the design, production and distribution of modern energy services.

Fifth, the role played by the private sector is critical to provide creative, cost-effective, and scalable solutions. Context-sensitive and innovative business models can help create sustainable approaches to connecting poor and rural communities. Public financing will still have a crucial role to play in bridging the affordability gap, funding an inclusive energy access ecosystem and infrastructure, and, where needed, leveraging private capital into the sector (IRENA and SELCO Foundation 2022). Investing in knowledge exchange, capacity building. and partnership building will drive further innovation to accelerate the pace of access expansion. Lastly, good-quality data are needed to inform more effective access interventions.

As noted in box 1.1, the Technical Working Group on Energy Access produced a report setting forth strategic priorities and recommendations to promote system-level approaches and focused investment to expand access to energy (UN 2021). Those priorities and recommendations are explored in the four subsections that follow.

REINFORCING POLICY AND REGULATORY FRAMEWORKS TO ENSURE UNIVERSAL ACCESS

Achieving universal access to sustainable, reliable, affordable and modern energy must be an integral part of the just energy transition. The goal of universal access should be embedded in countries' climate commitments and their strategies and actions for net-zero energy systems. All access-deficit countries should adopt comprehensive national electrification and clean cooking strategies and integrate energy access priorities within broader economic development and climate strategies, as well as their Nationally Determined Contributions under the 2015 Paris Agreement on climate change. The national strategies and accompanying plans should have specific targets and milestones, be kept up to date, be publicly available, and make good use of best practices. Plans should provide targets for tiers of access, specifically targeting the highest tiers, while ensuring that everyone gains access at least to basic and affordable energy access in the shortest possible time period.

Comprehensive national plans must be backed by dedicated policies and regulations for effective implementation and for ensuring inclusivity and permanence of supply. The policy needs vary depending on local contexts and the chosen electrification solution. Scaling up renewables-powered mini-grids, for instance, requires careful regulatory design to address key aspects of licensing, tariff setting, arrival of the main grid, and delivery of public financing support (IRENA and AfDB 2022). Stable fiscal incentives and robust quality standards have also played a crucial role in improving affordability for decentralized renewables and supporting market development.

More and better data are needed to design and implement sustainable electrification programs. Improving the availability and quality of open-source, verifiable energy data that are pertinent to national, subnational, and local contexts is critical. Policy makers and private companies need end-user and supply-side data to understand market dynamics; analyze the enabling environment for investments; produce effective, tailored projects; and track progress. Policy makers need data on the various dimensions of access (reliability, affordability, usage) to refine electrification strategies in ways that better meet people's needs. These data could be gathered by adding a module on energy to regular household surveys, following the Multi-Tier Framework approach (box 1.2).

Box 1.2 • Modifying household surveys to measure energy access more accurately

More granular household energy data can facilitate energy policy analysis and energy infrastructure planning. Because the data collected from national household surveys do not capture the dimensions needed to understand the role energy services play in poverty reduction, they do not allow for extensive policy analysis. Specialized, stand-alone energy surveys, meanwhile, do not have the breadth of topics and geographical scope of many national household surveys, such as surveys conducted by the World Bank's Living Standards Measurement Study.

Although the geographic coverage of energy access data has increased, most household surveys that collect and report information on energy access provide only very limited data, often reported as a binary metric. The simplistic questions in these surveys do not consider other dimensions of energy access, such as the use of multiple fuels and devices, varying levels of access and use, the quality and safety of the energy source, the affordability of consumer electricity service, and the importance of other household energy services (such as space heating and lighting).

To track these indicators and respond to the recommendations of the UN High-Level Dialogue on Energy for improved availability and quality of energy data, the World Health Organization and the World Bank's Energy Sector Management Assistance Program, in close collaboration with the Living Standards Measurement Study and other contributors, have developed core questions on household energy use and a guidebook for survey practitioners.

The household energy access questionnaire consists of a series of modules that can be incorporated into existing household surveys. The questions include those essential for measuring household access to electricity and clean cooking fuels, monitoring SDG indicators 7.1.1 and 7.1.2, and conducting detailed analysis of the limits of and barriers to access. An additional set of questions for fully assessing household energy use and its health impacts is also provided. As the questionnaire targets people in vulnerable regions, it includes a module on the status of energy access for displaced communities and refugees.

The following modules are included:

- Household electricity: Questions on the main source of electricity, appliances powered, hours of electricity available each day and each evening, and frequency and duration of unscheduled blackouts.
- Household cooking: Questions on the main cookstove used, the brand of the main stove, and the fuels used by the device.
- Household heating: Questions on the number of months the main heating device was used for heating, the main fuel used for heating the home, the brand of the heating device, and the main fuel used.
- Household lighting: Question on the main lighting sources.
- Household energy and gender: Recommended questions on the primary collector of fuel and the primary cook, the time spent collecting fuel, injuries sustained while collecting or transporting fuel, the time spent preparing the stove and fuel, and time spent cooking.

The guidebook provides practitioners with the tools and technical support they need to integrate the new energy access questions into existing national household surveys, including a manual for training enumerators and a photo guide containing visual and descriptive examples of cooking, heating, and lighting energy options. The guidebook and questionnaire can be downloaded using the QR code.

Source: World Bank and the World Health Organization 2021.

The use of geospatial and digital tools has yielded more accurate and real-time data and made the data more accessible in different geographies and at various levels of granularity. Better data on current and projected demand have facilitated the modeling of national electrification systems over time, informing decision-making processes. Technological advances such as system optimization, network design tools, and online platforms have reduced the cost of project preparation and planning, significantly increasing projects' effectiveness. Digital tools have brought innovations to new areas of action, such as community engagement. They have also enabled the creation of state-of-the art integrated energy plans at the national level that span electrification, clean cooking, and productive uses, including demand-side attributes like affordability and propensity to adopt. They have significantly improved the efficiency of mini-grid projects, saving both time and costs. They have been used to facilitate site prospecting, demand analysis, project packaging, solicitation of financing, procurement, and remote monitoring and verification (ESMAP 2022a). The tools are also strengthening cross-sectoral decision-making, fostering integrated planning between clean cooking and electrification and between energy and agriculture. The latter achievement makes it possible to identify opportunities to link electrification efforts with anchor loads such as existing and planned agro-processing infrastructure (IRENA and FAO 2022). Expanding the use and adoption of digital tools should be promoted for the benefit of both private developers and public sector players.

Technology has also allowed decision-makers and practitioners to share knowledge more easily and to build on what has worked and what has not. Accelerating the advancement of knowledge exchange, capacity building, and partnership building is essential to create more robust frameworks for policy and regulation. Investments in human development targeting policy makers, technicians, and local entrepreneurs, with a focus on women and youth, would increase the pace of innovation in technology, business models, financing, and policy, thereby helping to close the access gap.

ENHANCING THE SOCIOECONOMIC INCLUSIVENESS OF ENERGY ACCESS

Providing access to electricity does more than just connect people to power. It facilitates inclusive, sustainable, and resilient economic recovery and growth. Approaches that use targeted demand-side subsidies to support business models focusing on last-mile service and affordability help ensure that poor, remote, and vulnerable households (including displaced people and their host communities) share fully in the benefits of access. In addition to reaching the most vulnerable, inclusive planning for access to electricity also implies factoring in the achievement of other development outcomes under other SDGs through a cross-sectoral approach. Tailoring programs in this way increases their chances of success and improves people's access to public services (e.g., health care, education) and a wider range of possible livelihoods.

Productive uses of energy and rural business development are another area in which synergies with other sectors should be explored. Affordable and efficient appliances; access to finance for small businesses; and skills training, market linkages, and community engagement are all key elements in the design and implementation of robust mechanisms to support productive uses of electricity.[14]

The electrification of public institutions, which has received much attention in the context of the COVID-19 pandemic, illustrates the nexus between access and other sectors and the opportunity to maximize the socioeconomic benefits of access to electricity. Traditional business models for electrifying public institutions have not been made sustainable in most cases, however. To date, most projects for procuring solar PV assets have been grant based, with little attention to what happens after the systems are installed. Fortunately, growing attention is now being paid to service delivery, performance, and long-term operation and maintenance, all parts of a shift to a service-based model that opens new opportunities for the private sector (SEforAll 2021a).

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14 In Indonesia and Peru, for example, partnerships between energy providers (private developers, utilities) and nongovernmental organizations with deep knowledge of local socioeconomic contexts have increased the impact of rural electrification on jobs, income, and productivity (Finucane, Besnard, and Golumbeanu 2021).

Inclusiveness also implies prioritizing support for populations living under conditions of fragility, conflict, and violence. About 594 million people live in such countries and in the world's least-developed countries. Reducing energy poverty in these settings will depend on finding approaches that match the country context while also including the poor explicitly in national access plans, implementing dedicated access programs, improving enabling environments (e.g., for the development of renewables-based mini-grids), and scaling up both public and private financing. Supporting innovation and encouraging exchanges of knowledge derived from successful business models can contribute, as well.

More than 90 percent of refugees living in camps and settlements lack sustainable, reliable, and affordable access to energy, affecting their safety, security, well-being, and health. Poor access also limits opportunities for socialization, learning, and self-reliance (UNHCR 2022). Integrated, inclusive approaches to overcoming the challenges faced by such refugees and their host communities are sorely needed. Such approaches must ensure that energy infrastructure plans, policies, and regulatory frameworks aimed at refugees and host communities are well integrated with overall energy sector development.

Women and girls are disproportionally affected by the lack of access. Thus, there is a pressing need to enhance gender equality in energy-access interventions. Sharing global knowledge on ways to accomplish that goal is critical, because reducing gender gaps reduces poverty. Data that quantify gender inequities in diverse contexts must be collected and shared.[15] Women's groups and groups working to close gender gaps in the sector should be included as key stakeholders in planning and policy making. Similarly, women should be equally represented in decision-making bodies in energy institutions. Policy makers should encourage women's participation as primary agents of change in households and communities. Adequate resources should be allocated to monitoring and evaluating gender-related programs.

ALIGNING THE COSTS, RELIABILITY, QUALITY, AND AFFORDABILITY OF ENERGY SERVICES

Access to electricity does not mean simply getting a connection; it means having a reliable, sufficient ,and affordable source of power. Improving the reliability of grid services implies strengthening generation capacity and transmission and distribution systems; reducing losses; and improving utilities' overall performance.

Under certain circumstances, fostering private sector participation through public-private partnerships and encouraging companies to adopt innovative and scalable business models and technologies can help improve the quality of service, reach last-mile end users, and reduce costs. A prime example is that households remain underserved by electric utilities in most parts of Sub-Saharan Africa, where the largest access deficits are found. Therefore, more comprehensive measures are required to incentivize utilities to improve their technical and financial performance by adopting customer-centric approaches, entering into innovative partnerships, engaging the private sector, and stimulating demand for appliances and productive uses of electricity.

Modern mini-grids are another good example. ESMAP's research on mini-grids—including a detailed analysis of mini-grid costs from more than 400 individual projects in Africa and Asia and a database of more than 40,000 installed and planned mini-grids around the world—has identified five key drivers of better electricity service at lower cost (ESMAP 2022a). These drivers are as follows:

- Private sector companies develop portfolios of mini-grids instead of one-off projects, thus increasing economies of scale and the pace of deployment.
- Mini-grid developers engage with customers and communities to promote income-generating uses of electricity while increasing the up-time of their mini-grids to close to 100 percent.[16]

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15 At a minimum, data on gender gaps in access to electricity by male- and female-headed households and by male- and female-owned businesses should be collected.

16 According to 2022 benchmarking study by the Africa Mini-grid Developers Association, out of 35 mini-grid sites surveyed for the study only two reported service up time of less than 99 percent.

- Countries work to ensure the underlying conditions for private sector mini-grid development at scale, including support for public-private partnerships, light-handed yet well-codified regulations, and initiatives that cut bureaucratic red tape.
- Investors and development partners collaborate to find new ways to assemble financing for private mini-grid developers, consisting of results-based grants, private equity, affordable debt, and de-risking mechanisms.
- Leading mini-grid developers drive down their own costs by leveraging cost reductions in key components such as solar PV and batteries, deploy new strategies such as remote monitoring to reduce operating expenses, and innovate their supply chains to more easily mount projects in hard-to-reach locations.

Building the ecosystem to expand digitally enabled business models such as pay-as-you-go through close coordination with digital players and financiers has also been identified as a way to bring costs, quality, and affordability into closer alignment. In addition, service delivery and sustainability can be improved by incentivizing energy providers—especially utilities. Engaging women as entrepreneurs and employees in the energy access sector (within energy access companies and across value chains) is another way to contribute to reliable last-mile energy access.

Raising the quality of off-grid solutions through the adoption of international standards in local markets will ensure market sustainability. Quality-assurance activities include the adoption and implementation of international quality standards for off-grid products as well as for energy-efficient appliances.

CATALYZING, HARNESSING, AND REDIRECTING FINANCING FOR ENERGY ACCESS

To meet the energy access target, financing must increase to USD 35 billion annually on generation, electricity networks, and decentralized solutions by 2030, with priority given to public and private investments in the LDCs and countries experiencing fragility, conflict, and violence (IEA 2021). Moreover, disbursements must catch up with commitments. The share of public and private financing going to distributed renewable technologies (mini-grid and off-grid solar) is presently less than 1 percent of the total 2019 financing commitments in the electricity sectors of high-impact countries. That share should increase in alignment with the distributed renewable shares identified in national or regional least-cost electrification plans (SEforAll 2021b). The transition to clean energy will also require additional investments in green connections, both existing and future.

Comprehensive and gender-responsive financial packages consist of equity, debt, grants, and de-risking mechanisms. Such packages should first cover the public financing needs of all stakeholders in the energy access ecosystem using a variety of designs. Secondly, they should deploy proven delivery mechanisms such as results-based financing. Lastly, the packages should support more innovative instruments, such as new guarantees and credit-management instruments focused on risk mitigation, to leverage private-sector investments.

Scaling up digitally enabled consumer financing schemes (such as pay-as-you-go or on-bill financing) and mobilizing public funding through social security systems or the impact bond market are critical for reaching the poorest end users and making electricity services affordable. Public funding through results-based financing and tax exemptions is also needed to test innovative business models and support growth in nascent and riskier markets.

Innovative financing solutions can be devised for women, who face special barriers both as consumers and entrepreneurs in the energy sector. Such solutions include integrating gender criteria across funding windows, linking gender quotas to program incentives, teaching business skills, and focusing on technologies that create job opportunities for women or target their productive uses of energy.

End-user subsidies (such as direct cash transfers or results-based financing schemes for very-low-income households) have emerged to complement supply-side support in bridging the affordability gap (GOGLA 2021b and SEforAll 2022). These enable service providers to reduce product costs for the targeted segments (or mandate that they do so). Such subsidies are complex, however, and risk distorting markets. Policy makers should therefore consider them carefully within the broader range of energy access dynamics and financing mechanisms so that they can be adequately designed and implemented.

In summary, the World Bank has identified six principles to maximize the chance of success of public funding schemes[17] (ESMAP 2022b):

- Target resources to the people most in need.
- Support good-quality products.
- Provide support commensurate with need for closing the financing and affordability gaps.
- Provide funding in an efficient and timely manner.
- Effectively verify program results.
- Promote sustainable results.

17 These principles are from the report analyzing funding for off-grid solar, but they can be applied beyond it.

METHODOLOGY

THE WORLD BANK'S GLOBAL ELECTRIFICATION DATABASE

The World Bank's Global Electrification Database compiles nationally representative household survey data and census data for the years between 1990 and 2020. It also incorporates data from the Socio-Economic Database for Latin America and the Caribbean, the Middle East and North Africa Poverty Database, and the Europe and Central Asia Poverty Database, all of which are based on similar surveys. At the time of this analysis, the Global Electrification Database contained 1,270 surveys from 140 countries, excluding surveys from developed countries (as classified by the United Nations). Since 2010, 21 percent of countries have published or updated their electricity data at intervals of two to three years in time for global data collection. Greater investment in data collection and capacity building is needed to permit a more comprehensive and accurate understanding of the electricity access picture.

ESTIMATING MISSING VALUES

Surveys are typically published every two to three years, but they can be irregular and infrequent in many regions. A multilevel, nonparametric modeling approach developed by the WHO to estimate clean fuel usage was adapted to project electricity access and then applied to fill in missing data points between 1990 and 2020 (Bonjour et al. 2013).[18] Where data are available, access estimates are weighted by population. Multilevel, nonparametric modeling takes into account the hierarchical structure of data (country and regional levels), using the regional classification of the United Nations.

The model is applied in all countries with at least one data point. In order to use as much real data as possible, results based on survey data are reported in their original form for all years available. The statistical model is used to fill in data only for years in which data are missing and to conduct global and regional analyses. In the absence of survey data for a given year, information from regional trends is used. The difference between real data points and estimated values is clearly identified in the database. Countries considered "developed" by the United Nations and classified as high-income are assumed to have electrification rates of 100 percent from the first year the country joined the category.

For 1990–2010, the statistical model is generally based on insufficient data points or outdated household surveys. To avoid having electrification trends in this period overshadow efforts since 2010, the model was run twice, once with survey data assumptions for 1990–2020 (for model estimates for 1990–2020) and once with survey data and assumptions for 2010–20 (for model estimates for 2010–20). The first run extrapolates electrification trends for 1990–2020 given the available data points. The second considers only real data collected from 2010 and estimates the historical evolution in the most recent years. The outputs from the two model runs are then combined to generate a final value for access to electricity. If survey data are available, the original observation remains in the final database. Otherwise, taking account of a positive linear trend in electrification, the larger of the values generated by the model runs is chosen as the final data point.

18 The model draws from the modeling of solid fuel use for household cooking presented in Bonjour and others (2013).

MEASURING ACCESS TO ELECTRICITY THROUGH OFF-GRID SOURCES

Data coverage

IRENA collects global data on off-grid renewable energy in Africa, Asia, South America, Central America and the Caribbean, and Oceania. Its database covers off-grid renewable power capacity (in megawatts), biogas production (in cubic meters), and energy access (number of inhabitants):

- Off-grid power covers hydropower, solar lights, solar home systems (small and large), solar mini-grids, solar pumps, other solar panels, and biogas and other biomass.
- Biogas production includes cooking, electricity generation, industrial uses, the commercial and public sectors, and agriculture.
- Energy access is estimated for (i) people with access to hydropower, solar lights, solar home systems (small and large), solar mini-grids (Tiers 1 and 2), and biogas; and (ii) people with access to biogas for cooking.

Data sources and dissemination

IRENA collects off-grid capacity and generation data from a variety of sources. These include IRENA questionnaires; national and international databases; and unofficial sources, such as project reports, news articles, academic studies, and websites. For some countries, IRENA also estimates off-grid solar PV capacity, based on solar panel import statistics obtained from the United Nations' COMTRADE Database.

IRENA publishes off-grid statistics by the end of December each year. IRENA provides details on the methodology used in this report (IRENA 2018).

CALCULATING THE ANNUAL CHANGE IN ACCESS

The annual change in access is calculated as the difference between the access rate in year 2 and the rate in year 1, divided by the number of years. For the annual change in the number of people with access, UN population data are used to reflect population growth.

(Access Rate Year 2 – Access Rate Year 1) / (Year 2 – Year 1)

COMPARING THE ELECTRIFICATION DATA METHODS OF THE WORLD BANK AND THE INTERNATIONAL ENERGY AGENCY

The World Bank and the International Energy Agency (IEA) maintain separate databases of global electricity access rates. The World Bank's Global Electrification Database derives estimates from a suite of standardized household surveys and censuses that are conducted in most countries every two to three years, in conjunction with a multilevel, nonparametric model to extrapolate data for the missing years. The IEA Energy Access Database sources data from government reports of household electrification (usually based on connections reported by utilities). IEA considers a household to have access if it receives enough electricity to power a basic bundle of energy services. The World Bank uses the Multi-Tier Framework, which classifies access along a tiered spectrum, from Tier 0 (no access) to Tier 5 (highest level of access).

The two approaches sometimes yield different estimates. Access levels based on household surveys are moderately higher than those based on energy sector data, because they capture a wider range of phenomena, including off-grid access, "informality" (connections not made by or known to the utility), and self-supply systems.

The comparison of the two datasets in the previous edition of this report (updated in this edition) highlights their respective strengths. Household surveys, typically conducted by national statistical agencies, offer two distinct advantages for measuring electrification. First, thanks to efforts to harmonize questionnaire designs, electrification questions are largely standardized across country surveys. Although not all surveys reveal detailed information on the forms of access, questionnaire designs capture emerging phenomena, such as off-grid solar access. Second, data from surveys convey user-centric perspectives on electrification. Survey data capture all forms of electricity access, painting a more complete picture of access than may be possible from data supplied by service providers.

Government data on electrification reported by national ministries of energy are supply-side data on utility connections. Such data offer two principal advantages over national surveys. First, administrative data are often available on an annual basis and may therefore be more up to date than surveys, which are conducted every two to three years. Second, administrative data are not subject to the challenges that can arise when conducting field surveys. Household surveys (particularly those implemented in remote and rural areas) may suffer from sampling errors that may lead to underestimation of the access deficit.

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