CHAPTER 7
TRACKING PROGRESS TOWARD SDG 7 ACROSS TARGETS: INDICATORS AND DATA

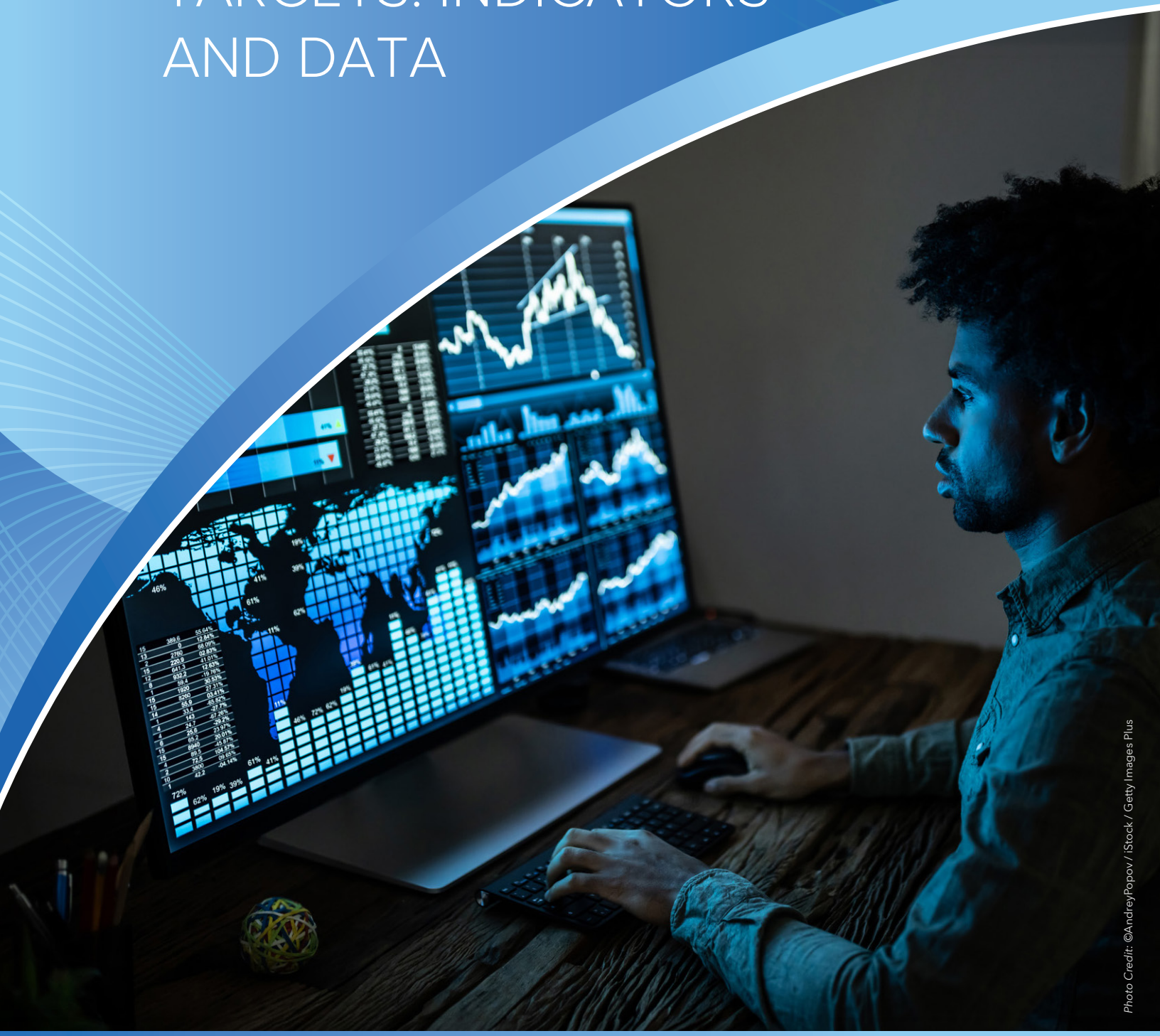

Photo Credit: ©AndreyPopov / iStock / Getty Images Plus

Drawing on national data efforts worldwide, this annual report is a joint effort of the five custodian agencies responsible for monitoring progress toward the targets of Sustainable Development Goal (SDG) 7—universal access to affordable, reliable, sustainable, and modern energy by 2030 (table 7.1). The World Bank and World Health Organization (WHO) are responsible for tracking progress toward SDG target 7.1 (universal access to modern energy services). The International Energy Agency (IEA), International Renewable Energy Agency (IRENA), and United Nations Statistics Division (UNSD) are responsible for tracking SDG target 7.2 (the share of renewable energy in the energy mix). The IEA and UNSD are responsible for tracking SDG target 7.3 (improvements in energy efficiency). IRENA is also responsible for tracking target 7.a (international cooperation)—with the Organisation for Economic Co-operation and Development (OECD)—and target 7.b (promotion of energy infrastructure). The World Bank's Energy Sector Management Assistance Program (ESMAP) produces and publishes the report.

This chapter summarizes the data behind each indicator as well as the methodological challenges of converting the data into indicators. Further details can be found in the United Nations' metadata repository for SDG indicators.[41]

TABLE 7.1 • SDG 7 TARGETS, INDICATORS, AND CUSTODIAN AGENCIES

Target	Indicator	Custodian agency or agencies	Relevant chapter in this report
7.1—By 2030, ensure universal access to affordable, reliable, and modern energy services	7.1.1—Proportion of population with access to electricity	World Bank	Chapter 1
	7.1.2—Proportion of population with primary reliance on clean fuels and technology for cooking	World Health Organization	Chapter 2
7.2—By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1—Renewable energy share in total final energy consumption	International Energy Agency, International Renewable Energy Agency, UN Statistics Division	Chapter 3
7.b—By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular, least-developed countries, small island developing states, and landlocked developing countries, in accordance with their respective programs of support	7.b.1—Installed [renewables-based] generating capacity in developing and developed countries (in watts per capita)	International Renewable Energy Agency	
7.3—By 2030, double the global rate of improvement in energy efficiency	7.3.1—Energy intensity measured in terms of primary energy and GDP	International Energy Agency, UN Statistics Division	Chapter 4
7.a—By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency, and advanced and cleaner fossil fuel technology, and promote investment in energy infrastructure and clean energy technology	7.a.1—International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems	International Renewable Energy Agency, Organisation for Economic Co-operation and Development	Chapter 5

Note: GDP = gross domestic product.

41 https://unstats.un.org/sdgs/metadata/.

Access to electricity

Measuring access to electricity (SDG indicator 7.1.1) is not as straightforward as simply counting the number of people with electricity. It is a complex process involving data collection and validation efforts carried out by national and international actors, including governments, energy utilities, private companies, and multilateral development organizations. Understanding the intricacies of electricity access in low-income countries and countries marked by fragility, conflict, or violence requires a comprehensive look at the multiple attributes of access in different settings.

While most microdata from household, enterprise, and agricultural surveys provide useful information to energy practitioners and ministries, they fail to capture the more nuanced aspects of electricity access in households—for example, the economic activities of a household's individual members. Further complexities arise when trying to account for the scale-up of decentralized energy solutions that are not typically distinguished in routine national surveys and energy statistics.

Because the concept of electricity access does not lend itself to easy definition, efforts are underway, using the World Bank's Multi-Tier Framework (MTF), to better capture the spectrum of energy services sought and used by households, enterprises, communities, and institutions. The spectrum spans capacity, availability, reliability, affordability, quality, formality, and safety.[42] The information collected paints a precise and detailed picture of the number of people benefiting from interventions and the nature and magnitude of improvements in electrification. Such information is critical for policy and decision-making.

Capacity-building activities, such as the training of energy statisticians through bilateral and regional programs, will improve the tracking of electricity access by building the skills needed for effective data collection and analysis. High-quality, user-friendly, and comparable data sets will, in turn, help governments and energy practitioners apply new technologies and data analytics to inform policy and its implementation. Resources like the World Bank's online Atlas of Sustainable Development Goals (World Bank 2026), which features interactive storytelling and graphical representations of electricity access trends, demonstrate how accessible data can sharpen insights relevant to key SDG indicators. Similarly, large-scale, open databases that provide real-time information based on satellite data can clarify where and how electricity is being used, while also revealing socioeconomic trends in energy consumption.

Improving data quality and granularity are critical. In 2021, ESMAP collaborated with WHO and the Living Standard Measurement Study (LSMS, the World Bank's flagship household survey program) to publish the Core Questions on Household Energy Use (WHO n.d.), which offered detailed guidelines for fieldwork and data tabulation.[43] These standardized modules are being integrated into national surveys so as to supply timely and actionable insights in support of universal access, rather than merely serving as retrospective assessments. The World Bank has also partnered with national statistical offices to deepen their understanding of energy indicators and improve survey methodologies.

Since its introduction in 2015, ESMAP's MTF survey has been implemented across 27 countries through 29 nationally representative surveys, establishing a globally comparable evidence base on electricity access (Angelou and others 2026). Findings consistently highlight persistent access gaps, where proximity to the grid or decentralized networks does not translate into meaningful service. MTF metrics are now widely used by governments and development partners for target-setting and progress monitoring. Building on this foundation, ESMAP is applying both the MTF and the LSMS to craft new measurement approaches aligned with Mission 300 (Angelou and others) that leverage innovations in remote monitoring, geospatial analysis, and AI-enabled tools. This evolution will make the measurement of electricity access more accurate, less reliant on recall, and better able to capture how service varies across locations and over time.

---

42 Information on the MTF can be found at https://mtfenergyaccess.esmap.org/.

43 Living Standard Measurement Study (LSMS), https://www.worldbank.org/en/programs/lsms; Core Questions on Household Energy Use, https://www.who.int/tools/core-questions-for-household-energy-use (World Bank and WHO 2021).

Access to clean cooking fuels and technologies for cooking

SDG indicator 7.1.2 measures the number of people using clean fuels and technologies as their primary energy source for household cooking. Households considered to have access to clean cooking are those that primarily rely on electricity, biogas, solar, alcohol fuels, natural gas, and liquefied petroleum gas for household cooking purposes.[44]

At the moment, most energy-related data collected by national household surveys do not capture everything needed to understand the role of household energy services in mitigating poverty and other impacts; hence, they do not permit extensive energy policy analysis. Including questions on cooking time, fuel collection, and health implications would make clean cooking estimates more granular and aid in the formulation of better national and global policies (World Bank and WHO 2021). Improving the collection of data on the parallel use of multiple cooking solutions (also known as "stove stacking") in low- and middle-income countries would allow a more complete picture of the population exposed to pollution and resultant diseases. Presently, however, such data are too limited in geographic coverage to be used in global tracking efforts.

As with access to electricity, household surveys and censuses are the primary data sources for global estimates. Knowing the extent to which household surveys capture modes and duration of use is vital for designing, implementing, and monitoring the effectiveness and outcomes of clean cooking policies and programs. By refining household surveys and censuses, countries can gain a more complete picture of household energy use; access to clean cooking fuels and technologies; and the effects of cooking practices on air pollution, gender, climate, and other impacts. WHO and the World Bank developed the Measuring Energy Access guidebook and the set of core questions on household energy referenced in the previous section for use as part of the WHO Clean Household Energy Solutions Toolkit.[45] The questions improve upon previous surveys by not only establishing whether a household has electricity access and what its primary cooking fuel is, but also by assessing the type of electricity access; the quality of access; impediments to access; the types of fuels and devices used for cooking, heating, and lighting; and important safety and livelihood impacts of household energy use.

Renewable energy

Progress toward SDG target 7.2—substantially increasing the share of renewable energy in the global energy mix—is tracked using renewable energy's share of total final energy consumption as the key indicator. Here, too, accurate tracking requires comprehensive data across all energy sources (renewable and nonrenewable) and across supply, transformation, and final consumption. The methodology used to derive total final energy consumption, total energy supply, and energy balances is detailed in United Nations (2024). The aggregates are calculated from basic energy statistics compiled by the IEA and UNSD, primarily through questionnaires from national administrations containing thousands of data points per country per year.

To increase the accuracy of tracking renewables, two measurement challenges must be met: (1) monitoring the rapid development of geographically distributed energy sources, such as off-grid and micro-grid solar photovoltaic and wind; and (2) enhancing countries' capacity to measure traditional uses of biomass (solid biofuels) by households. Biomass is the largest source of renewable (if not clean) energy in low- and middle-income countries.

---

44 Here, "clean" refers to the combinations of fuels and technologies that meet the emissions targets set out in the WHO guidelines for indoor air quality and household fuel combustion (WHO 2014).

45 https://www.who.int/tools/clean-household-energy-solutions-toolkit.

Looking ahead, another measurement challenge looms large with the increasing development of synthetic and hydrogen-based fuels, the renewability of which may be hard to ascertain depending on the mix of energy sources used to produce them. It is also a methodological challenge, since harmonized criteria have not yet been developed to determine the renewable portion of such fuels in individual cases.

National-level household and industry surveys could do more to make renewable energy statistics more reliable. For example, a broader range of questions on biomass use in households and organizations could help determine to what extent it can be considered a sustainable energy source. Traditional fuelwood harvesting is associated with deforestation and habitat loss, yet fuelwood is still assumed to be a renewable energy source for lack of an agreed definition of sustainable harvesting and accurate measures of fuelwood harvests. Survey-based data could help better quantify the "renewable" fraction of biomass use and perhaps prompt significant revisions of earlier estimates. Remote sensing could also help measure fuelwood harvesting, but the resulting data would need to be carefully calibrated against well-run household surveys.

In this context, the IEA's Designing an Energy Statistics Roadmap (IEA 2024) offers a structured framework for national institutions to assess existing energy information systems and plan their development, thus helping to strengthen data collection, integration, and dissemination.

Energy efficiency

Energy intensity, defined as the ratio of total energy supply (TES) to economic output, is used to track progress toward SDG target 7.3—doubling the global rate of improvement in energy efficiency (UN 2018).[46] Measuring the total energy supply requires credible information on, among other things, primary energy production across all sources, as well as trade in all energy products. TES is calculated from basic energy statistics compiled by the IEA and UNSD, primarily through questionnaires from national administrations. This information includes commercially traded energy sources and is of fairly good quality in most countries. [47]

To improve the granularity of energy intensity tracking, it is important to analyze the drivers of demand across sectors, such as industry, transport, and buildings (both residential and commercial/industrial). Collecting demand-side data is much more complex, time consuming, and expensive than collecting supply-side data, because end users are diverse. Consumer surveys can complement data-collection efforts when energy suppliers have limited or no information on how much energy is consumed by different types of users.

Analyzing energy efficiency within sectors requires countries to monitor energy intensities at the end-use level. Efficiency indicators might include energy expended per passenger-kilometer by vehicle type for passenger transport and by tonne-kilometer for freight transport; energy for space heating and cooling by unit of area for buildings; and, for industry, energy used in the physical production of each unit of a particular good. More details on a methodological framework for energy efficiency indicators, as well as country experiences, can be found in IEA's Energy Efficiency Indicators: Fundamentals on Statistics (2014).

Besides finer disaggregation of data, better energy efficiency indicators will depend on greater cross-organizational coordination in activities beyond the energy sector, drawing on building records, vehicle registration, and industrial reports, among other things. Many countries have already begun to collect end-use data and to compile energy efficiency indicators to support their policy making and planning.[48]

---

46 In UN 2018, this indicator is called "Overall productivity," as taken from the 2005 publication Energy Indicators for Sustainable Development: Guidelines and Methodologies (IAEA and others 2005). Productivity puts the focus on the economic output, whereas intensity brings the energy aspect into focus.

47 Data collected by various agencies in response to legislation or regulation (not necessarily for statistical purposes) may be used to compile energy statistics after verifying their quality and addressing limitations related to their purpose.

48 An example, besides the IEA energy efficiency indicators themselves (IEA 2014), is the Odyssée database for Europe (https://www.indicators.odyssee-mure.eu/).

International financial flows to developing countries in support of clean and renewable energy

Indicator 7.a.1 measures international public financial flows to developing countries in support of clean energy research and development, as well as renewable energy production (including in hybrid systems). The measurement utilizes data from IRENA and the OECD.

Good measurement of international public investment flows has four components: (1) tracking financial flows; (2) standardizing commitment details; (3) centralizing data collection; and (4) presenting flows in a consistent way.

Tracking public financial flows requires an understanding of how recipients intend to spend aid and other investments for end-use projects and programs. Recipients are defined as end-use organizations and projects run by public investors. The amount of private finance leveraged through public funds, which the OECD already monitors in its data on mobilization of private finance, adds valuable supplementary information to analyses of public flows. International financial flows are typically disbursed in multiple phases and through multiple stakeholders (local governments, ventures, or funds). Some commitments may also be canceled or modified after data have been gathered. Thus, where reporting institutions revise financial investment figures, historical investment information covering multiple years should be considered to reveal changes in amounts.

Commitment details can and should be standardized by sharing best practices among public investors and donors, refining reporting directives, and encouraging public investors and donors. At present, energy-related details are often excluded while collecting investment data. The standardization process can make data more accurate and granular. For example, most data on public investments in clean energy and renewables continue to be collected in a decentralized manner, adversely affecting consistency. For comparability across public donors, data collection must be centralized, using online data-entry portals and questionnaires prefilled to the extent possible with data from other agencies. The Creditor Reporting System database of the OECD's Development Assistance Committee is exemplary in this regard—and also allows self-reporting by donors.

Exchange rates and inflation must be taken into account when comparing international commitments across countries. The OECD methodology is used in this report to deflate international flows by adjusting for inflation from the year the flows occurred to a baseline year (2023) and by converting local currency values to US dollars using exchange rates from the baseline year.

Installed renewable electricity: Generating capacity in developing and developed countries

Indicator 7.b.1 tracks the installed capacity of power plants generating electricity from renewable sources (expressed in watts per capita). The 36 energy types disaggregated by IRENA as renewable fall into six broad categories: hydropower, marine energy (ocean, tidal, and wave), wind energy, solar energy (photovoltaic and thermal), bioenergy, and geothermal energy.

Capacity is defined as the year-end net maximum installed electrical capacity. Assessing a country's electricity production capacity is a valuable way to track progress toward target 7.b because it is an actual reflection of efforts. For many nations, the focus on increasing electricity production, especially from renewable sources, is a crucial step in their journey toward sustainable and modernized services.

Data on renewable energy capacity are collected in the course of IRENA's annual questionnaire cycle. Countries receive questionnaires at the beginning of each year and report renewable energy data for the previous two years. To minimize the reporting burden, the questionnaires for some countries are prefilled with data collected by other agencies (Eurostat, for example). The questionnaires are then sent to relevant national agencies so they can provide any additional details requested by IRENA. Validated data, by country, are published each year in late June in IRENA's Renewable Energy Statistics. Population data are extracted from the UN Population Division's annual World Population Prospects, which represent a country's population at midyear (July 1).

A measure of indicator 7.b.1 in watts per capita is computed by dividing a country's year-end renewable-electricity-generating capacity by its population in that year. Capacity data are drawn from this computation, and they account for the immense variations in needs between countries. Population data are used instead of gross domestic product, since population is the most basic indicator of the demand for modern and sustainable energy services in a country.

Importantly, the indicator's focus on electricity capacity does not capture trends in the modernization of technologies in important, energy-intense sectors such as heat production and transport. Overall, electricity accounts for only about a quarter of the energy used globally, and the share is even smaller in most developing countries. With electricity access continuing to increase, however, the focus on electricity capacity will grow in relevance.

Conclusion

Since the first effort back in 2013, improvements in reporting, advances in countries' statistical capacities, and enhanced models have raised the quality, reliability, and consistency of data on progress toward the SDG 7 targets. This progress should be seen as a reminder of the value of pursuing a common framework using standardized data collection and estimation methodologies. But such a common framework is possible only through cooperation among national statistical offices and other national agencies compiling energy information, and among those offices and relevant international bodies. International cooperation in the compilation of global databases will harmonize estimates across regions and countries and raise awareness of the need for good data.

As the custodian agencies work together to track SDG 7 at a global level, they have found ways to refine their collaboration and strengthen their support to countries. For example, the custodian agencies responsible for this report host webinars for statistical agencies and energy authorities; publish statistical guidance and reports on data collection; and regularly consult with national statistical offices and other national agencies on the estimates they provide. Continuing efforts by the World Bank, WHO, and other custodians to mainstream energy access questions into national household surveys are an important form of support to those offices. For example, the IEA and UNSD have a long history of working together to build national reporting capacity. The two agencies jointly organize workshops with the United Nations Framework Convention on Climate Change to help countries improve institutional coordination and compilation of energy balances.

Improving the accuracy of the SDG 7 indicators ultimately depends on collection of accurate national-level data. Building on recent improvements in data collection for the SDGs, national statistical capacities must continue to grow in strength. National and international institutions interested in policy success should increase resources for this purpose.

In closing, the custodian agencies would like to express their appreciation of the work and dedication of the many colleagues who collect national-level data around the world. Without their efforts, no precise estimates could be produced, and no tracking would be possible. Their work underpins the international efforts culminating in this report and ensures that the SDG 7 targets remain in full view.