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CHAPTER 5 INTERNATIONAL PUBLIC FINANCIAL FLOWS TO DEVELOPING COUNTRIES IN SUPPORT OF CLEAN ENERGY

Main messages

Global trends. Tracking of Sustainable Development Goal (SDG) indicator 7.a.1 reveals that international public financial flows in support of clean energy in developing countries rebounded in 2022. However, the rebound did not correct a declining five-year trend that may delay the achievement of SDG 7 by least-developed countries (LDCs), landlocked developing countries (LLDCs), and small island developing states (SIDS). While flows increased to USD 15.4 billion, a 25 percent increase over 2021, the level is still around half the 2016 peak of USD 28.5 billion. The global average for the five years ending in 2022 amounted to USD 14.1 billion, down by USD 1.5 billion from the five-year average ending in 2021.³¹

Target for 2030. There is no quantitative target for international public financial flows under indicator 7.a.1. However, the declining trend shows that the world is not on track to meet the goal of enhancing international cooperation to facilitate access to clean energy research and technologies for countries in need. Given the role of financing in delivering progress toward SDG 7 (as outlined in chapter 6), international public flows must increase substantially and target those countries most in need of financial aid.

Technology highlights. Almost half (47 percent) of financial commitments in 2022 flowed to renewable programs that are not technology specific. Donors increasingly bundle their support for a range of renewable energy solutions, such as electrification programs. The remaining flows are distributed between solar energy (35 percent), wind energy (11 percent), hydropower (7 percent), and geothermal energy (0.4 percent). These trends are likely to continue, since donors are increasing the number of their investments, while decreasing the project size (except in the case of hydropower and other multi-billion-dollar technologies).

Regional highlights. International public investment flows changed substantially in all developing regions except Sub-Saharan Africa between 2021 and 2022. Flows increased in six regions and decreased in two, but remained unevenly distributed across regions and the countries within them.³² Oceania enjoyed the largest relative increase: 662 percent (USD 85.9 million). Flows to Western Asia and Northern Africa followed, rising 135 percent (USD 990.5 million). Flows to Latin America and the Caribbean were up 114 percent (USD 1.994 billion), while those to Northern America and Europe climbed by 24 percent (USD 90 million). Flows to Sub-Saharan Africa, by contrast, showed only a modest 2.5 percent increase (USD 112.5 million). Flows to Central Asia and Southern Asia fell by 39 percent (USD 1.166.7 billion); those to Eastern Asia and South-eastern Asia dropped by 9 percent (USD 135.4 million). Meanwhile, commitments not directed to a specific region or country (e.g., regional bonds and funds, umbrella loans for multiple projects) climbed 193 percent (USD 1.076.7 billion).

31 Public investment flows fluctuate widely, with hundreds of commitments, including multi-billion-dollar ones, in some years and fewer and smaller commitments in others. For this reason, a five-year moving average provides a more meaningful analysis of the trend over time. Detailed datasets with country data for the SDG 7 indicator discussed in this chapter can be accessed at no charge at <https://trackingsdg7.esmap.org/downloads>.

32 The most recent increases are highlighted here. More detailed analysis of longer trends appears in the regional section of this chapter.

Commitment distribution highlights. International public financial flows remain concentrated in a few countries. In 2021, 80 percent of commitments were distributed among 19 countries, while 25 countries accounted for 80 percent of commitments in 2022, which is lower than the average for 2010-22. The number of countries receiving no commitments fell from 28 to 27 in 2022. Forty-three LDCs received some sort of financing in 2022, leaving only Guinea-Bissau and Burundi without inflows. Between 2010 and 2022, LLDCs attracted more finance than LDCs. Flows to SIDS reflect the most even distribution relative to their population, with 80 percent of flows going to countries in which 86 percent of the population lives.

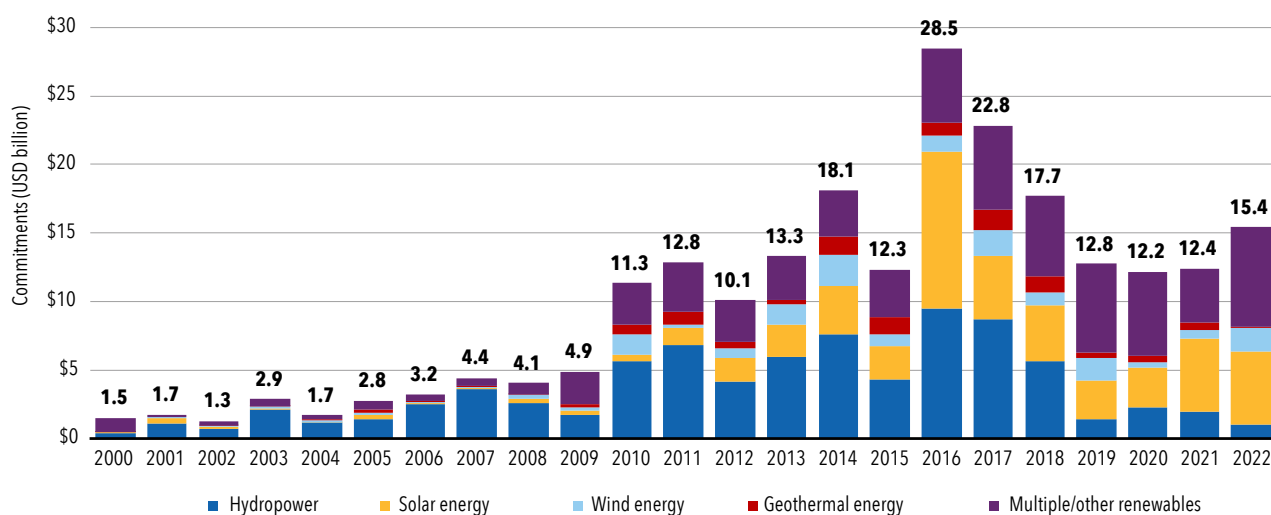
Financing instruments. Debt instruments accounted for two-thirds of flows in 2022, down from more than 90 percent in 2010, while the share of grants, equity, and guarantees increased. Standard loans totaling USD 7.1 billion accounted for 46 percent of flows in 2022, making them the most-used financial instrument. Grants reached an all-time high of USD 3.6 billion, up 50 percent over 2021, to become the second-most frequently used financial instrument, at 23 percent. A larger share of grants helps countries receiving them avoid increasing their debt burdens. Concessional loans reached USD 3.2 billion and equity investments USD 1.2 billion. Mezzanine finance reached USD 136 million, less than 1 percent of total flows in 2022.³³ Guarantees and credit lines reached just USD 16 million.

33 Mezzanine finance includes subordinated loans, preferred equity, and other hybrid instruments, including convertible debt or equity. In case of default, subordinated loans are repaid only after all senior obligations have been satisfied. For the increased risk, mezzanine debtholders require a higher return on their investment than do secured or more senior lenders. In the event of a default, preferred equity is repaid after all senior obligations and subordinated loans have been satisfied and before common equity holders are paid. Mezzanine finance is a more expensive source of finance than senior debt but less expensive than equity.

Are we on track?

The volume of public international financial flows to developing countries in support of clean energy research and development and renewable energy production has fallen over time. Even in the absence of a quantified SDG 7.a.1 target for enhanced international cooperation, data show that these flows have declined since their 2016 peak of USD 28.5 billion. While flows were 25 percent higher in 2022 (USD 15.4 billion) than in 2021 (USD 12.4 billion)—see figure 5.1³⁴—a relatively small group of funders is responsible for most flows, as discussed in detail in last year’s edition.

FIGURE 5.1 • ANNUAL INTERNATIONAL PUBLIC FINANCIAL FLOWS FOR RENEWABLES IN DEVELOPING COUNTRIES, BY TECHNOLOGY, 2000–22



Source: IRENA and OECD 2024.

Note: The “multiple/other renewables” category is explained in the methodology section.

The uptake in international public flows in 2022 was driven by flows toward multiple renewables (or renewables other than the most common technologies identified in the figure) and from European sources. This potentially reflects a change in portfolio management, with the European Union as the top investor; the European Union accounted for USD 2.3 billion (15 percent) of the year’s total—an increase of USD 883 million over 2021.

The largest shift among donors was the USD 912 million invested by the European Bank for Reconstruction and Development (EBRD), which made it the fourth-largest donor in 2022. On the other hand, the International Finance Corporation had the largest year-on-year drop in investment (USD 457 million), followed by the Green Climate Fund (USD 396 million).

In contrast with previous years, the last two years showed no international investments in energy projects from the two Chinese development banks considered for this indicator: the China Development Bank and the Export-Import Bank of China. China accounted for 20 percent of all international public investment in renewable energy between 2000 and 2022—more than twice that of Germany, the second-largest donor.

34 Unless stated otherwise, all commitment amounts are expressed in US dollars at 2021 constant prices and exchange rates. Constant amounts are adjusted for inflation rates and changes in exchange rates. The methodology section of this chapter provides more information.

China's hydropower investment significantly affected flows, making hydropower the largest renewable energy technology attracting donor support. China directed 96 percent of its financial flows for renewable energy in 2000-22 to hydropower. Its investments accounted for more than half of total hydropower investments by donors over the period.

Looking beyond the main indicators

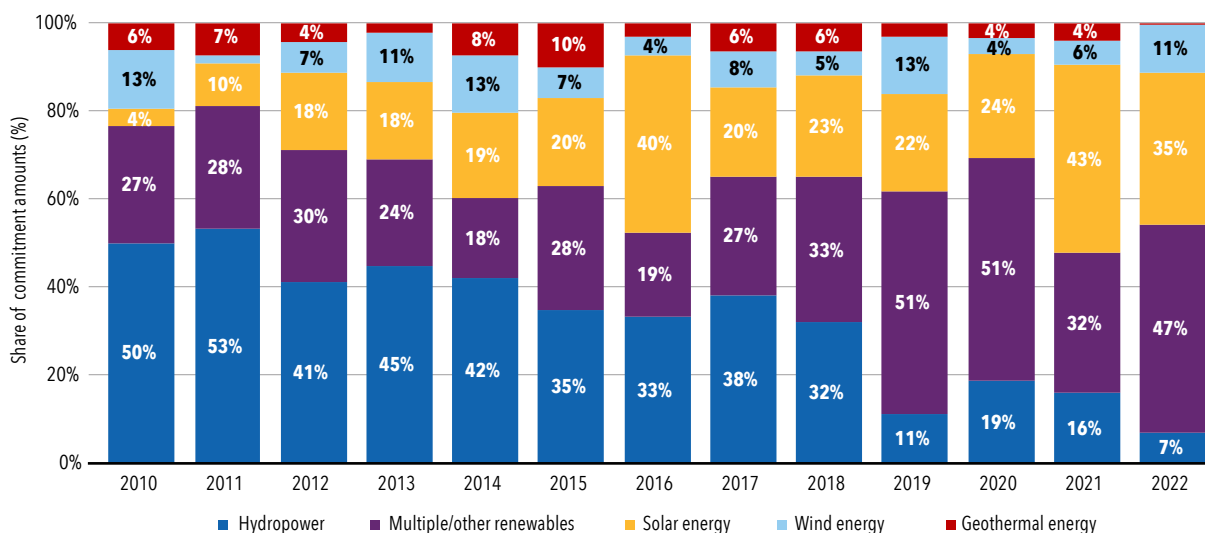
This section studies trends in international public flows from the perspective of technologies, geographic regions, countries, and financing mechanisms.³⁵

TECHNOLOGY TRENDS

International public investors categorize flows to clean energy by the type of renewable energy involved: hydropower, solar, wind, geothermal, and multiple/other³⁶ (figure 5.2).

Over the past decade, the share of energy investments in hydropower fell and that of solar and multiple/other energy investments rose. This trend is likely to continue, though it may occasionally be disrupted by multi-billion-dollar investments in single hydropower projects. The reduction in hydropower is linked to the absence of such large investments. The data show donors opting for an increased number of loans and grants but reduced commitment amounts for individual projects.

FIGURE 5.2 • SHARE OF INTERNATIONAL PUBLIC FINANCIAL FLOWS TO RENEWABLES, BY TYPE OF ENERGY, 2010–22



Source: IRENA and OECD 2024.

35 The word country refers to a territory, area, or other unspecified location within the scope of SDG indicator 7.a.1.

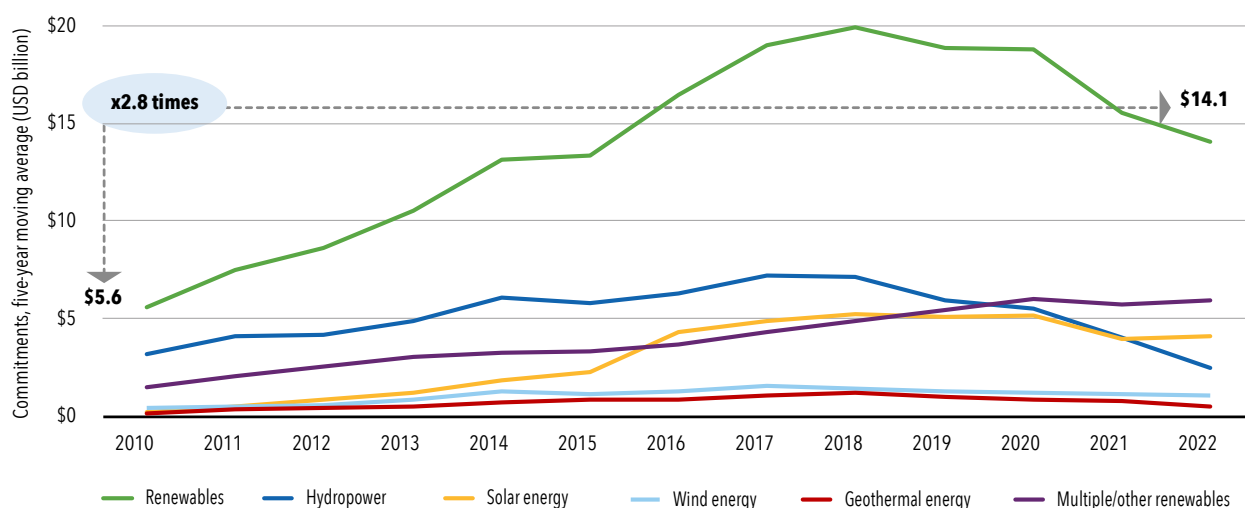
36 The multiple/other renewables category comprises unclear commitment descriptions in financial databases and lacks detail on the financial breakdown by technology. It includes bioenergy commitments, which are almost negligible; multipurpose financial instruments like green bonds and investment funds; and commitments targeting a broader range of technologies, such as renewable energy and electrification programs, technical assistance, energy efficiency programs, and other infrastructure supporting renewable energy.

The size of contributions and the choice of technology are related, with smaller investments gravitating toward the multiple technologies category. This category captures entries in financial databases that are unclear or nonspecific (therefore, it lacks detail on the financial breakdown by technology). The category includes multipurpose financial instruments like green bonds and investment funds; bioenergy commitments, which are almost negligible; and commitments targeting a broad range of technologies, such as renewable energy and electrification programs, technical assistance, energy efficiency programs, and renewable energy used to support infrastructure.

Almost half (47 percent) of commitments in 2022 were dedicated to multiple/other renewables; solar energy investments accounted for 35 percent of flows. The remaining flows went to wind energy (11 percent), hydropower (7 percent), and geothermal energy (0.4 percent). Among these technologies, investment in hydropower was USD 13.4 million per commitment (an unusually low level); the average investment in wind energy rose from USD 13.6 million in 2021 to USD 36 million in 2022 (figure 5.3).

The trend toward the “multiple/other” category adds complexity to flows. Its growth parallels the drops in commitments in recent years from large investors under the influence of national and other macroeconomic factors. It also reflects smaller but more frequent changes in how donors select their commitments, perhaps signaling a change in portfolio strategies.

FIGURE 5.3 • FIVE-YEAR MOVING AVERAGE OF INTERNATIONAL PUBLIC FINANCIAL FLOWS TO RENEWABLES, BY TECHNOLOGY, 2010–22



Source: IRENA and OECD 2024.

The moving average for all renewables for the five years ending in 2022 was USD 14.1 billion, 2.8 times greater than the moving average for the five years ending in 2010 (USD 5.6 billion) but 9.5 percent lower than the USD 15.6 billion in 2021. The trend toward smaller investments per commitment stabilized over the past four years; the average commitment was USD 11.1 million in 2022, partly because of the lack of Chinese investments, which tend to be large. Last year’s report predicted this downward trend. For 2023, we may expect a recovery in this trend if investment amounts surpass USD 17.7 billion.

All the five-year average trends shown in figure 5.3 are bell-shaped and have different time horizons. Wind energy and hydropower were the first to peak, in 2017, at USD 1.5 billion and USD 7.2 billion, respectively. The year after, geothermal and solar energy peaked, at USD 1.2 billion and USD 5.2 billion, respectively. In 2022, solar energy investments were strong, ending the drop in the five-year average as commitments rose from USD 4.0 billion in 2021

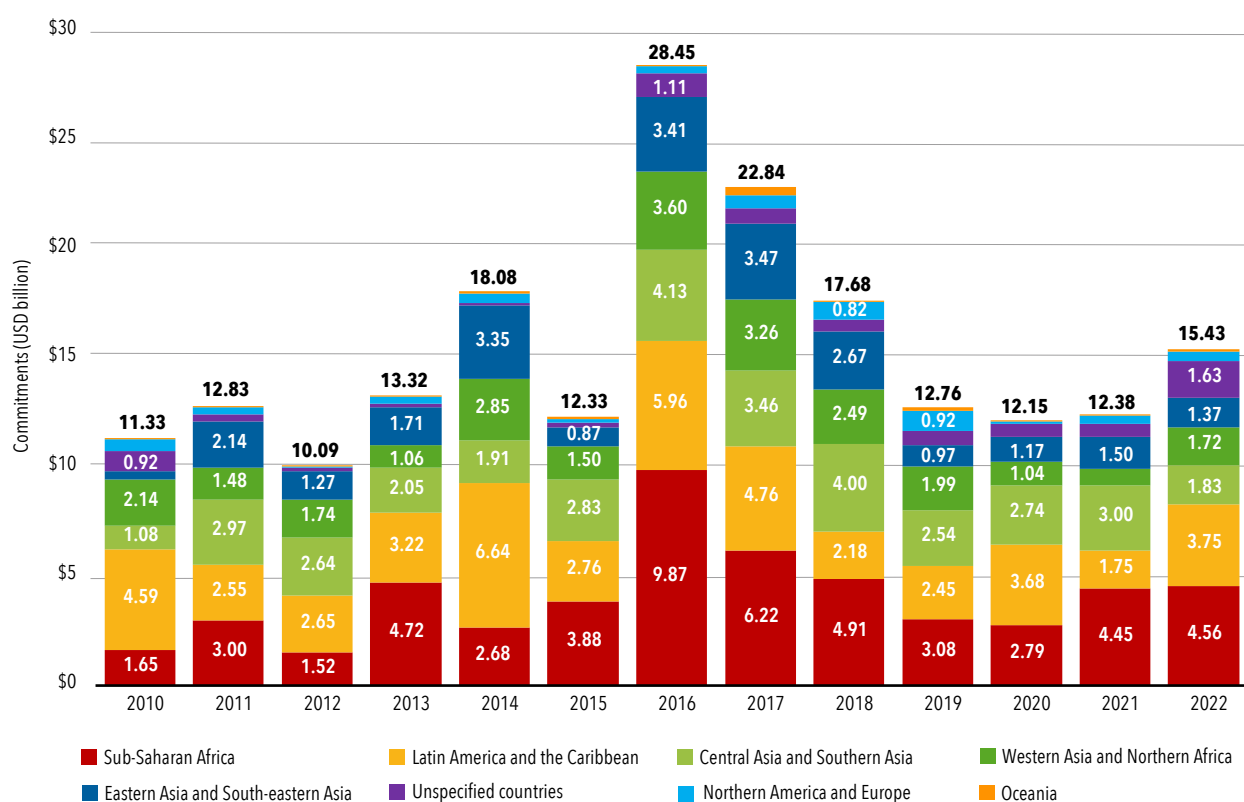
to USD 4.5 billion. Multiple/other renewables, which peaked in 2020, remained almost flat in 2021 and 2022, reflecting a preference for bundling energy transition investments.

But the overall decline in investment continued, reflecting the need for more and larger investments in the upcoming years.

REGIONAL TRENDS

Most of the recovery of flows in 2022 came from investments in Latin America and the Caribbean. Flows to Central Asia and Southern Asia fell significantly (figure 5.4).

FIGURE 5.4 • ANNUAL INTERNATIONAL PUBLIC FINANCIAL FLOWS TO RENEWABLES, BY REGION, 2010–22



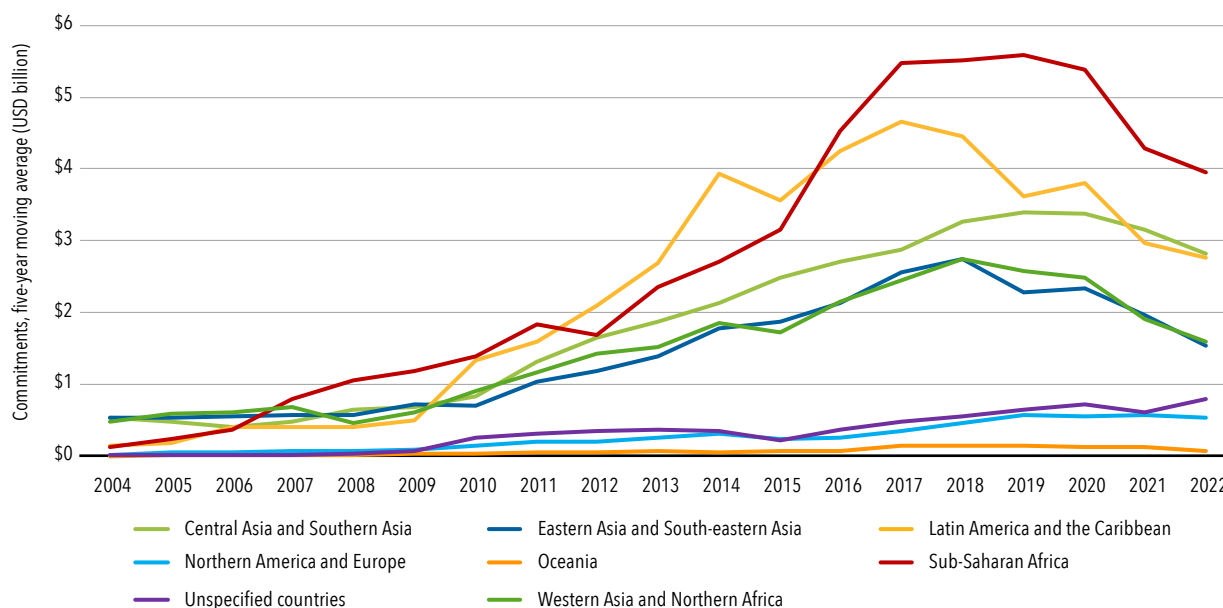
Source: IRENA and OECD 2024.

Note: See chapter 7 for the list of countries included in each region.

Public investment flows to all regions except Sub-Saharan Africa changed markedly between 2021 and 2022. Five regions saw increases in 2022; two experienced drops (figure 5.5). Oceania enjoyed the largest relative increase: 662 percent (USD 85.9 million). Flows to Western Asia and Northern Africa followed, rising 135 percent (USD 990.5 million). Flows to Latin America and the Caribbean rose 114 percent (USD 1.994 billion). Flows to Northern America and Europe were up by 24 percent (USD 90 million), but flows to Sub-Saharan Africa showed only a modest 2.5 percent increase (USD 112.5 million). Flows to Central Asia and Southern Asia fell by 39 percent (USD 1.17 billion). Those to Eastern Asia and South-eastern Asia dropped by 9 percent (USD 135.4 million).

Given annual fluctuations, five-year averages provide a clearer picture of regional trends (figure 5.5).

FIGURE 5.5 • FIVE-YEAR MOVING AVERAGE OF INTERNATIONAL PUBLIC FINANCIAL FLOWS TO RENEWABLES, BY REGION, 2004–22



Source: IRENA and OECD 2024.

Note: See chapter 7 for the list of countries included in each region.

Regional trends reveal a bell-shaped curve, apart from unspecified countries.³⁷ Funding to the unspecified country category grew over the past decade, as multicountry funding programs proliferated.

Sub-Saharan Africa was the top recipient of funding for renewables for the five years ending in 2022, with an annual average of USD 3.96 billion (28 percent of all commitments) driven largely by debt commitments for hydropower. Average annual commitments increased by 2.5 percent in 2022, reaching USD 4.6 billion. If these flow levels turn out to have held steady for 2023, the five-year average would drop by USD 70 million. Historically, large hydropower projects have attracted significant investment, especially from China. The recent decline in flows from China was accompanied by a decrease in hydropower investment. The global drop reflected a lack of new commitments, the completion of earlier commitments, a change in economic conditions caused by global events, and possibly changes in donors' priorities.

In recent years, solar investments have also taken priority in the region. Solar was the technology commanding the most commitments for the five years ending in 2022 (USD 2.3 billion), closely followed by multiple/other renewables (at USD 1.9 billion). Debt instruments were significant in 2022, with the five-year moving average valued at almost USD 3 billion (65 percent of flows). The debt component comprised USD 1.5 billion in concessional loans (33 percent), USD 1.5 billion in standard loans (32 percent), and USD 1.2 billion (26 percent) in grants. The largest donors for the region were the International Development Association (USD 1.4 billion), France (USD 611 million), and the International Bank for Reconstruction and Development (USD 562 million).

³⁷ The bell-shaped distribution of some financial flows may appear flatter because the transaction amounts for North America and Europe and Oceania were relatively lower compared with those in other regions.

The five-year average for **Central Asia and Southern Asia** was the second-largest in 2022, at USD 2.8 billion. Average annual funding fell to USD 1.8 billion in 2022; if flows remain at this level for 2023, the five-year average will fall by USD 433 million. Despite the decline, the region attracts more investment now than it did in the past. Since 2010, the five-year average has more than tripled, thanks to steady increases in funding for solar and wind energy, as well as occasional large hydropower projects. In 2022, investments in wind energy reached USD 640 million; investments in solar energy, USD 525 million. These financial flows are also skewed toward debt instruments, totaling USD 1.4 billion in debt (77 percent), and including USD 731 million (40 percent) in standard loans and USD 677 million (37 percent) in concessional loans. The largest donors were Germany (USD 521 million) and the EBRD (USD 381 million).

The five-year average for **Latin America and the Caribbean** fell by almost 7 percent, from USD 2.96 billion in 2021 to USD 2.76 billion in 2022. Annual flows rose to USD 3.7 billion, up from USD 1.7 billion in 2021, pushed by USD 1.9 billion in multiple/other renewables and USD 1.3 billion in solar energy projects, mostly in the form of debt instruments—USD 3.2 billion (86 percent)—and an unexpected increase in equity (USD 282 million, 7 percent). The region is attractive to investors thanks to its range of renewable energy potential and middle- to high-income economies with track records of paying back large loans from development banks and bilateral donors (ECLAC 2017; IEA 2023).

All regions except **Western Asia and Northern Africa** at least doubled their five-year average inflows since 2010. In Western Asia and Northern Africa, flows increased by a factor of just 1.8, to USD 1.6 billion in 2022. This region has been experiencing a slowdown in international public flows since its peak of USD 3.6 billion in 2016. Flows fell to just USD 731 million in 2021; they climbed back to USD 1.7 billion in 2022. If they hold steady at USD 1.7 billion for 2023 (once these are known), the five-year average will fall by USD 155 million, to a five-year average of USD 1.3 billion. Solar and wind energy commitments are prominent in the region. Solar and wind energy auctions could have played a significant role in increased financing of solar and wind in 2016–17 (IRENA 2023). The use of standard loans declined in the past few years, accounting for the drop in overall public flows. Concessional loans remained stable, and grants fluctuated, reaching a recent high of USD 292 million in 2022.

Between 2010 and 2022, the five-year moving average committed to **unspecified countries** more than tripled, reaching an all-time high of USD 792 million, a 30 percent increase over the five-year average ending in the previous year. In 2022, unspecified countries attracted USD 1.6 billion, the largest amount ever recorded. If 2023 flows reach this level, the five-year average will increase by USD 223 million, reaching USD 1,014 million. Public flows in this category are for multiple or other renewables and tend to be global or multiregional in nature. They include green bonds and other sustainability-related funds and grants rather than commitments to specific countries. Most funding in this category is in the form of grants. In 2022, only 2.5 percent of commitments to this group were debt instruments. Top donors include the Green Climate Fund, Norway, Germany, the European Union, and the International Finance Corporation.

The five-year average in **Eastern Asia and South-eastern Asia** fell for the second year in a row in 2022, to USD 1.5 billion, a 21 percent decline. Annual flows declined 9 percent to USD 1.4 billion, down from USD 1.5 billion in 2021. If reported flows for 2023 hold steady, the five-year average will fall by USD 261 million, to USD 1.3 billion. Historically, the region has attracted flows to hydropower projects. Recent flows have been concentrated in solar, wind, and geothermal energy. The region's fluctuations in investments are explained by large hydropower and geothermal projects in the mid-2010s and perhaps instability in donor preferences, reflected by varying amounts of investment in the region by donors and variation in their technology selections. China has appeared as the largest donor in recent years, because of an extraordinary USD 2.3 billion committed in 2017. Standard and concessional loans continue to be the most common form of funding in this region, accounting for 87 percent (USD 1.2 billion) of flows in 2022.

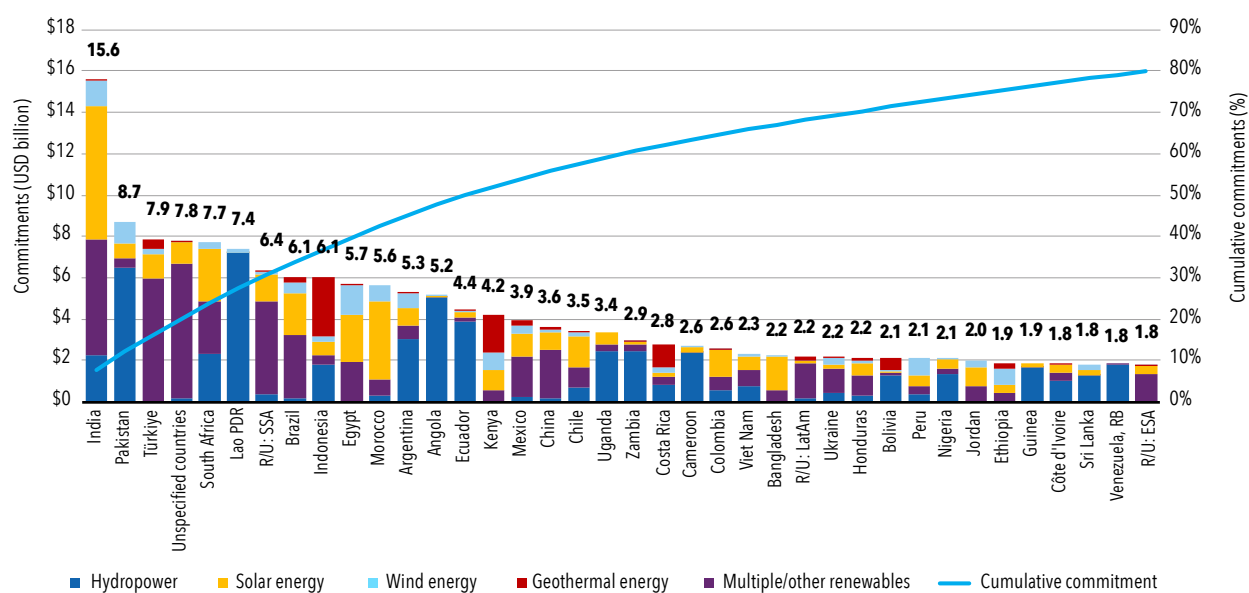
The five-year average in **Northern America and Europe** declined by 4.3 percent, from USD 566 million in 2021 to USD 542 million in 2022. Notwithstanding this reduction, the region has seen the largest increase of any region in five-year averages since 2010, with commitment amounts almost quadrupling. In 2022, countries in the region received USD 471 million, up from USD 381 million in 2021 but less than half the all-time high of USD 925 million in 2019. If 2023 flows hold steady when recorded, the five-year average will fall by USD 70 million, to USD 472 million. The EBRD has been by far the largest donor in the region over the last few years, providing USD 289 million in 2022. Flows to the region are predominantly in the form of debt instruments, with USD 319 million (68 percent) in standard loans committed in 2022. Most flows have been directed to multiple/other renewables and wind energy.

Oceania, the world's smallest region by population, with just 11.9 million people, had the lowest five-year average across regions, at USD 70 million in 2022. The figure was more than twice the average in 2010. It received just USD 99 million in 2022. If flows for 2023 hold steady, the five-year average will increase by USD 3 million. Historically, commitments were for solar, hydropower, and multiple/other renewables, provided in the form of technical assistance and government support programs. Of the USD 99 million received in 2022, USD 81 million was in the form of grants, and the rest in concessional loans.

COUNTRY TRENDS

During 2010–21, 38 countries and territories received 80 percent of all commitments. This figure remained unchanged in 2010–22 (figure 5.6).

FIGURE 5.6 • TOP RECIPIENTS OF INTERNATIONAL PUBLIC FINANCIAL FLOWS TO RENEWABLES, BY TYPE OF ENERGY, 2010–22



Source: IRENA and OECD 2024.

ESA = Eastern and South-eastern Asia; LatAm = Latin America and the Caribbean; R/U = residual/unallocated official development assistance; SSA = Sub-Saharan Africa.

Commitments to the top receiving countries are becoming marginally more widely distributed, although they remain heavily concentrated. While the distribution of flows is wider when averaged over several years, international public financial flows remain concentrated among a small group. In 2021, 80 percent of commitments went to 19 countries. While 2022 saw a wider distribution, with 25 countries receiving 80 percent of the commitments, this figure is still lower than when compared to the 2010-22 range of 38 countries. This means that the annual flows present more variation than the total average of flows over the 2010-22 period, rather than a steady stream of diversified flows to all countries.

The top five country recipients of international public flows in 2022 were Brazil (USD 1.213 billion), South Africa (USD 1.210 billion), Egypt (USD 823 million), Uzbekistan (USD 756 million), and India (USD 627 million).

Brazil received funding for 23 projects in 2022. Over the years, most international flows into the country were directed to solar energy projects in the form of loans, supplemented by equity and grants. The combination of debt instruments and a focus on solar indicates a mature market for solar projects in Brazil, where investors may perceive a low risk of default. The most significant projects of the year were the USD 340 million loan for solar development by the European Investment Bank, the USD 252 million loan by the Inter-American Investment Corporation to fund the Mendubim Solar PV project, and the USD 227 million loan from the European Investment Bank for the Sicredi Solar Energy Portfolio.

South Africa received USD 1.21 billion in 2022 across 16 projects. These investments were balanced across multiple renewable energy technologies, with solar energy playing a significant role. The International Bank for Reconstruction and Development lent USD 455 million for the Eskom Just Energy Transition Project, which aims to decommission a 1 gigawatt coal power plant and replace it largely with solar energy. Other major projects included the USD 347 million concessional loan from France to support the Just Energy Transition and the USD 227 million loan from the European Investment Bank to the Development Bank of Southern Africa for eligible renewable energy projects within the Embedded Generation Investment Programme.

Egypt received USD 823 million in 2022. The investments were spread across 24 projects, multiple technologies, and diversified financial instruments. The largest sources of funding were a USD 119 million concessional loan from Japan to fund the Komombo solar plant, the Scatec Green Bond of USD 102 million from EBRD, and a confidential USD 101 million loan from the International Finance Corporation.

Uzbekistan received USD 756 million in 2022 across 12 projects concentrated on wind energy, indicating a shift away from natural gas. The top two inflows were loans from EBRD to finance the Bash (USD 153 million) and Dzhankeldy (USD 153 million) wind power plants. Close behind, was a concessional loan of USD 141 million from the International Development Association for solar thermal energy in buildings.

India received USD 627 million in 2022 for 47 projects. Many were renewable energy projects valued at less than USD 1 million. Funding came in various forms. India also received a USD 168 million concessional loan from Germany as part of the Indo-German Solar Partnership, a USD 124 million loan from the International Bank for Reconstruction and Development as additional financing for the Rooftop Solar Program for the Residential Sector, and USD 89 million in a German concessional loan directed to hydropower initiatives in the Himalayas.

Along with regional investments, unspecified countries made up the largest category of recipients in 2022, at USD 1.635 billion. These flows cannot be allocated to any specific region. Within the regional trends, there are also substantial flows to multiple or unallocated countries. For instance, unallocated countries in Sub-Saharan Africa received USD 936 million.³⁸

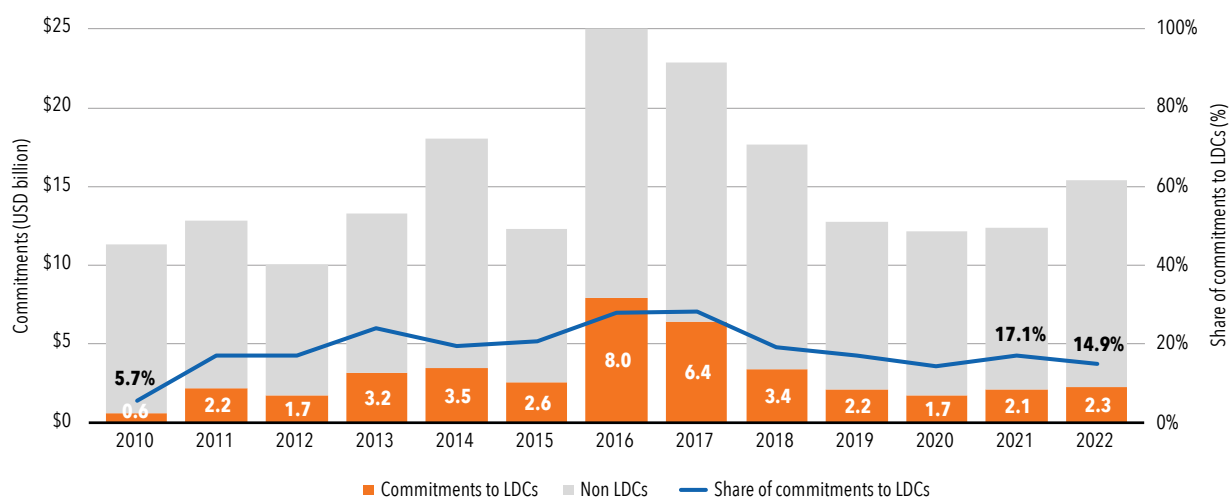
38 Investments are classified as “residual/unallocated” or “unspecified countries” when they are not specifically directed to certain countries. When commitments are residual/unallocated for a specific region, they are considered as part of regional totals. When they are directed to unspecified countries, this category is treated separately at the regional level.

SUPPORT TO LEAST-DEVELOPED COUNTRIES, LANDLOCKED DEVELOPING COUNTRIES, AND SMALL ISLAND DEVELOPING STATES

Analysis of the flow of international public finance to support renewable energy in the 45 LDCs, 32 LLDCs, and 40 SIDS³⁹ yields insights into flows to the poorest countries.⁴⁰

Flows to LDCs rose 8 percent in 2022, from USD 2.1 billion in 2021 to USD 2.3 billion, but their share of total flows fell from 17 to 15 percent—well below the historical average of 21 percent (figure 5.7).

FIGURE 5.7 • INTERNATIONAL PUBLIC FINANCIAL FLOWS FOR RENEWABLES IN LEAST-DEVELOPED AND NON-LEAST-DEVELOPED COUNTRIES, 2010–22



Source: IRENA and OECD 2024.
LDC = least-developed country.

Forty-three LDCs received financing during 2022, leaving only Guinea-Bissau and Burundi without inflows for the year. Eighty percent of inflows to LDCs went to 12 countries, with Uganda (USD 566 million), Chad (USD 200 million), and the Lao People’s Democratic Republic (USD 135 million) at the top of the list.

Uzbekistan drove the growth in LLDC financing in 2022. The distribution of flows was less even than it was for LDCs, with 80 percent of 2010–22 flows going to countries where 68 percent of the population lives. Historically the Lao People’s Democratic Republic received more investments per capita than any other LLDC (USD 82.3 over the 2010–22 period). The smallest per capita flows went to South Sudan (USD 0.04), Turkmenistan (USD 0.12), and Eswatini (USD 1.08).

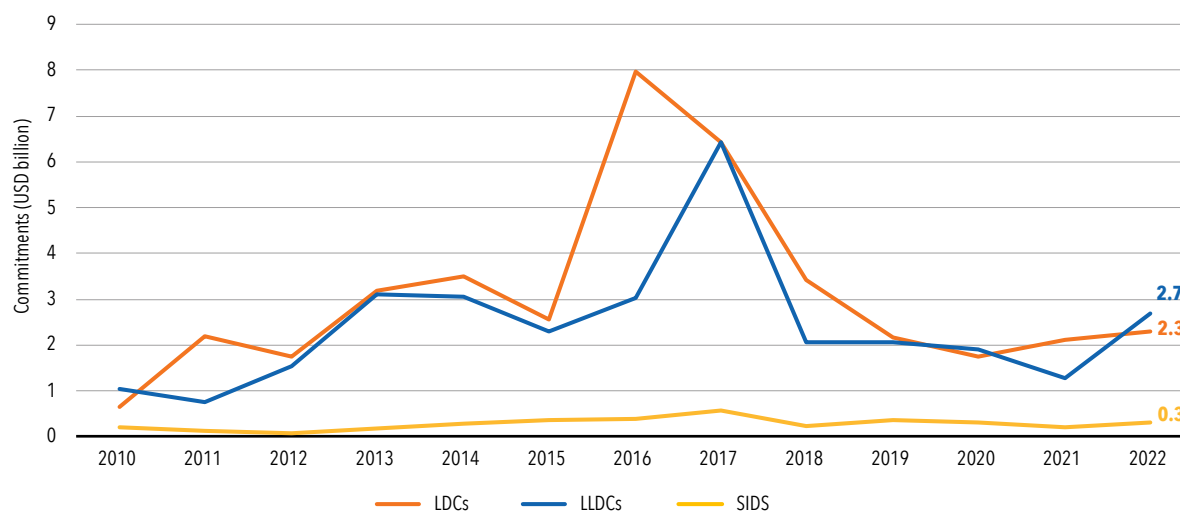
SIDS have historically received the smallest amounts of investment in absolute terms (figure 5.8). In 2022, they received USD 2.7 billion. On a per capita basis, however, some SIDS are among the most successful in attracting international public flows. Some countries benefited more than others. On average, the top recipients among SIDS

39 The United Nations’ M49 regional classification includes 53 SIDS; this report excludes 13 of them from the SDG 7.a.1 classification, as explained in the methodology section at the end of the chapter. The exclusion has a negligible effect on the analysis, as only St. Kitts received any flows (of USD 19 million, or less than 0.5 percent of all flows received by SIDS since 2000).

40 The country categories are regularly updated in line with the United Nations’ latest M49 classification. Some countries appear in more than one category.

(Tuvalu, Montserrat) have received more than USD 300 per capita since 2010. At the other end of the spectrum, flows were just USD 0.03 per capita in Trinidad and Tobago, USD 0.07 in French Polynesia, and USD 0.43 in Guinea-Bissau. Each of these countries received less than USD 10 million over the entire 2010-22 period.

FIGURE 5.8 • INTERNATIONAL PUBLIC FINANCIAL FLOWS TO LEAST-DEVELOPED COUNTRIES, LANDLOCKED DEVELOPING COUNTRIES, AND SMALL ISLAND DEVELOPING STATES, 2010–22



Source: IRENA and OECD 2024.

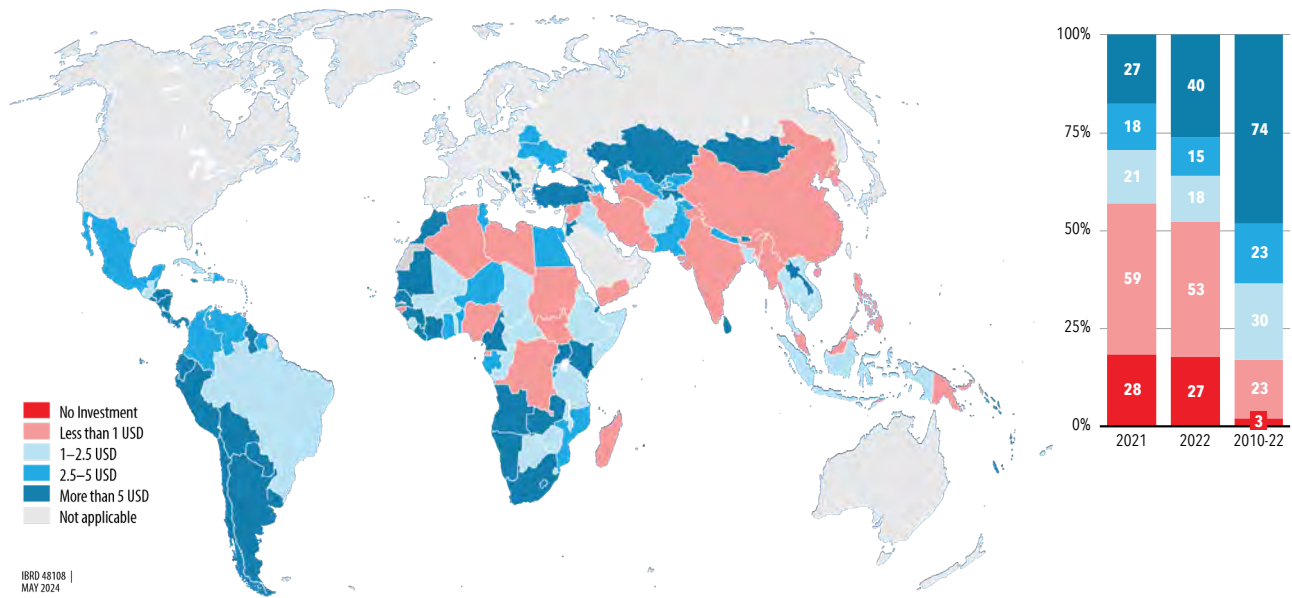
LDC = least-developed country; LLDC = landlocked developing country; SIDS = small island developing states.

DISTRIBUTION OF FINANCIAL FLOWS AMONG COUNTRIES

The number of countries that received no commitments fell slightly from 28 to 27 in 2022 (figure 5.9). Over the past decade, only three economies (the Wallis and Futuna Islands; China, Macao Special Administrative Region; and China, Hong Kong Special Administrative Region) received no international public commitments. The largest change in 2022 was the increase in the number of countries that received more than USD 5 per capita (from 27 in 2021 to 40 in 2022). Most countries receiving more than USD 5 per capita in 2022 are island countries in Oceania.

Over the 2010-22 period, total average flows were USD 2.26 per capita. The largest receiving countries on a per capita basis were small islands: Tokelau (USD 511), Tuvalu (USD 358), Montserrat (USD 339), Nauru (USD 271), and the Cook Islands (USD 261). At the bottom of the distribution are the Wallis and Futuna Islands, which have received no commitments since 2010; the Democratic People’s Republic of Korea (USD 0.01); Algeria (USD 0.02); the Syrian Arab Republic (USD 0.02); Malaysia (USD 0.03); Trinidad and Tobago (USD 0.03); and South Sudan (USD 0.04). Seventy percent of SIDS received more than USD 5 per capita during 2010-22; these percentages were lower for LDCs (36 percent) and LLDCs (37 percent).

FIGURE 5.9 • AVERAGE PER CAPITA INTERNATIONAL PUBLIC FINANCIAL FLOWS FOR RENEWABLES, BY COUNTRY, 2010–22



Source: Data from IRENA and OECD (2024).

Disclaimer: This map was produced by the Geospatial Operations Support Team of the World Bank based in the Cartography Unit of the World Bank. The boundaries, colors, denominations, and other information shown do not imply any judgment on the part of the custodian agencies concerning the legal status of or sovereignty over any territory or the endorsement or acceptance of such boundaries.

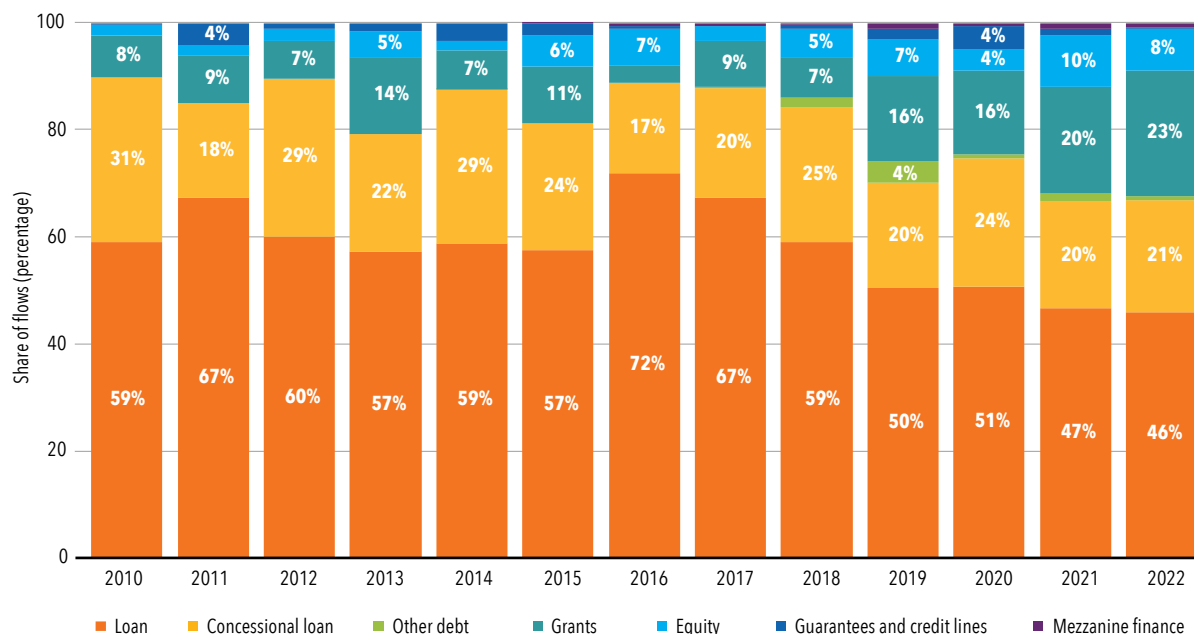
Globally, inclusive of all regions and categories within the scope of the indicator, the leading recipients of funding per capita in 2022 were Palau (USD 2,299), Montenegro (USD 143), and Vanuatu (USD 112), indicating that countries with small populations receive more international public flows per capita without receiving vast amounts of commitments. The 2022 figures show outlier behaviors for these three countries. Palau averaged USD 208 per capita in 2010–22; Montenegro, USD 41 per capita; and Vanuatu, USD 24 per capita. These large per capita values do not necessarily mean that these countries are better off than more highly populated countries; in smaller economies, the cost of implementing renewable solutions at the same relative scale as in larger countries is higher, in addition to other operational, logistical, and strategic complications.

INVESTMENTS BY FINANCING INSTRUMENT

The choice of financial instrument is as important as the quantity of the flows, as many recipient countries struggle with high debt-to-GDP ratios. Incurring more debt hinders development and limits the capacity to pay back loans, as discussed in greater detail in last year’s edition of this report. Ideally, flows of international public financing to recipient countries would include larger shares of non-debt instruments or concessional loans, rather than loans at market rates.

The mix of financial instruments supporting renewables has evolved in recent years (figure 5.10). The proportion of debt from public financing sources declined to less than two-thirds of flows in 2022, down from more than 90 percent in 2010; meanwhile, the shares of grants, equity, and guarantees increased.

FIGURE 5.10 • INTERNATIONAL PUBLIC FINANCIAL FLOWS FOR RENEWABLES, BY INSTRUMENT, 2010–22



Source: IRENA and OECD 2024.

Standard loans were the most-used financial instrument in 2022, accounting for USD 7.1 billion in commitments, up 23 percent from USD 5.8 billion in 2021. Standard loans accounted for 46 percent of all flows, down from an average of 59 percent between 2010 and 2022. Loans continue to focus on renewables, with 39 percent going to solar projects, 32 percent to multiple/other renewables, 21 percent to wind energy, 7 percent to hydropower, and less than 1 percent to geothermal energy. Almost 43 percent of loans went to Latin America and the Caribbean, and 21 percent to Sub-Saharan Africa. The largest loans in 2022 were a USD 561 million loan to Brazil and other countries in Latin America and the Caribbean and a USD 455 million loan to South Africa as part of the Eskom Just Energy Transition Project.

Grants reached an all-time high of USD 3.6 billion in 2022, up 50 percent from USD 2.4 billion in 2021, making grants the second-largest financial instrument used in 2022. However, over the 2010–21 period, grants accounted for less than 10 percent of total flows; in 2022, they accounted for 23 percent. In 2022, grants went primarily for multiple/other renewables (61 percent) and solar energy (33 percent).⁴¹ Most went to unspecified countries (36 percent), followed by Sub-Saharan Africa (33 percent). The largest grants were USD 482 million for the Norfund Climate Investment Fund capital replenishment; a USD 421 million provision to the Common Provisioning Fund, a component of the European Fund for Sustainable Development Plus (both funds being available for multiple countries within regions); and USD 228 million for the Electricity Access Scale-up Project in Uganda.

Concessional loans reached USD 3.2 billion in 2022, up 29 percent from USD 2.5 billion in 2021. These loans represented 21 percent of all flows in 2022, slightly less than the 23 percent they represented over the 2010–21 period. The distribution of concessional loans was similar to the distribution of grants, with 53 percent going to multiple/other renewables, 33 percent to solar energy, 10 percent to hydropower, and the rest to wind energy. The largest share of

41 Grants can include standard grants, interest subsidies, capital subscriptions on an encashment basis, and capital subscriptions on a deposit basis. Most grants committed are standard grants, with a few interest subsidies almost entirely dedicated to solar or wind energy projects. Capital subscriptions are often unrecorded as commitments since they are usually accounted for at the moment of disbursement to multilateral agencies or when the agencies access the funds in their accounts. See the methodology section at the end of this chapter for more information.

concessional loans went to Sub-Saharan Africa (47 percent), followed by Central Asia and Southern Asia (21 percent) and Eastern Asia and South-eastern Asia (18 percent). The largest concessional loans included USD 663 million for the Climate Investment Funds–Accelerating Coal Transition Investment Program in Eastern and South-eastern Asia and Sub-Saharan Africa, USD 347 million for the Just Energy Transition in South Africa, and USD 319 million for the Electricity Access Scale-up Project in Uganda.

Equity reached USD 1.2 billion in 2022, up 1.6 percent from 2021. It accounted for 8 percent of all flows in 2022, up from 5 percent over the 2010–21 period. In 2022, three-quarters of equity was directed to multiple/other renewables, with the rest invested in solar energy ventures. Equity was almost equally divided into common equity and shares in collective investment vehicles. Common equity is normally directed to specific energy sources; shares in collective investment vehicles normally target multiple renewables. Equity investments were well distributed: 27 percent went to Sub-Saharan Africa, 25 percent to unspecified countries, 23 percent to Latin America and the Caribbean, 12 percent to Western Asia and Northern Africa, and the rest to other countries in Asia. The largest equity investment in 2022 totaled USD 144 million for a private investment fund for climate change in Honduras. This was followed by a USD 84.5 million transaction for a private equity fund in Egypt and USD 82.8 million in common equity by Alcazar Energy Partners II, a sustainable infrastructure fund.

Mezzanine finance reached USD 136.3 million in 2022, a small decrease from USD 136.8 million in 2021.⁴² Representing less than 1 percent of flows, it was equally distributed between multiple/other renewables and solar energy. Regionally, it went to Central Asia and Southern Asia (42 percent of 2022 flows), Sub-Saharan Africa (36 percent), and Latin America and the Caribbean (21 percent). The largest investment was a USD 57.3 million preferred equity in SAEL, a waste-to-energy company in India.

Guarantees and credit lines fell to USD 16 million in 2022, a 90 percent decrease from USD 160 million in 2021. This category represented a negligible share of flows in 2022.

42 Mezzanine finance allows for the conversion of debt into equity in certain cases, such as subordinated loans, preferred equity, and other hybrid instruments. In case of default, they are repaid after all senior obligations are satisfied, and so the increased risk requires a higher return than other lenders. Preferred equity is repaid after all senior obligations and subordinated loans have been satisfied, and before common equity holders are paid. It is a more expensive source of finance than senior debt but a less expensive source than equity.

Policy insights

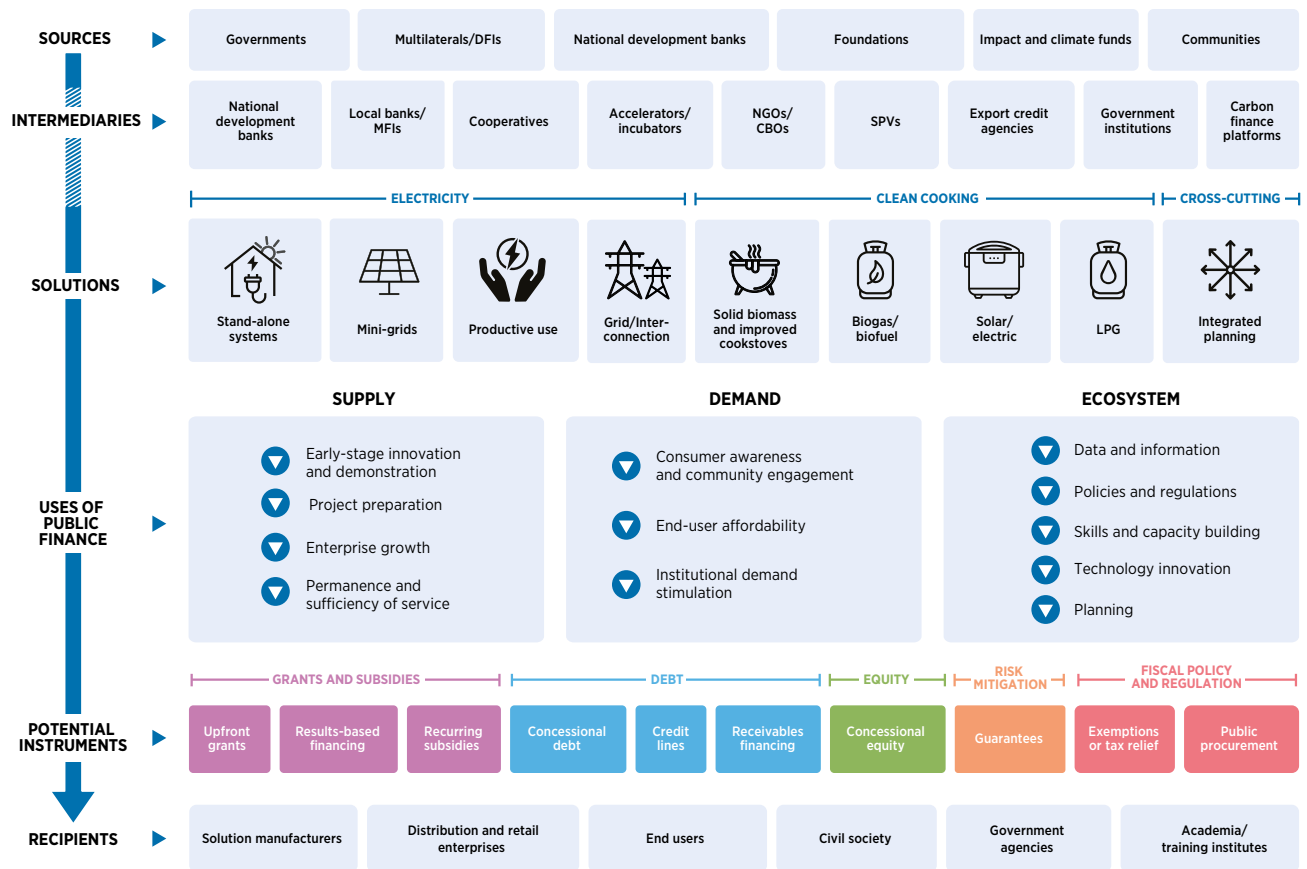
The rebound of international public financial flows in 2022 to developing countries is encouraging, but the level remains insufficient to achieve SDG 7 and other Sustainable Development Goals under the UN 2030 Agenda (see chapter 6 on investment needs). Investments are heavily concentrated in a number of countries (IRENA and CPI 2023), even as a growing number of developing countries are incurring international debt (IMF 2023). The debt financing modality at standard market rates remains the instrument most used, in spite of the recent increase in the use of grants and other non-debt instruments.

More innovative instruments and initiatives are needed to enable underinvested countries to benefit from the energy transition without compromising their fiscally constrained economies. Some countries have struggled to attract investments and access affordable capital because of shrinking fiscal space, macroeconomic constraints (UNCTAD 2022), or political conflicts. Previous editions of this report have highlighted the role international public finance has in supporting the establishment of effective policy frameworks and catalyzing private capital where private investments appear feasible to financiers, developers, and service providers. Calls for enhanced flows that reach countries in need are more relevant than ever. Answering those calls may entail changes in the international finance architecture (IEA and others 2021, 2022, 2023).

Financing to ensure universal access must be a priority, as 685 million and 2.1 billion people, respectively, live without access to electricity and clean cooking (see chapters 1 and 2 of this report). Public finance should be channeled toward deploying energy solutions for unserved and underserved areas. Those solutions will comprise integrated planning and building of energy infrastructure; investing in the ecosystem that enhances energy service provision (notably skills and capacity building, industrial development, consumer awareness and education, agriculture, and health care); bridging end-users' affordability gaps; and mobilizing private capital through policy and regulatory instruments (IRENA 2024).

Deployable technological solutions exist to close the access gap, as seen in figure 5.11, which presents the International Renewable Energy Agency's (IRENA's) framework for the flow of public finance for universal energy access. Specific financing needs vary depending on the location, the energy technology, and the type of user, but the priority must remain on scaling up nondebt sources of funding.

FIGURE 5.11 • IRENA'S PUBLIC FINANCE FRAMEWORK FOR UNIVERSAL ENERGY ACCESS



Source: IRENA 2024.

CBO = community-based organization; DFI = development finance institution; LPG = liquefied petroleum gas; MFI = microfinance institution; NGO = nongovernmental organization; SPV = special purpose vehicle.

The need to go beyond project bankability is urgent in cases where perceived risks reach the point where they cannot be mitigated through financial instruments. Within the wider public finance ecosystem, multilateral development banks, governments, and other relevant actors should work together to shift the focus from bankability toward potential impact at the program or portfolio levels. Renewable energy investment decisions need to be based on factors that not only produce financial profit, but also encompass other aspects of sustainable development that lead to crucial transformations in renewable energy markets. Finally, these reforms should include a reconfiguration of risk mitigation instruments, given the impact that real and perceived risks have on the cost of capital.

ANNEX 1.

METHODOLOGICAL NOTES

Chapter 5. International public financial flows to developing countries in support of clean energy

DATA SOURCES

SDG indicator 7.a.1 is a subset of two combined databases used to track international public financial flows—the Creditor Reporting System (CRS) of the Organisation for Economic Co-operation and Development’s (OECD’s) Development Assistance Committee (DAC) and IRENA’s Renewable Energy Public Finance Database. The CRS database includes various financial flows provided by investors to countries for multiple purposes; it is updated quarterly.⁴ Only a subset of the commitments in the CRS database is required for this indicator. To obtain that subset, we downloaded bulk data from the CRS from 2000 onward, consolidated the files; removed unused columns, noncommitments, and private donor flows (flow code 30); and filtered the data to include clean energy investments (purpose codes 23210-23290, 23410, 23631).

IRENA’s database covers commitments beyond the CRS database, particularly by non-DAC donors that do not report their commitments through the CRS. These flows account for around 40 percent of the financial value of commitments. We categorized each commitment by type of energy, financial instrument, and other metadata that matches the CRS. Reporting occurs a few months before the CRS. After the CRS data were released, we reviewed each commitment across the datasets to remove duplicates from the IRENA data. We compiled both sources and used the combined dataset for SDG 7.a.1.

DEFLATING NOMINAL US DOLLAR PRICES TO CONSTANT PRICES AND EXCHANGE RATES

Commitments are measured in millions of US dollars at constant prices, using an exchange rate for a base year. The base year is updated annually; it usually reflects a three-year lag in the publication cycle and a one-year lag in the latest reporting data (that is, the 2024 cycle will report commitments up to 2022 at 2021 constant prices).

International finance flows expressed in nominal terms are deflated to remove the effects of inflation and exchange rate changes so that all flows, from all donors and in all years, are expressed as the purchasing power of a U.S. dollar in a recent year (2021 in this report). A combination of the OECD deflators for DAC donors and deflators calculated by IRENA for other international donors not included in the CRS database is used.⁵ The following formula converts the nominal investment amounts in current US dollars to US dollars at constant prices and exchange rates:

4 The data are available at <https://stats.oecd.org/Index.aspx?DataSetCode=crs1>.

5 The OECD publishes DAC deflators for each donor. For more information, see <https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/informationnoteonthedacdeflators.htm>. IRENA sometimes tracks flows from donors that are not identified in the DAC list and that do not have an allocated DAC deflator. The agency follows the same methodology as the OECD to calculate country-specific DAC deflators.

$$USD_{constant,n,m} = \frac{USD_{current,n}}{DAC\ Deflator_{n,m}}$$

where n is the current year (nominal) and m the constant year (real).

REGIONAL AGGREGATIONS AND CLASSIFICATIONS

Regional aggregations start with the microdata of commitments. Each commitment is dedicated to either a specific country or an unspecified country or mix of countries. Where commitments could not be categorized under specific countries or territories following the United Nations' M49 classification, they were classified as "residual/unallocated ODA [official development assistance]," followed by the name of the region. Where the region was unclear, the commitment was classified under "unspecified countries." Residual flows to specific regions are aggregated under the geographical region aggregates. Residual flows to unspecified countries are aggregated directly under the totals, rather than under any region. International flows for which no information about the region or country is available are classified as multilateral and excluded from the indicator, as some of this finance may be directed to countries outside the scope of the SDG 7.a.1 indicator.

We continue aggregating financial flows based on the SDG regions and subregions defined by the United Nations and published as the M49 classifications. For other kinds of classifications, we keep a modified list of countries from "developing regions" to determine which countries are to be included in the aggregation and data dissemination. Chapter 7 discusses these classifications.

MEASURING FINANCIAL FLOWS THROUGH COMMITMENTS

Financial flows are recorded as donor commitments. A commitment is defined as a firm obligation, expressed in writing and backed by the necessary funds. Bilateral commitments are recorded as the full number of expected transfers for the year in which commitments are announced, irrespective of the time required for the completion of disbursements, which may occur over weeks, months, or years.

Tracking financial commitments can yield quite different results than approaches that consider financial disbursements. Disbursement information would provide a more accurate picture of actual financial flows for renewable energy each year, but data on disbursements are often limited or not available. Tracking commitments allows for a more comprehensive and granular analysis of financial flows and ensures methodological consistency across data sources. It may, however, produce large annual fluctuations in financial flows when large projects are approved. In addition, financial commitments may not always translate into disbursements, as contracts may be voided, cancelled, or altered. Any changes must be reflected in annual values.

FINANCIAL INSTRUMENTS

The financial instruments used by public financial institutions were categorized based on the OECD list of financial types and the IRENA classifications for concessional loans and credit lines (table A1.2). This taxonomy excludes debt relief mechanisms. Some of these instruments have yet to be used in connection with commitments made in the years covered by this chapter.

TABLE A1.2 • DESCRIPTION OF INSTRUMENTS USED FOR INTERNATIONAL PUBLIC FINANCIAL FLOWS

	FINANCIAL INSTRUMENT	DESCRIPTION
<i>Debt</i>		
	Standard loan	<p>Legal debt obligations assumed by recipient, including transfers in cash or in kind (creditor acknowledges the nontradability of obligations should any claim arise from nonpayment).</p> <p>As payment obligations on a standard loan are senior obligations (loans entitle creditors to receive payments against their claims before anyone else), they are referred to as senior loans. These loans have better lending terms than those provided by private financial institutions, including longer payment terms, lower interest rates, and grant elements. They are not necessarily market-rate loans.</p> <p>Where no concessional information is available, commitments are categorized as loans, not concessional loans.</p>
	Concessional loan	<p>Loans that meet official development assistance criteria of at least a 45 percent grant element for least-developed countries, landlocked developing countries, and small island developing states; 15 percent for lower-middle-income countries; and 10 percent for upper-middle-income countries and multilateral development banks within the Creditor Reporting System database—or when specified as “concessional” by the public donor itself in the International Renewable Energy Agency’s Public Investments database.</p> <p>Concessional loans incur external debt from recipients, albeit at a significantly lower interest rate than developed countries could get from commercial banks or private finance institutions.</p>
	Bonds	Fixed-interest debt instruments issued by governments, public utilities, banks, or companies that are tradable in financial markets.
	Asset-backed securities	Securities whose value and income are backed by a pool of underlying assets.
	Reimbursable grants	Contributions provided to a recipient institution for investment purposes with the expectation of long-term reimbursement under conditions specified in the financing agreement. The provider assumes the risk of total or partial failure of the investment; it can also decide when to reclaim its investment.
	Other debt securities	<p>Financial instruments that represent a debt obligation but are neither standard loans, concessional loans, bonds, or asset-backed securities. They can be issued by various entities, including governments, corporations, or financial institutions. Examples include promissory notes, commercial paper, and medium-term notes.</p> <p>These securities typically have varying maturities, interest rates, and risk profiles; they may be traded in secondary markets, providing liquidity to investors. They serve as an alternative means of raising capital or financing projects, offering issuers and investors additional options for diversifying their portfolios and managing risk.</p>
<i>Grants</i>		
	Standard grant	Transfers in cash or in kind that create no legal debt for the recipient.
	Interest subsidy	Payment to soften the terms of private export credits, loans, or credits by the banking sector.
	Capital subscription on deposit basis	Payments to multilateral agencies in the form of notes and similar instruments, unconditionally cashable on sight by the recipient institutions. The deposit basis refers to the accounting of the capital once it is deposited in the multilateral agencies’ funds.
	Capital subscription on encashment basis	Payments to multilateral agencies in the form of notes and similar instruments, unconditionally cashable on sight by the recipient institutions. The encashment basis refers to the accounting of the capital once it is accessed (cash) by the multilateral agencies from its funds.
<i>Mezzanine finance</i>		
	Subordinated loan	A loan that, in the event of default, will be repaid only after all senior obligations have been satisfied. In return for this increased risk, mezzanine debtholders receive a higher return for their investment than secured or more senior lenders.
	Preferred equity	Equity that, in the event of default, will be repaid only after all senior obligations and subordinated loans have been satisfied but before common equity holders are paid. It is a more expensive source of finance than senior debt, but less expensive than equity.
	Other hybrid instruments	Such instruments include convertible debt or equity.

	FINANCIAL INSTRUMENT	DESCRIPTION
<i>Equity</i>		
	Common equity	Share of ownership in a corporation that gives the owner claims on the residual value of the corporation after the corporation meets creditors' claims.
	Shares in collective investment vehicles	Collective undertakings through which investors pool funds for investment in financial or nonfinancial assets. These vehicles issue shares (for corporate structures) or units (for trust structures).
	Reinvested earnings	Reinvested earnings are applicable only to foreign direct investment (FDI). Reinvested earnings on FDI consist of the retained earnings of an FDI enterprise that are treated as if they were distributed and remitted to foreign direct investors in proportion to their ownership of the equity of the enterprise and then reinvested by them in the enterprise.
<i>Guarantees</i>		
	Guarantees/ insurance	Promise of indemnification up to a specified amount in the case of default or nonperformance of an asset (such as a failure to meet loan repayments or to redeem bonds or expropriation of an equity stake). Guarantees typically cover political and commercial risks (credit, regulatory/contractual) that investors are unwilling or unable to bear.
	Credit lines	Arrangements between a bank and a borrower establishing a maximum loan balance that the bank will permit the client to maintain. A credit line guarantees that funds will be available, but no financial assets exist until funds are advanced.

Source: OECD and IRENA.

CHANGES TO THE DATA

Several revisions were made in 2024 to the combined public investments database (OECD and IRENA). Some commitments were cancelled, some were reclassified to different years, and some recipient countries were removed from the dataset. All figures were subsequently updated to reflect 2021 prices and exchange rates (table A1.3).

Table A1.3 • 2024 revisions to public flows, 2000-21

YEAR	BEFORE REVISION (2020 USD MILLIONS)	AFTER REVISION (2021 USD MILLIONS)	DIFFERENCE (2021 USD MILLIONS)
2000	1,469	1,535	66
2001	2,038	1,739	-300
2002	1,381	1,283	-98
2003	3,102	2,878	-225
2004	2,166	1,723	-443
2005	2,218	2,772	553
2006	3,327	3,231	-96
2007	4,349	4,391	42
2008	2,919	4,066	1,148
2009	8,263	4,896	-3,367
2010	11,912	11,334	-578
2011	12,603	12,826	223
2012	10,808	10,085	-723
2013	14,176	13,322	-855
2014	16,626	18,076	1,450

2015	12,588	12,329	-259
2016	21,874	28,454	6,580
2017	26,365	22,840	-3,525
2018	15,752	17,680	1,929
2019	13,987	12,758	-1,229
2020	12,229	12,151	-78
2021	10,775	12,385	1,610
Total	210,927	212,754	1,827

Source: IRENA and OECD 2024.

The difference over the past two decades reflects an additional USD 1.8 billion in commitments, driven by massive upward revisions for 2016 (USD 6.6 billion), 2018 (USD 1.9 billion), 2014 (USD 1.4 billion), and 2008 (USD 1.1 billion). Huge drops in commitments for 2017 (USD 3.5 billion) and 2009 (USD 3.4 billion) reflect commitments from China that did not materialize or for which the commitment year changed.

ANNEX 2.
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CHAPTER 5 • INTERNATIONAL PUBLIC FINANCIAL FLOWS TO DEVELOPING COUNTRIES IN SUPPORT OF CLEAN ENERGY

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