

GLOBAL LANDSCAPE OF RENEWABLE ENERGY FINANCE 2020 METHODOLOGY



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The background features a dark blue field with a faint, repeating pattern of solar panels. Overlaid on this are several large, overlapping, semi-transparent blue geometric shapes, primarily triangles and trapezoids, that create a sense of depth and movement. The text is centered in the upper right quadrant of the image.

Meeting international climate and development objectives will require a massive re-allocation of capital toward low-carbon technologies, including renewables, and the mobilisation of all available capital sources

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ABBREVIATIONS

BNEF	Bloomberg New Energy Finance
CPI	Climate Policy Initiative
DFI	development finance institutions
HBF	Heinrich Böll Foundation
IRENA	International Renewable Energy Agency
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
OECD-DAC	OECD Development Assistance Committee
PV	photovoltaic
R&D	research and development
REN 21	Renewable Energy Policy Network for the 21st Century
USD	United States dollars

1. INTRODUCTION

This background document provides an overview of the methodology used for the analysis presented in the report *Global Landscape of Renewable Energy Finance 2020* (IRENA and CPI, 2020). Jointly developed by the International Renewable Energy Agency (IRENA) and the Climate Policy Initiative (CPI), the report presents a comprehensive overview of global renewable energy investment trends, breaking down financial flows by region, sector and technology. In this second edition of the series, finance commitments to off-grid technologies are also analysed in detail.

This document outlines the methodology used to track two different renewable energy finance flows which are analysed in the main report: global renewable energy investment flows during 2013-2018 and off-grid renewable energy investment flows during 2007-2019.

2. TRACKING GLOBAL RENEWABLE ENERGY INVESTMENT FLOWS

Chapter 2 of *Global Landscape of Renewable Energy Finance 2020* analyses key trends in global annual investments in renewable energy over the period 2013-2018. This analysis is based on empirical data drawn from a wide range of primary and secondary sources. The methodology used stems from the approach developed by CPI to produce the *Global Landscape of Climate Finance* reports since 2011. The analysis extracts renewable energy investment, which represents the majority of annual global climate finance flows as tracked by CPI (63% of total climate mitigation finance in 2017-2018) and delves deeper into the main investment trends related to renewables (CPI, 2019).

2.1 Scope of the analysis

The sub-sections below provide details regarding the main variables covered by the analysis, including types of investors, types of recipients, financial instruments and technologies.

2.1.1 Types of investors

The analysis distinguishes between public and private investors, depending on the nature of financing. Private investors include the following:

- **Commercial financial institutions**, *i.e.*, providers of private debt capital (and occasionally other instruments), including commercial and investment banks
- **Corporate actors (or non-energy-producing companies)**, which can have activities in the renewable energy sector mainly to source energy for self-consumption or to offset carbon. Unlike project developers, non-energy-producing corporate actors do not engage in renewable energy projects for the primary purpose of profit making
- **Households**, *i.e.*, family-level economic entities, which includes high-net-worth individuals and their intermediaries (*e.g.*, family offices investing on their behalf)
- **Institutional investors**, including insurance companies, asset management firms, pension funds, foundations, and endowments
- **Private equity, venture capital and infrastructure funds**
- **Project developers** *i.e.*, entities that develop renewable energy projects, from inception to realisation, and can enter into power sale agreement with buyers (off-takers)
- **Governments and their agencies**
- **National and multilateral climate funds**

2.1.2 Types of recipients

The analysis tracks the recipients of investments¹ as public or private as follows:

- **For publicly sourced finance:** Information on recipients is taken from the creditor reporting systems of the Organisation for Economic Co-operation and Development's Development Assistance Committee (OECD-DAC), from reporting from DFIs, and from the datasets of climate funds. For climate funds, when information on a recipient was not available, the public or private nature of the implementing entity was used.
- **For privately sourced finance:** Given the lack of detailed data, recipients are classified as public or private based on the classification of the project's equity provider(s) as tracked by the Bloomberg New Energy Finance (BNEF) renewable energy and asset finance databases (BNEF, 2019a).²
- **For unknown sources:** Recipients are assumed to be private.

Public actors include the following:

- **Development finance institutions** (DFIs), further sub-categorised as follows:
 - *Multilateral and regional*, where the institution has multiple shareholder countries and directs flows of finance internationally
 - *Bilateral*, where the institution is owned by a single country and directs flows of finance internationally
 - *National*, where the institution is owned by a single country and directs flows of finance domestically

2.1.3 Financial instruments

The analysis of global renewable energy investments captures investment made through the following financial instruments:

- **Balance sheet financing**, *i.e.*, direct debt or equity investment in a recipient entity by a company or financial institution
- **Grants**, *i.e.*, transfers made in cash, goods or services for which no repayment is required
- **Project-level debt**, *i.e.*, debt relying on a project's cash flow for repayment, further distinguished between:

¹ A recipient is defined as the entity receiving money from the source of finance or an intermediary.

² Data limitations, as well as methodological and definitional issues, can lead to misclassifications of recipients, causing omissions or inconsistent tracking of recipients across sources of climate finance data. The methodology attempts to standardise recipient classifications to the greatest extent possible given the data limitations.

- *Low-cost (or concessional) debt*, which refers to loans extended at terms preferable to those prevailing on the market. In this case, the analysis tracks the full amount of the loan, not the grant equivalent.
- *Market-rate debt*, which refers to loans extended at regular market conditions
- **Project-level equity**, *i.e.*, equity investment relying on the project's cash flow for repayment

2.1.4 Technologies

The analysis captures investment in electricity and/or heat production made in the following technologies:

- **Biomass and biogas power**
- **Solar**, including photovoltaic (PV), concentrated solar power and solar heating systems (*e.g.*, solar water heaters)
- **Geothermal**
- **Hydropower**
- **Wind**, onshore and offshore
- **Other technologies** such as biofuels (including bioethanol) and ocean renewable energies (*e.g.*, wave, tidal, ocean currents, salt gradient, etc.)

Private research and development and investment in manufacturing for the production of green technologies (*e.g.*, new types of wind turbines) are excluded from the analysis, as well as any investment in energy efficiency.

Investments in transmission and distribution projects which do not explicitly benefit renewable

energy are also excluded. Although general upgrades to transmission and distribution infrastructure are often important for renewable energy, investment in transmission and distribution infrastructure typically benefit a wide variety of electricity generating plants. For this reason, such investments are excluded unless it can be shown they largely benefit renewable energy.

2.2 Data sources

The analysis is based on empirical data drawn from a wide range of primary and secondary sources, depending on the public or private nature of the investment flows, as determined by the type of investor undertaking a given transaction.

Private finance flows capture the following:

- **Large-scale renewable energy projects:** The research team individually analysed direct primary financing data from large-scale renewable energy projects based in 108 countries to identify their financing structure and the entities providing financing. These data are retrieved from the BNEF renewable energy and asset finance databases (BNEF, 2019a).
- **Small-scale renewable energy investments³:** Data on market size, generation capacity and finance were obtained from BNEF databases (BNEF, 2019b).
- **Households, corporates, and governments' investments in solar water heating systems:** Data were estimated based on cost data from REN21 *Global Status Report* (REN21, 2015) and capacity additions data from the International Energy Agency's Solar Heating and Cooling Programme (Weiss and Spörk-Dür, 2019).^{4,5}

³ Namely, residential and commercial solar PV projects with capacity of less than 1 MW.

⁴ This analysis considered new installed capacity in 2015 and 2016 as reported in Weiss et al. (2017) and systems capital costs reported in REN21 (2015). For 2016, total estimated additions for 2016 from the Weiss source were broken down by the 2015 segment proportions. Estimates for 2015 and 2016 were USD 15 billion and USD 13 billion, respectively, lower than the 2014 estimate of USD 18 billion. To ensure that figures were conservative and to avoid double counting with asset finance projects tracked through the BNEF project-level datasets, the analysis assumes the lower bound of solar home systems capital costs.

⁵ The International Energy Agency's most recent Solar Heat Worldwide report (Weiss and Spörk-Dür, 2019) states, "Since system costs [through 2018] have not changed significantly in the past three years, the costs presented [in the report] still provide a good indication" (p. 61). The REN21 cost estimates cited have not been updated since the 2015 edition of the *Global Renewables Status Report*.

The data for public finance flows were gathered through the following means:

- CPI's own quantitative aggregate survey and project-level data template, which was sent to 36 DFIs for data collection in 2015, 2016, 2017 and 2018
- The creditor reporting systems of the Organisation for Economic Co-operation and Development's Development Assistance Committee (OECD-DAC) for DFI data (OECD, 2019)
- Data retrieved through the project-level assessment of transactions tracked by BNEF (2019a)
- National and multilateral climate funds' commitments retrieved from OECD (2019) for 2017 and *Climate Funds Update* for 2018 (ODI and HBF, 2019)

Table 1 summarises the relevant sources used to collect the data in the report, broken out by the type of investment and the level of data.

2.3 The principles applied in data collection and reporting

Track primary investment

The analysis of global landscape of renewable energy finance captures total primary financial transactions and investment costs and components of activities that directly contribute to renewable energy. Secondary market transactions (e.g., re-selling of stakes or public trading in financial markets) are not tracked, as they do not represent new investment targeting new renewable energy assets, but rather capital being exchanged for existing assets.

Maximise granularity

Wherever possible, the analysis uses project-level data to check and select flows. Project-level information is more likely to provide verifiable details on project characteristics, instruments, and financing destinations and structures. Where project-level data is not available or complete, aggregated data is used.

Table 1 Data sources used in Chapter 2 of the *Global Landscape of Renewable Energy Finance 2020*

Investment type	Source	Data level
Private finance	BNEF (2019a)	Project-level (large scale renewable)
	BNEF (2019b)	Aggregated (small-scale solar)
	IJ Global (2019)	Project-level (large scale renewable)
	Weiss and Spörk-Dür (2019)	Aggregated
Development finance institutions	Surveys*	Project-level and aggregated (depending on reporting institutions)
	OECD (2019) BNEF** (2019a)	Project-level
Climate funds	ODI and HBF (2019)	Project-level
	OECD (2019)	
Governments and their agencies	OECD (2019)	Project-level
	BNEF (2019a)	

(*) This year's report includes primary survey data from 36 DFIs.

(**) Additional data not provided in the surveys or OECD reporting.

Include tangible financial commitments

In the analysis, “*investment*” is defined as a financial commitment represented by a firm obligation by means of a board’s decision on investment programs, the closure of financing contracts or similar actions. Such commitments are backed by the necessary funds to provide the specified financing to a project.

The category of “financial resources committed” records the amount of an expected transfer at the time the corresponding contract was closed (or the commitment otherwise established), irrespective of the time required to complete the disbursement. This approach can yield results that differ from those of approaches that consider investment based on disbursements. For example, under the approach adopted in this analysis, a project which reaches financial close in 2017 but becomes operational in 2018 will be recorded as a 2017 investment, regardless of when construction starts and ends. By contrast, an approach which records investment when an asset becomes operational would treat the same investment as having occurred in 2018.

Although the focus on commitments rather than disbursements may affect the sequencing of flows over time – given that committed amounts are often disbursed over several years – disbursement information would provide a more accurate picture of the actual volume of financial resources devoted to renewable energy in a given year. However, consistent data on disbursements is often lacking.

Err on the conservative side

In case of insufficient details, a conservative approach is taken, and under-reporting of renewable energy investments is preferred to over-reporting. The analysis excludes risk-mitigation instruments, such as guarantees and insurance products, since actual disbursements from these instruments are contingent upon uncertain future events.

Avoid double counting

The analysis tracks only investments in new renewable energy projects. Investments in private research and development are excluded, since costs to develop new technologies are capitalised

and factored into the investment amounts of new projects implementing these technologies. Including R&D investments would, therefore, increase the risk of double counting.

Similarly, policy-induced revenue-support mechanisms and other public subsidies whose primary function is to pay back investment costs are not tracked. Revenue-support mechanisms, such as feed-in tariffs, pay back investment costs, so including the investments made for their implementation would constitute double counting.

Finally, many overlaps exist between the datasets used as sources for the analysis, implying that the same transactions may be recorded several times. During the data-consolidation phase, sources of duplicate transactions are ranked according to reliability and comprehensiveness; only the best entry for each overlapping transaction is selected to avoid double counting.

2.4 Data assumptions

Gearing ratios

Gearing ratios describe the ratio of a project’s long-term debt to the total capital invested. Where a project-specific gearing ratio is provided, it is used directly to calculate debt and/or equity values for the relevant project. Where no gearing ratio is provided, a 70/30 ratio is assumed, except for wind power projects in China, where an 80/20 gearing is assumed, based on the higher debt-to-equity ratios observed in historical transactions.

Cost multipliers

Where information on investment is not available, technology- and geography-specific investment cost multipliers are used to estimate total investment amounts. Country-level multipliers from the REN21 *Global Status Report* (REN21, 2019) are used whenever possible. If country-level multipliers are not available, REN21 regional multipliers are used. If neither country-level nor REN21 regional multipliers are available, regional multipliers from IRENA’s *Renewable Power Generation Costs* series (IRENA, 2019) or the REN21 transregional multipliers are used.

Cost of solar water heaters

When country-level data on the cost of solar water heaters are not available, cost estimates are derived by averaging available values for other countries in the same region. In regions where no country-level estimates are available, the global average is used. Some exceptions have been made to this rule where appropriate. For example, the European average cost for large domestic hot water applications does not include France, given that it is an outlier relative to other countries' cost ranges and does not comprise a significant portion of the European solar water heating market.

2.5 Geographic classification

Table 2 shows the regional grouping used in Chapter 2 of the *Global Landscape of Renewable Energy Finance 2020*. The designations employed do not imply the expression of any opinion on the part of IRENA or CPI concerning the legal status of any region, country, territory, city or area or of its authorities, or concerning the delimitation of frontiers or boundaries. Flows are classified as “transregional” when resources are channelled to more than one region.

Table 2 Regional grouping used for the analysis in Chapter 2 of the *Global Landscape of Renewable Energy Finance 2020*

Region	Country
Middle East and North Africa	Algeria, Bahrain, Egypt, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen
Sub-Saharan Africa	Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Togo, Uganda, United Republic of Tanzania, Zambia
South Asia	Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka
East Asia and Pacific	Brunei Darussalam, Cambodia, China, Cook Islands, Democratic People's Republic of Korea, Fiji, Indonesia, Kiribati, Lao People's Democratic Republic, Malaysia, Marshall Islands, Micronesia (Federated States of), Mongolia, Myanmar, Nauru, Palau, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Thailand, Timor-Leste, Tonga, Tuvalu, Vanuatu, Viet Nam
Central Asia and Eastern Europe	Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Belarus, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Montenegro, North Macedonia, Republic of Moldova, Romania, Russian Federation, Serbia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan
Latin America and the Caribbean	Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia (Plurinational State of), Brazil, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela (Bolivarian Republic of)
Western Europe	Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom
OECD Americas	Canada, Chile, Mexico, United States of America
OECD Asia	Japan, Korea (Republic of)
OECD Oceania	Australia, New Zealand

Note: OECD = Organisation for Economic Co-operation and Development

3. TRACKING OFF-GRID RENEWABLE ENERGY INVESTMENT FLOWS

Chapter 4 of the *Global Landscape of Renewable Energy Finance 2020* analyses key trends in off-grid renewable energy investment over the period 2007-2019. Data for this analysis was initially gathered by IRENA from Wood Mackenzie *Off-Grid Renewable Investment* database (Wood Mackenzie, 2020). At the time the analysis was conducted, this database tracked information for 895 commitments made to companies operating in the off-grid renewable energy space in emerging and developing countries. The database, which initially covered some 12 500 datapoints, was further expanded by IRENA to include additional variables necessary to carry out a comprehensive analysis of financing flows; it now includes over 42 000 datapoints.

3.1 Description of the database

This database tracks off-grid renewable energy investments in the form of financial commitments, *i.e.*, firm obligations to provide specified financing, backed by the necessary funds. The full amount of financial commitments is recorded as of a certain date, irrespective of the time required for the completion of disbursements. Because commitments do not necessarily equate to capacity additions, information on disbursements would provide a more accurate picture of the actual investment volume for each year. However, accurate and comprehensive data on financial disbursements is not always available (SEforAll and CPI, 2019).

All transactions tracked in the database are in nominal United States dollars (USD). In a number of cases where financing occurred in other currencies (*e.g.*, euros or British pounds), transaction values were converted to USD using average annual exchange rates from the OECD exchange rates database (OECD, 2020).

3.2 Scope of the analysis

The sub-sections below provide details regarding the main variables covered by the off-grid renewable energy investment database, including types of investors, financial instruments, energy uses, products and sources.

3.2.1 Types of investors

The database distinguishes between public and private investors, depending on the nature of financing. Investors are further disaggregated by type, as listed below:

- **Commercial financial institutions**, *i.e.*, providers of private debt capital such as commercial and investment banks
- **Corporations and business associations**, *i.e.*, energy and non-energy companies
- **Development finance institutions**, including multilateral DFIs (public finance institutions that have multiple countries as shareholders and direct flows of finance internationally); bilateral DFIs (single-country ownership of the institution; flows directed internationally); and national DFIs (single-country ownership of the institution; flows directed domestically)
- **Government agencies and intergovernmental institutions**
- **Individuals**, *i.e.*, family-level economic entities, high net-worth individuals, investing either directly or through crowdfunding platforms
- **Institutional investors**, *i.e.*, insurance companies, pension funds, sovereign wealth funds, endowments and foundations
- **Private equity, venture capital and infrastructure funds**
- **Others**, including non-profit organisations, impact funds and research institutes

3.2.2 Financial instruments

The database captures commitments made through the following financial instruments:

- **Blended finance**, defined as the use of public and philanthropic funds to mobilize additional private capital
- **Debt**, including bonds, convertible notes, term loans and venture debt
- **Equity**
- **Grants**

3.2.3 Energy uses

Investors' financial commitments for off-grid renewable energy are directed toward a variety of uses. The database aggregates these in the following way:

- **Residential use**, *i.e.*, energy access for household uses that do not include any revenue-generating activities
- **Commercial and industrial use**, *i.e.*, energy access for commercial and industrial revenue-generating activities, such as farming and fishing
- **Communities and other economic activities**, *i.e.*, energy access benefitting entire communities; this includes, for example, energy systems for public buildings (*e.g.*, hospitals and schools), installation of street lights and electricity access for refugee camps
- **Support for infrastructure and services**, *i.e.*, a variety of ancillary products and services necessary to sustain the provision of energy – including storage systems, voltage converters and voltage converters

3.2.4 Energy products and services

Off-grid renewable energy in this analysis refers to both stand-alone systems and mini-grids. In particular, the database includes the energy products and ancillary products and services listed below.

Energy products:

- **Clean cookstoves**, *i.e.*, solar-powered or biofuel-burning household stoves
- **Micro/mini grids**, *i.e.*, remote, distributed, autonomous grids designed to provide electricity to residential and small commercial users
- **Solar home systems**, *i.e.*, small to mid-size stand-alone solar photovoltaic systems
- **Solar kiosks**, *i.e.*, centralised community-scale solutions which do not include household distribution networks
- **Solar lights**, *i.e.*, solar-powered lanterns that may include mobile charging stations
- **Solar refrigerators**, *i.e.*, refrigerators running on energy directly provided from the sun (either solar PV or solar thermal systems)
- **Solar water heaters**, *i.e.*, devices that convert sunlight into heated water
- **Solar water pumps**, *i.e.*, devices that convert solar power into mechanical work

Ancillary products and services:

- **Research and development**
- **Smart meters**
- **Software applications**, *i.e.*, applications which provide services for energy management
- **Storage systems**, *i.e.*, systems that capture the energy generated at one time for use at a later time
- **Training**
- **Voltage converters**, *i.e.*, electric power converters which change the voltage of an electric power source

3.2.5 Energy sources

Given the flexibility and modularity of **solar photovoltaic** (PV), this energy source accounts for 95% of total investment tracked. In addition, the database also covers other renewable energy sources used to power off-grid solutions, such as **bioenergy, hybrid bioenergy and solar power, and mini hydropower**.

3.3 Data sources

Data on off-grid renewable energy commitments was gathered from a wide range of primary and secondary sources, including press releases, annual reports, public disclosures, crowdfunding filings, investment data aggregators and competitor analysis.

3.4 Geographic classification

Table 3 shows the regional grouping used for the analysis of off-grid renewable energy financing landscape in Chapter 4 of the *Global Landscape of Renewable Energy Finance 2020*. The designations employed do not imply the expression of any opinion on the part of IRENA or CPI concerning the legal status of any region, country, territory, city or area or of its authorities, or concerning the delimitation of frontiers or boundaries.

Table 3 Regional grouping used for the analysis in Chapter 4 of the *Global Landscape of Renewable Energy Finance 2020*

Region	Sub-region	Country
Latin America and the Caribbean	Caribbean	Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands
	Central America	Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama
	South America	Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela (Bolivarian Republic of)
Middle East and North Africa	Middle East	Bahrain, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, Yemen
	North Africa	Algeria, Egypt, Libya, Morocco, Sudan, Tunisia
Sub-Saharan Africa	Central Africa	Angola, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, São Tomé and Príncipe
	East Africa	Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Mauritius, Rwanda, Seychelles, Somalia, South Sudan, Uganda, United Republic of Tanzania
	Southern Africa	Botswana, Eswatini, Lesotho, Madagascar, Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe
	West Africa	Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo
South and Southeast Asia	Southeast Asia	Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Timor-Leste, Viet Nam
	South Asia	Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka

REFERENCES

- BNEF (Bloomberg New Energy Finance) (2019a)**, *Renewable energy projects and asset finance databases* (database), www.bnef.com/assetfinancing/ (subscription required).
- BNEF (2019b)**, *Market size: Generation capacity and finance databases* (database), www.bnef.com/MarketSizing/GenerationCapacity and www.bnef.com/MarketSizing/Finance (subscription required).
- CPI (Climate Policy Initiative) (2019)**, *Global Landscape of Climate Finance 2019*, Climate Policy Initiative, London, www.climatepolicyinitiative.org/wp-content/uploads/2019/11/2019-Global-Landscape-of-Climate-Finance.pdf
- IJ Global (2019)**, “Recently updated transactions” (database) <https://ijglobal.com/data>
- IRENA (International Renewable Energy Agency) (2019)**, *Renewable Power Generation Costs in 2018*, International Renewable Energy Agency, Abu Dhabi, www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/May/IRENA_Renewable-Power-Generations-Costs-in-2018.pdf
- IRENA and CPI (2020)**, *Global Landscape of Renewable Energy Finance 2020*, International Renewable Energy Agency, Abu Dhabi.
- ODI (Overseas Development Institute) and HBF (Heinrich Böll Foundation) (2019)**, *Climate funds update database*, ODI/HBF, www.climatefundsupdate.org.
- OECD (Organisation for Economic Co-operation and Development) (2020)**, *Exchange rates* (database), Organisation for Economic Co-operation and Development, <https://data.oecd.org/conversion/exchange-rates.htm> (accessed January 2020).
- OECD (2019)**, *Climate related development finance* (database), OECD, www.oecd.org/dac/stats/climate-change.htm.
- REN21 (Renewable Energy Policy Network for the 21st Century) (2019)**, *Renewables 2019: Global Status Report*, REN21 Secretariat, Paris, www.ren21.net/wp-content/uploads/2019/05/gsr_2019_full_report_en.pdf?fbclid=IwAR09z-ESWSfBkAZcLHioNryG4CZKMzor0ZzazSvfp-78cQ37vApKJ7qJAaMBg
- REN 21 (2015)**, *Renewables 2015: Global Status Report*, REN21 Secretariat, Paris, www.ren21.net/wp-content/uploads/2019/05/GSR2015_Full-Report_English.pdf
- SEforAll and CPI (Sustainable Energy for All and Climate Policy Initiative) (2019)**, *Energizing Finance: Understanding the Landscape*, www.seforall.org/system/files/2019-11/EF-2019-UL-SEforALL-w.pdf
- Weiss, W., and Spörk-Dür, M. (2019)**, *Solar Heat Worldwide – Global Market Development and Trends in 2018, Detailed Market Figures 2017*, IEA Solar Heating and Cooling Programme, Paris.
- Weiss W., Spörk-Dür M., and Mauthner F. (2017)**, *Solar Heat Worldwide – Global Market Development and Trends in 2016, Detailed Market Figures 2015*, IEA Solar Heating and Cooling Programme, Paris.
- Wood Mackenzie (2020)**, *Off-grid renewable investment* (database), Wood Mackenzie, <https://datahub.woodmac.com/app/main#/dashboards/5d3a1511d249d18c0f001758> (subscription required).

GLOBAL LANDSCAPE OF
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FINANCE 2020
METHODOLOGY**