

NDCs and renewable energy targets in 2023

Tripling renewable power by 2030



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ABBREVIATIONS

CAGR	cumulative annual growth rate
CO₂	carbon dioxide
COP28	2023 United Nations Climate Change Conference
°C	degrees Celsius
GtCO₂eq	gigatonne of carbon dioxide equivalent
GW	gigawatt
GWh	gigawatt hours
GFANZ	Glasgow Financial Alliance for Net Zero
GCF	Green Climate Fund
GHG	greenhouse gas
G20	Group of 20
IFI	international financial
IPG	International Partners Group
JET-IP	Just Energy Transition Investment Plan
JETP	Just Energy Transition Partnership
LLDC	landlocked developing country
LDC	least developed country
LTES	long-term energy scenarios
LT-LEDS	long-term low GHG emission development strategies
Masdar	Abu Dhabi Future Energy Company
MtCO₂eq	megatonnes of carbon dioxide equivalent
MW	megawatt
MDB	multilateral development bank
NDC	Nationally Determined Contribution
NCQG	New Collective Quantified Goal
PACE	Partnership for Accelerating Clean Energy
PV	photovoltaic
SIDS	small island developing States
TW	terawatt
UNCTAD	The United Nations Conference on Trade and Development
UNFCCC	The United Nations Framework Convention on Climate Change
UAE	United Arab Emirates
UK	United Kingdom
USD	United States dollars
ZAR	South African rand

KEY MESSAGES

Current commitments on global action against climate change show that proposed mitigation measures are primarily focused on the energy sector, which makes up more than three-quarters of greenhouse gas (GHG) emissions globally. Transitioning to renewable energy – alongside electrification and energy efficiency measures, and phasing out fossil fuels – is of paramount importance to limit temperature rise to 1.5 degrees Celsius (°C). However, eight years after the Paris Agreement, the ambition outlined in climate commitments falls short of delivering these climate goals.

A total of 184 parties have included renewable energy components in their Nationally Determined Contributions (NDCs), but only 148 of those have quantified targets. Of these targets, 113 focus on power. Decarbonising power is both crucial and readily accessible. According to IRENA's 1.5°C Scenario outlined in the *World energy transitions outlook*, more than half of the world's energy consumption should be met with power in 2050. Meanwhile, power technologies like solar and wind have reached technological maturity and cost competitiveness globally. Nevertheless, more concrete targets are needed for the decarbonisation of end-use sectors and applications, mainly heat and transport, which together account for more than three-quarters of energy consumption.

Renewable energy ambitions within NDCs are not only insufficient, they also fall short of what countries have committed to in their domestic policies that exist outside the framework of the Paris Agreement (national laws, policies, roadmaps, plans, strategies). As per IRENA's 1.5°C pathway, and the proposed COP28 pledge to triple renewable power globally, the Group of 20 (G20) alone would need to grow its renewable power capacity from less than 3 terawatts (TW) in 2022 to 9.4 TW by 2030, accounting for 80% of the global total. The commitments made in NDCs are less than half of what they need to be to align with the tripling renewables pledge, and those made in national energy plans and policies fall short by 30%.

This discrepancy between NDCs and national policies and plans highlights a critical issue: not all national-level renewable energy commitments are reflected in global climate pledges. For example, among the G20 economies that account for the bulk of global emissions, only 13 members have set renewable energy targets in their NDCs, although almost all have set such targets domestically. This translates to G20 members planning to install 6.3 TW by 2030 in their national energy plans and policies, compared to 4.6 TW in their NDCs.

A country-level cross-examination of NDCs and national policies shows that for the 95 Parties analysed across the G20, least developed countries (LDCs) and small island developing States (SIDS), only one-third of the Parties have aligned their targets while the rest remain completely misaligned or only partially aligned. Misalignments between targets set in NDCs and national policies underscore the need for further harmonisation between climate pledges to the international community, and policy objectives set within countries' national contexts.

Aligning renewable energy targets in NDCs and national energy plans would increase the effectiveness and credibility of both. It would also reinforce clear signals to investors, developers and other players across the supply chain, thus enabling further development of the renewable energy sector. In some cases, this will involve establishing or updating national targets. In other cases, it will mean including existing national targets in the next round of NDCs.

At the other end of the emissions spectrum, LDCs and SIDS contribute less than 5% of global GHG emissions, yet they are disproportionately impacted by climate change and remain particularly vulnerable due to their economic structures, limited adaptive capacity and geographical locations. For both groups of countries, renewable energy offers opportunities for socioeconomic development, increased access to reliable and affordable clean energy, and energy security.



To capture these opportunities, LDCs have set targets in their NDCs that indicate an intention to double their capacity as of 2022 – to reach total installed renewable capacity of 105 gigawatts (GW) by 2030. More than half of the capacity that remains to be added – around 30 GW – is conditional on international support in the form of financing, technical assistance, technology transfer, capacity building and other forms of support. Among the SIDS, many countries have set 100% renewable power targets (equivalent to around 13 GW total installed renewable capacity by 2030) up from less than 6 GW in 2022, which would help alleviate the financial drain of importing fossil fuels. Similar to LDCs, almost half of the targeted capacity is contingent on support from the international community.

LDCs and SIDS continue to lack the resources to attract adequate levels of financing. For instance, during 2013-2020, LDCs received less than USD (United States dollars) 30 billion in renewable energy investments, equivalent to less than 1% of the global total, a share that has likely dropped further since the pandemic. This stands in stark contrast with a more than USD 100 billion of renewable energy investment opportunity in LDCs, as communicated through their NDCs.

Mobilising this financing – at affordable terms – by means of international assistance represents a litmus test against which history will judge the efforts of the international community to achieve a just and inclusive energy transition for all. Such support can help facilitate higher energy access rates, create socio-economic benefits, enhance energy security and bolster resilience against climate change. But in the absence of low-cost financing, many Parties that have conditional commitments may alternatively opt to lock themselves into fossil fuel investments that have lower upfront costs, precluding them from the benefits that renewables offer. This would not only delay the energy transition globally, but it would also leave behind the lowest income communities and neglect a golden opportunity to bridge socio-economic gaps, as well as achieve the sustainable development goals.

The international community must step up and scale up financing for a just and inclusive energy transition. Part of this includes honouring the USD 100 billion per year commitment of climate finance from developed to developing countries, which had not been met as of 2021. Preliminary findings from the Organisation for Economic Co-operation and Development suggest that this goal may have been met for the first time in 2022, but this is subject to further confirmation. In the grand scheme of things, this commitment is rather small. It is estimated that on average, around USD 9 trillion climate finance is needed globally until 2030 (up from around USD 1.3 trillion committed in 2021-2022). The 2023 United Nations Climate Change Conference (COP28) will set the stage for a commitment to a New Collective Quantified Goal (NCQG), with USD 100 billion per year as a lower limit. This must be accompanied by a binding and robust framework for actual delivery of financing.

In addition, donor countries need to integrate stronger elements of justice in their support. One way to achieve this is by providing more grant-based and concessional financing, which although intended as a core element of the Just Energy Transition Partnerships (JETPs), has so far been missing from their financial structures.

Beyond international collaboration, progress towards meeting renewable energy targets in NDCs and energy plans globally and achieving the energy transition will necessitate overcoming deeply entrenched barriers stemming from the systems and structures created for the fossil-fuel era. Three pillars form the foundations for a way forward: investing at scale and building the necessary infrastructure, implementing the necessary policy and regulatory framework, and strategically realigning institutional capacities to help ensure the skills and capabilities that match the energy system we aspire to create.

INTRODUCTION

Since the historic signing of the Paris Climate Change Agreement in 2015, nearly all countries have committed to reducing greenhouse gas (GHG) emissions through their Nationally Determined Contributions (NDCs). Current commitments on global action against climate change show that proposed mitigation measures are primarily focused on the energy sector (UNFCCC, 2023), which makes up more than three-quarters of GHG emissions globally (IEA, 2023). Transitioning to renewable energy – alongside electrification and energy efficiency measures, and phasing out fossil fuels – is of paramount importance to limit temperature rise to 1.5 degrees Celsius (°C), according to IRENA's *World energy transitions outlook* (IRENA, 2023a). However, the current ambition outlined in NDCs regarding renewable energy deployment falls short of delivering these climate goals.

According to the United Nations Framework Convention on Climate Change (UNFCCC), renewable energy-based mitigation measures and targets are the most frequently cited components of countries' climate commitments (UNFCCC, 2023). Of the 196 UNFCCC Parties, 184 mentioned renewable energy in their NDCs as a key mitigation strategy. Of those, 148 Parties have set quantifiable targets for renewable energy, mainly in the power sector. Many of these targets remain conditional on international financial and technical assistance.

IRENA has been analysing NDCs since 2019, focusing on their renewable energy components and how they compare to what is needed to be in line with the 1.5°C goal. This brief focuses on renewable energy targets in NDCs as of the end of October 2023. Chapter 1 presents the status of NDC submissions in the run-up to the 2023 United Nations Climate Change Conference (COP28). Chapter 2 dives into the status of renewable energy targets in the NDCs. Chapter 3 focuses on renewable power targets in the NDCs. It analyses their level of ambition with regard to IRENA's 1.5°C scenario and the goal of tripling renewables in the power sector by 2030 and highlights the progress made with respect to these targets. For developing countries, the analysis identifies the portion of targets that is conditional on financial assistance and the minimum level of financing needed to support the achievement of these targets. Finally, the brief examines the alignment of renewable energy targets in NDCs with those set in national plans and policies, including whether these are reflected in laws, policies, roadmaps and plans.¹

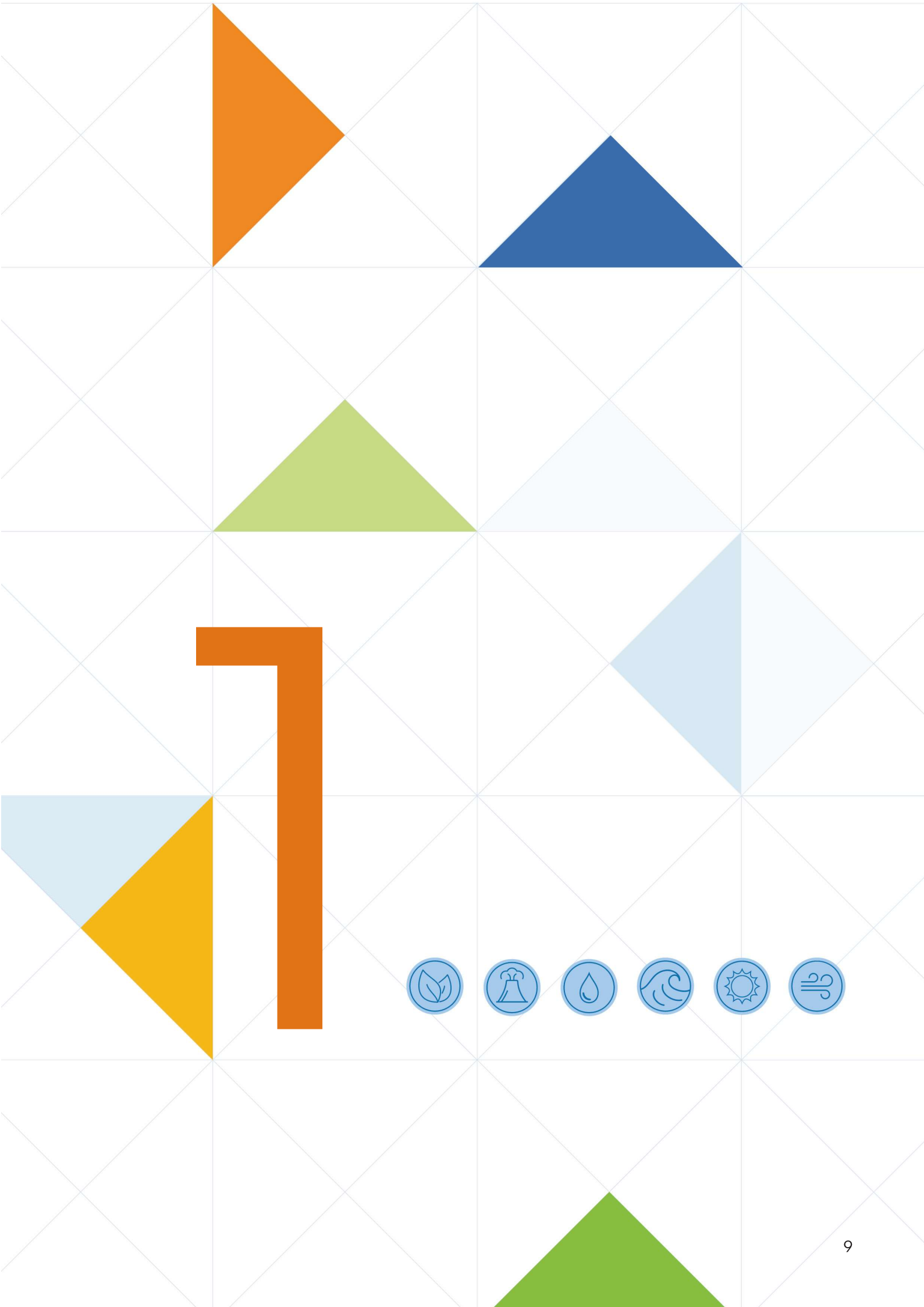
While the analysis covers all 195 Parties to the Paris Agreement,² it zooms in on commitments made by members within specific groups, such as the Group of 20 (G20), small island developing States (SIDS), and least developed countries³ (LDCs). G20 members are the world's largest emitters, making up more than three-fourths of GHG emissions in 2020 (World Bank, n.d.a). Their actions today will have a large impact on mitigating global emissions going forward. Conversely, LDCs and SIDS collectively account for less than 5% of emissions (World Bank, n.d.a)⁴ but are disproportionately affected by and highly vulnerable to climate change. An analysis of their targets in NDCs is important, as these not only reflect plans to reduce GHG emissions but also show the opportunities for international collaboration that exist through commitments that are conditional on financial and technical support. Capitalising on these opportunities can help countries increase energy security, bolster climate resilience and capture a range of socio-economic benefits.

¹ In this brief, renewable targets in NDCs are treated differently from targets in national policies that exist outside the framework of the Paris Agreement. For more details, refer to the Appendix (A1).

² Up from 194 since IRENA's previous annual update in November 2022. Eritrea is the latest country to ratify the agreement, on 7 February 2023 (UNFCCC, n.d.b).

³ LDCs are defined as countries that have low levels of income and face severe structural impediments to sustainable development (UNDESA, n.d.).

⁴ SIDS make up less than 1% of the world's GHG emissions (World Bank, n.d.a).



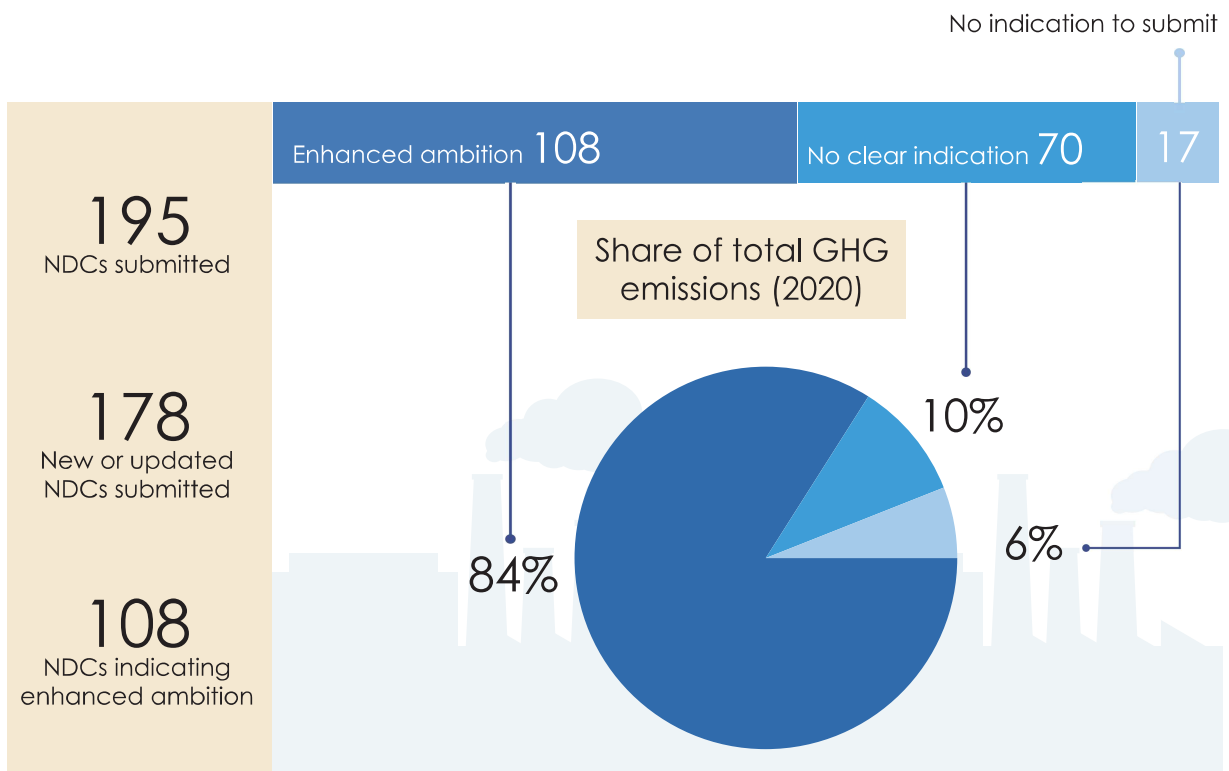
1 STATUS OF NDC SUBMISSIONS AS OF END-OCTOBER 2023

As of end of October 2023, a total of 108 Parties making up 84% of the world's GHG emissions had updated and enhanced their NDCs. Still, the level of ambition of the commitments made to date is not sufficient to limit global temperature rise to 1.5°C.⁵

By the end of October 2023 in the run-up to COP28, almost all countries had ratified the Paris Agreement and submitted NDCs. A total of 108 Parties making up 84% of world's GHG emissions had updated their NDCs at least once since their first submission, with clear enhancements made in ambition in terms of emission reduction targets. The latest Parties to enhance ambition since COP27 in November 2022 include Andorra, the Bahamas, the European Union, Mexico, Türkiye, Turkmenistan, the United Arab Emirates (UAE), Uruguay and Viet Nam.

There are 70 Parties for which an enhancement of ambition is not clear and 17 Parties that are yet to submit an updated NDC. Collectively, these Parties represent around 16% of global GHG emissions (Figure 1).

Figure 1 NDCs by ambition and share of global emissions (as of end October 2023)



Note: The European Union and its 27 Member States communicated one joint NDC that, for this report, has been counted as one NDC representing 28 Parties.

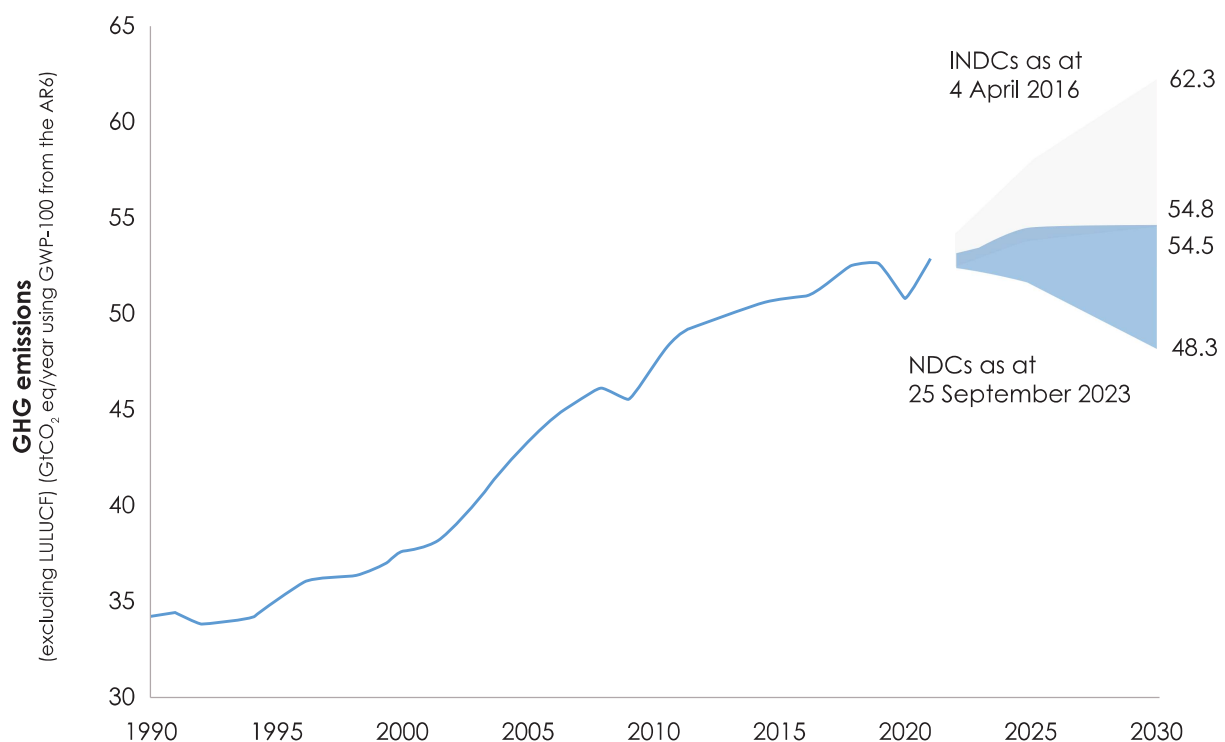
Sources: Climate Watch (2023); World Bank (n.d.b).

⁵ As confirmed by the UNFCCC NDC synthesis report 2023 (UNFCCC, 2023).



Although efforts to enhance NDCs are notable, the UNFCCC NDC synthesis report shows that a full implementation of actions outlined in NDCs submitted ahead of COP28 (up to September 2023), including all conditional elements, would only limit temperature increase to 2.1-2.3°C. Global GHG emissions in 2030 are estimated to remain constant or at best experience a slight reduction, ranging from 48.3 gigatonnes of carbon dioxide equivalent (GtCO₂eq) to 62.3 GtCO₂eq compared to today's levels of 52.6 GtCO₂ (UNFCCC, 2023) (Figure 2). According to IRENA's 1.5°C Scenario, global carbon dioxide (CO₂) emissions alone must fall by 30% or more compared to 2023 levels to below 25 GtCO₂ by 2030 (IRENA, 2023a). This confirms that the overall level of ambition falls far short of setting the world on a climate safe pathway.

Figure 2 Global GHG emissions projected under NDC implementation (for NDCs submitted up to September 2023)



Note: INDC = intended nationally determined contribution , LULUCF = land use, land-use change and forestry , GWP = global warming potential and AR6 = IPCC (2022).
Source: UNFCCC (2023).

IRENA has engaged with Parties to support their NDC implementation and enhancement efforts in collaboration with development agencies and partners. This engagement has included 26 SIDS, 22 LDCs and 21 landlocked developing countries (LLDCs), contributing to countries' climate policy and planning processes (Box 1).



Box 1. IRENA's support on NDC enhancement and implementation

IRENA is supporting 95 Parties to the Paris Agreement and has delivered 190 activities related to NDC enhancement and implementation through direct country engagement in collaboration with development agencies and partners.

IRENA's climate action support activities call on the agency's expertise to increase renewable energy capacity and implement different facets of the energy transition. IRENA's work packages include:

- data and statistics
- monitoring, reporting and verification systems
- technology and infrastructure technical analysis
- capacity building in renewable energy policy and finance
- resource assessment
- long-term energy planning
- renewable energy power system flexibility
- renewables readiness assessments
- renewable energy roadmaps (REmap)
- renewable energy project facilitation services.

Source: IRENA (2023b)



2



2 STATUS OF RENEWABLE ENERGY TARGETS IN NDCs AS OF OCTOBER 2023

Of the 148 Parties that have a quantifiable renewable energy target in their NDCs, 113 have power targets and only 33 have targets for end uses such as heating, cooling and transport, despite the need for more ambitious, concrete targets for end uses to achieve climate goals.

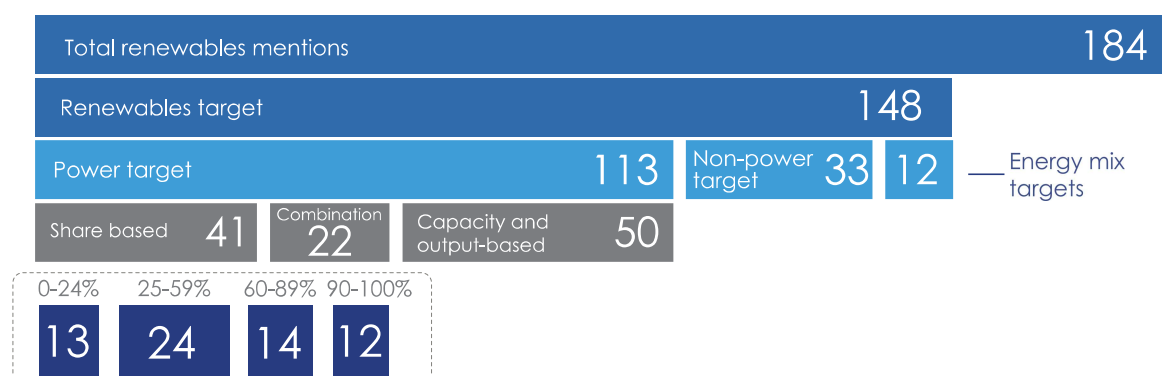
Renewable energy is a key component of the energy transition and the most widely adopted mitigation option for Parties (UNFCCC, 2023). As of end-October 2023, 184 Parties had included renewable energy components in their NDCs, of which 148 had a quantifiable target. Only 12 Parties had committed to a percentage of renewables in their overall energy mixes.

Of the quantifiable targets, 113 focus on the power sector and only 33 cover other end uses such as heating, cooling, transport and/or cooking. To achieve climate goals, concrete and quantified renewable energy targets for end uses beyond power are needed.

Nevertheless, power sector targets are welcome and necessary. In IRENA's 1.5°C Scenario, by 2050, half of the total energy consumption comes from electricity (up from 22% in 2020), with over 90% of that electricity sourced from renewables (compared to 28% in 2020) (IRENA, 2023a). As such, significant scaling up of renewable energy deployment in the power sector, together with the electrification of end-use sectors such as heating and transport, is crucial to achieving climate goals.

Of the 113 Parties that had defined targets for renewables in the power sector in their NDCs, 50 presented them in the form of absolute targets, mostly in the form of capacity (megawatts, or MW) and a few in terms of output (megawatt hours, or MWh). Of the 63 Parties with targets defined as a share of the power mix, 13 commit to achieving a renewable energy share lower than 24%, 24 commit to a share between 25% and 59%, 14 commit to shares between 60% and 89%, and 12 commit to shares between 90% to 100%, and most of these are SIDS⁶ (Figure 3).

Figure 3 Renewable energy targets in NDCs globally

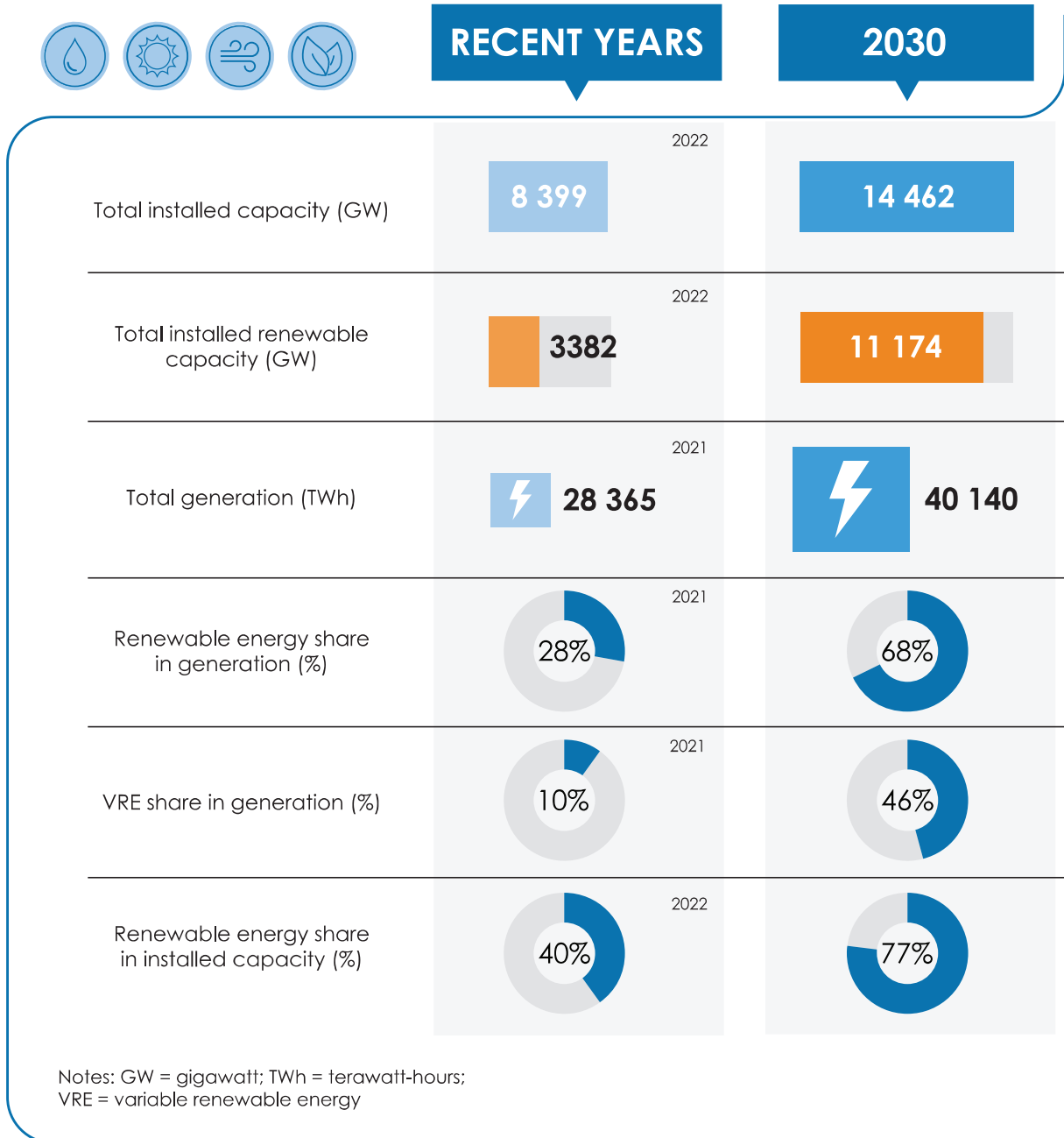


Note: RE = renewable energy, MW= megawatts, MWh= megawatt hours; numbers in Figure 3 correspond to the number of NDCs that mention a particular type of target.

⁶ Barbados, Cook Islands, Dominica, Fiji, Guyana, Saint Kitts and Nevis, Samoa, Solomon Islands, Tuvalu and Vanuatu.

Against this backdrop, the Presidency of COP28, hosted in the UAE, has been calling on policy makers, energy authorities, industry and civil society to agree on global targets to triple renewable power generation capacity to more than 11 000 gigawatts (GW) - or 11 terawatts (TW) - and double the energy efficiency improvement rate by 2030 (IRENA, 2023c). Figure 4 shows the global targets related to the power sector according to IRENA’s 1.5°C Scenario for 2030, along with the progress made in recent years. The rest of this brief focuses on renewable energy targets in the power sector.

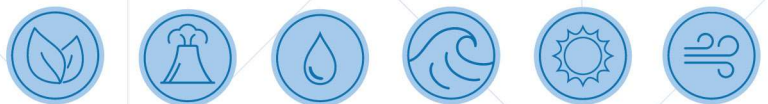
Figure 4 Global power sector targets for 2030 to align with the 1.5°C Scenario



Source: (IRENA, 2023c) based on (IRENA, 2023a and 2023d).



3



3 ANALYSIS OF RENEWABLE POWER TARGETS IN NDCs CONSIDERING CALLS FOR THE PLEDGE TO TRIPLE CAPACITY BY 2030

This section analyses renewable power targets in NDCs as of October 2023 across four dimensions. First, it quantifies them and analyses their level of ambition with regard to IRENA's 1.5°C Scenario and calls for tripling renewables globally by 2030. Second, it looks at progress made with respect to these targets, *i.e.* what portion of the target has been achieved. The third dimension is conditionality: for developing countries, the analysis identifies the portion of targets that are conditional on financial assistance and the minimum level of financing needed to support the achievement of these targets. The last dimension is alignment with national energy plans, policies and laws, which also indicates how binding these targets are. This builds on the recommendations from IRENA's report *Renewable energy targets in 2022: A guide to design*, which highlighted that for renewable energy targets in NDCs to be implemented, they need to be aligned with renewable energy targets set in national energy plans, policies and laws (IRENA, 2022a). This analysis focuses specifically on G20 Parties, LDCs and SIDS.

3.1 G20 PARTIES

Climate commitments and renewable energy targets of G20 members fall drastically short of the levels needed to limit global temperature rise to below 1.5°C. The commitments made in their NDCs are less than half of what they need to be to align with the global goal of tripling renewables, and targets in national energy plans and policies fall short by 30%. This necessitates an urgent and significant escalation of commitments.

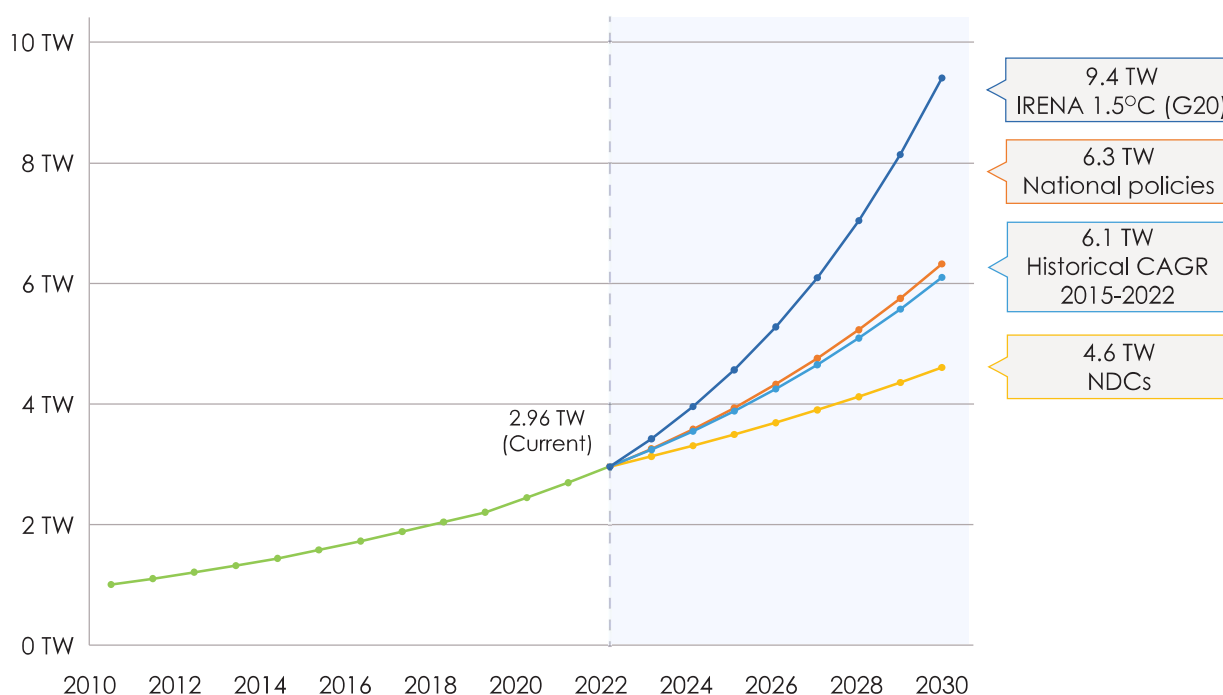
At the 18th G20 Summit in September 2023, G20 leaders declared their intent to “pursue and encourage efforts to triple renewable energy capacity globally through existing targets and policies, as well as demonstrate similar ambition with respect to other zero and low-emission technologies, including abatement and removal technologies, in line with national circumstances by 2030” (G20, 2023). Per IRENA's 1.5°C pathway and the pledge to triple renewable power globally, the G20 alone would need to grow renewable installed capacity from less than 3 TW in 2022 to 9.4 TW by 2030, accounting for 80% of the global share. The commitments made in NDCs are less than half of what they need to be to align with the tripling renewables pledge, and those made in national energy plans fall short by 30%.

As of October 2023, 13 of the 20 members of the G20 had set renewable energy power targets in their NDCs. A quantification of these targets finds that if they were all met by 2030, this would result in just 4.6 TW of installed capacity in G20 economies (Figure 5). However, looking at the commitments made in national policies and plans (excluding announcements), G20 members are already planning to install 6.3 TW (Ember, 2023). This shows that the current ambition laid out in both the NDCs and the national energy plans of G20 Parties is insufficient. Moreover, not all commitments made at the national level are reflected in global climate pledges or NDCs.

Current commitments in NDCs and national plans are also not ambitious when compared to recent deployment trends. G20 Parties have already met 64% of the targeted capacity in NDCs, and historical data show the

capacity added has been growing at a cumulative annual growth rate (CAGR) of around 9.5% since 2015. If the same growth rate is retained, installed capacity would reach 6.1 TW in 2030. This is just below the total targeted capacity in national policies and plans. This lack of ambition in both NDCs and national policies may actually act as a cap on renewables, hindering rather than promoting their deployment.

Figure 5 G20 renewable installed capacity, historical trends and future projections based on NDCs vs. IRENA's 1.5°C Scenario



Misalignments between targets set in NDCs and national policies underscore the need for further harmonisation between climate pledges to the international community and policy objectives set within countries' national contexts.

Among the 13 of the G20 Parties that have renewable power targets in their NDCs, 11 are aligned with their national policy documents.⁷ Mexico is the only G20 Party with a partially aligned target,⁸ as the NDC communicates a target of approximately 40 GW by 2030, whereas the National Electric System Development Program 2023-2037 (PRODESEN) targets 52.2 GW of installed capacity (Ember, 2023). While Canada has a national-level target in its policy documents, its NDC communicates several power targets at the state level. The alignment check was inconclusive, and targets differ in terms of the extent to which they are binding.

⁷ Once a renewable energy target in the NDC is identified (based on the methodology in the Appendix), the target is considered aligned if it matches with the active target(s) in the national policy documents. As targets may be expressed in different formats (e.g. capacity-based vs. percentage-based), the alignment is verified by quantifying the targets in terms of MW (see methodology in the Appendix for more details). Targets are considered aligned if they are within 15% of each other.

⁸ A target is considered partially aligned if both the NDC and national policy documents have quantifiable targets but the difference exceeds the 15% difference criteria – this means that at least part of the NDC target is reflected in the national policies.

For the remaining 7 Parties that do not have a target in their NDCs but have one in their national energy plans, the targets are considered misaligned.⁹ While some of the misalignment, in the case of G20 Parties, may be due to national energy plans being more up to date, it may also indicate that renewables are being pursued for objectives that go beyond climate. In any case, commitments to the international community under the Paris Agreement need to be more harmonised with targets in national energy plans, and they need to be more ambitious to achieve global climate goals.

Developing G20 countries are calling for enhanced international financial and technical support to fulfil their commitments made in the NDCs. While Just Energy Transition Partnerships (JETPs) are gaining traction as a support mechanism to deliver these commitments, considerable uncertainty remains regarding their sufficiency, fairness and execution.

Conditionality features in the commitments of some G20 countries. The NDCs of India, Indonesia and Türkiye suggest the need for international financial assistance and technology transfer. India's NDC aims at "50% cumulative installed capacity from non-fossil fuel-based resources by 2030, with the help of transfer of technology and low-cost international finance including from Green Climate Fund (GCF)" (Government of India, 2022). Türkiye's NDC (updated in 2023) includes an 86 GW renewable energy target while specifying the need for "significant international financial support for its climate-friendly technical assistance and investment projects" (Government of Republic of Türkiye, 2023). Indonesia has included unconditional renewable energy targets (as part of its CM1 Scenario) but stated that further efforts would be pursued should international financial support become available (CM2 Scenario) (Government of Indonesia, 2022). This brings unconditional commitments to just 4.3 TW of cumulative installed capacity (93% of the 4.6 TW committed in NDCs), while 7% of the overall capacity targeted by G20 is conditional on international financial support.

For developing countries, mobilising financing at affordable terms will be key to supporting their energy transitions and preventing them from locking into unsustainable fossil fuel investments (IRENA, 2023a; World Bank, 2023). To address this, the JETPs have been developed specifically to leverage concessional financing and technical assistance from developed economies, to attract the necessary investment for transitioning countries from fossil fuels to renewables (Box 2).

⁹ Targets are considered misaligned when the NDC does not have a renewable energy target but there is an active target in the national policy documents (or vice versa).

Box 2. Just Energy Transition Partnerships

The JETPs are innovative funding models that can support developing countries to achieve their energy transitions. Underscored by multi-billion-dollar financial commitments – from the International Partners Group (IPG)¹⁰ and other partners, such as the Glasgow Financial Alliance for Net Zero (GFANZ) – the JETPs include dedicated justice components to support the transition in economic sectors and communities adversely affected by decarbonisation efforts. To date, four JETPs have been agreed, as described in Table 1.

Table 1 JETP programmes by country, package size, donors and timeline

Beneficiary country	Amount (USD)	Donors	Timeline
South Africa	8.5 billion	United Kingdom (lead), European Union, France, Germany, United States.	2023-2027
Indonesia	20 billion ¹¹	United States, Japan (leads), Canada, Denmark, European Union, France, Germany, Italy, Norway United Kingdom, and GFANZ.	2023-2027
Vietnam	15.5 billion ¹²	United Kingdom, European Union (leads), Canada Denmark, France, Germany, Italy, Japan, Norway, United States, and GFANZ.	2023-2027
Senegal	2.7 billion	European Union (lead), Canada, France, Germany, United Kingdom.	2023-2027

Note: USD = United States dollar.

Since these partnerships have been established, some key issues are evident.

JETPs only represent a small fraction of the required investment needed to meet the NDC targets.

The government of South Africa has emphasised that the lower end of the NDC target – 350-420 megatonnes of carbon dioxide equivalent (MtCO₂eq) by 2030 – is entirely conditional on available financing. The JETP commitments to date, however, only represent around 10% of the investment needed per the Just Energy Transition Investment Plan (JET-IP), which stands at USD 80 billion (equivalent to ZAR 1.5 trillion [South African rand]). The same goes for Indonesia. The country commits to reducing 1 953 MtCO₂eq by 2030, more than 80% of which is conditional on financial support. The Indonesian government estimates that it will need at least USD 96 billion for new renewable energy generation and transmission and distribution and an additional USD 150 200 billion annually from 2021-2030 for low-carbon programmes to meet its goal of net zero carbon emissions by 2060 or sooner (Reuters, 2021a), making the initial USD 20 billion commitment from the JETP a minute, yet important, first step. Other sources of funding must be tapped and mobilised to enable countries to achieve their NDC targets.

¹⁰ Comprising Canada, Denmark, the European Union, France, Germany, Italy, Japan, Norway, the United Kingdom and the United States.

¹¹ USD 10 billion of public sector finance from IPG and USD 10 billion from private sector finance mobilised by GFFANZ.

¹² USD 7.75 billion of public sector finance from IPG and USD 7.75 billion from private sector finance mobilised by GFFANZ.



In addition, **the JETP's financing compositions put into question whether these partnerships are indeed just.** Only 4% of South Africa's JETP is in the form of grants, while 81% are composed of loans and the rest are guarantees (The Presidency - Republic of South Africa, n.d.). The indicative mix for Viet Nam's JETP financing package is 1.3% in grants (Chinh, 2022), while the rest is expected to consist of loans. For Indonesia, only USD 292 million (equivalent to 2.5% of public funding committed by IPG countries) has been earmarked as grants, while the rest comes in the form of loans, equity and guarantees (JETP Indonesia, 2023).

Furthermore, elements focusing on social justice are quite small compared to projects for low-carbon and renewable projects. In South Africa's JET-IP, jobs and skills development account for only 0.17% of the total amount (Center for Global Development, 2023). Similarly, just transition components in Indonesia's Comprehensive Investment and Policy Plan are allocated only USD 28.8 million or 0.25% of total IPG funding (excluding GFANZ). A thorough assessment of whether financing for social justice components is adequate is needed.

Justice cannot be largely contingent on private financing and bankability (IRENA and CPI, 2023). A higher share of grants and concessional financing should be a core underpinning of these JETPs. This can help lower the overall cost of financing and encourage sufficient crowding in of the private sector to cover the capital shortfall.

Most targets in national policy documents that align with those in NDCs are not legally binding.

For G20 members that have targets in NDCs that are partially or fully aligned with those set in national policy documents, their level of bindingness varies. Only five Parties have reflected their NDC targets in a national law (or regional law, in the case of the European Union), while seven have only reflected them in plans and roadmaps. In terms of targeted capacity by 2030, about 43% of the additional 1 672 GW to be installed between 2023-2030 per the G20's NDC commitments is legally mandated (mainly in the European Union and Indonesia), and 57% is part of non-binding policy documents such as plans and roadmaps.

Making renewable energy targets legally binding (including other targets for the phaseout of fossil fuels) can help provide more clarity and certainty to the global community of the countries' renewable energy ambitions (Johnston and van der Marel, 2016). This is important for the international community to understand the respective contribution of each country towards mitigating emissions, and the global pledge to triple renewables by 2030. It may also have an effect domestically, encouraging governments to allocate the right level of resources and efforts towards enacting the needed regulations and incentives. This can in turn provide clear signals and incentives for investors and other relevant stakeholders, thereby facilitating the development of relevant technologies and supporting their commercial deployment. Moreover, it allows for governments to be held accountable and provide further transparency regarding the measures that will be undertaken to achieve a target – with the United Kingdom (UK) being a case in point (Box 3).

Box 3. Legally binding targets and accountability in the United Kingdom and Germany

In 2022, the United Kingdom's High Court ruled the country's net zero strategy unlawful, in breach of the 2008 Climate Change Act, which legally binds the UK government to reducing GHG emissions by at least 100% of 1990 levels (net zero) by 2050 (Climate Change Committee, 2023). The court deemed the net zero strategy insufficient in delivering the required emission reductions to meet the 2050 target, while failing to provide sufficient details on how the target could be managed under the United Kingdom's legally binding carbon budgets.

With this accountability mechanism in place, it became possible to assess whether the United Kingdom's policies and plans align with commitments made to the international community under the Paris Agreement framework. This demonstrates how establishing legally binding targets can allow for governments to be held accountable, although well-functioning and robust legal institutions are prerequisites for this accountability to be achieved.

In response to this ruling, the government launched a package of 44 documents, including a Carbon Budget Delivery Plan in March 2023 that outlined how the government intends to meet its legally binding climate goals and the emissions impact of government policies over the next 15 years. However, the statutory advisory body established under the Climate Change Act, the Climate Change Committee, remains concerned about the likelihood of achieving the United Kingdom's future targets. According to the committee, recent policy announcements were not accompanied by estimates of their effect on future emissions (Climate Change Committee, 2023).

In 2021, a similar ruling in Germany led to the government committing to a more ambitious target to become GHG neutral by 2045 (compared to 2050 earlier) after the country's constitutional court declared the climate protection measures insufficient (Reuters, 2021b).

Source: Carbon Brief (2023).

To support energy sector long-term planning and inform policy making, many countries have been developing long-term energy scenarios (LTES). With the adoption of the Paris Agreement in 2015, countries were encouraged to submit long-term low greenhouse gas emission development strategies (LT-LEDS) to the UNFCCC to inform long-term climate policy (Box 4).



Box 4. Long-term energy scenarios (LTES) and long-term low GHG emission development strategies (LT-LEDS)

Aligning climate commitments with national energy strategies is a key focus not only for NDCs but also for more long-term energy and climate plans. IRENA's (2023e) report evaluates the alignment between 24 official Long-Term Energy Scenario (LTES) documents and 36 Long-Term Low Greenhouse Gas Emission Development Strategies (LT-LEDS) from 45 countries. The assessment aims to gauge alignment at both institutional and technical levels, identifying areas for improvement.

The findings indicate that when LTES and LT-LEDS processes are harmonized, the resulting mitigation plans become more robust. Documents stemming from multiple or interdisciplinary ministries with both energy and climate in their portfolios offer scenarios that encompass a broader spectrum of transitional elements. Furthermore, these processes can build on each other; LTES provide 10-20% more quantitative insights into energy production, transmission, distribution and storage than LT-LEDS, while LT-LEDS offer around 10-15% more quantitative representation of socio-economic aspects. A synergized approach to LTES and LT-LEDS would contribute to a more comprehensive national strategy.

The report recommends basing climate change mitigation strategies on scenarios, as this fosters a scientifically rigorous coordination of planning aligned with resultant proposals. As of October 2022, 36 LT-LEDS have incorporated scenarios as their primary tool to delineate alternative pathways and targets, quantitatively assessing the short- and medium-term policies required to achieve long-term objectives.

Preliminary findings from an upcoming IRENA study on LTES and LT-LEDS alignment emphasise the need for alignment between national energy scenarios and international climate commitments. There is a general lack of quantifiable data, especially on energy-related indicators, in LT-LEDS, particularly those that are not based on scenarios.

Source: IRENA (2023e).

3.2 LDCs

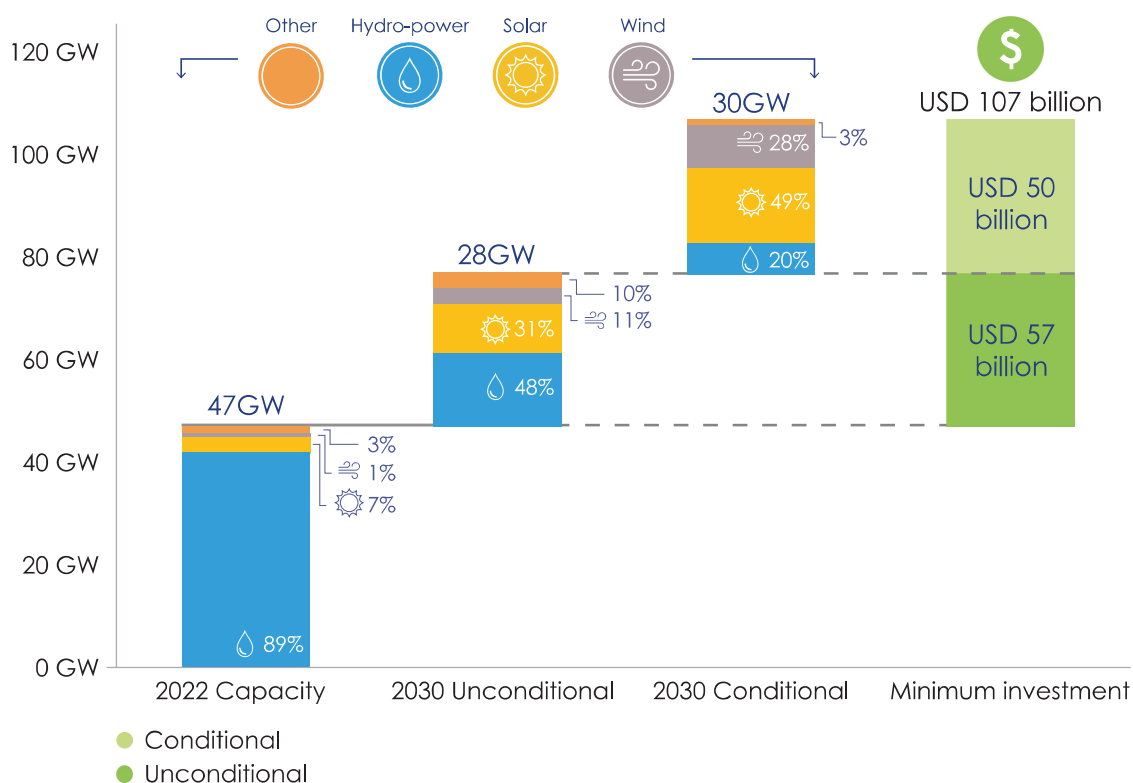
Despite global commitments, current financial and technological support for LDCs remains alarmingly insufficient, necessitating a significant scale-up in international assistance to achieve objectives that include, but also go beyond, climate.

LDCs contribute to less than 4% of global GHG emissions (World Bank, n.d.b) but are particularly vulnerable to climate change due to their “geographical location, economic structures, labour market composition and limited adaptive capacity” (UNDP, 2022). Almost all LDCs have set ambitious targets for renewable energy deployment, which offers an opportunity for socioeconomic development based on reliable, affordable and sustainable energy.

A total of 46 Parties to the Paris Agreement that are classified as LDCs have committed to a total of 105 GW of renewable installed capacity by 2030 in their NDCs (a total of 47 GW was installed as of 2022, out of which almost 90% is hydropower). About 28 GW remains to be installed unconditionally – through a mix of domestic and international public and private funding sources – and an additional 30 GW is conditional on securing additional international financial support (Figure 6). These conditional targets predominantly focus on relatively more emerging technologies such as solar photovoltaic (PV) (49%), onshore wind (28%) and hydropower (20%). In contrast, unconditional targets, which are more reliant on domestic public funding, lean more towards hydropower (48%), followed by solar PV (31%) and onshore wind (11%). As unconditional targets often rely on domestic public sources, and hydropower has traditionally been funded through public sources (often domestic), this difference in technological breakdown makes sense (IRENA and CPI, 2023; Larosa *et al.*, 2022).

A minimum of USD 104 billion is needed to achieve LDC’s NDC target of installing an additional 58 GW of capacity by 2030, out of which at least USD 48 billion must be provided through international sources (conditional) (Figure 6). Additional support will be needed in the form of technical assistance, capacity building and technology transfer.

Figure 6 NDC targets in LDCs by conditionality and the minimum level of financing needed



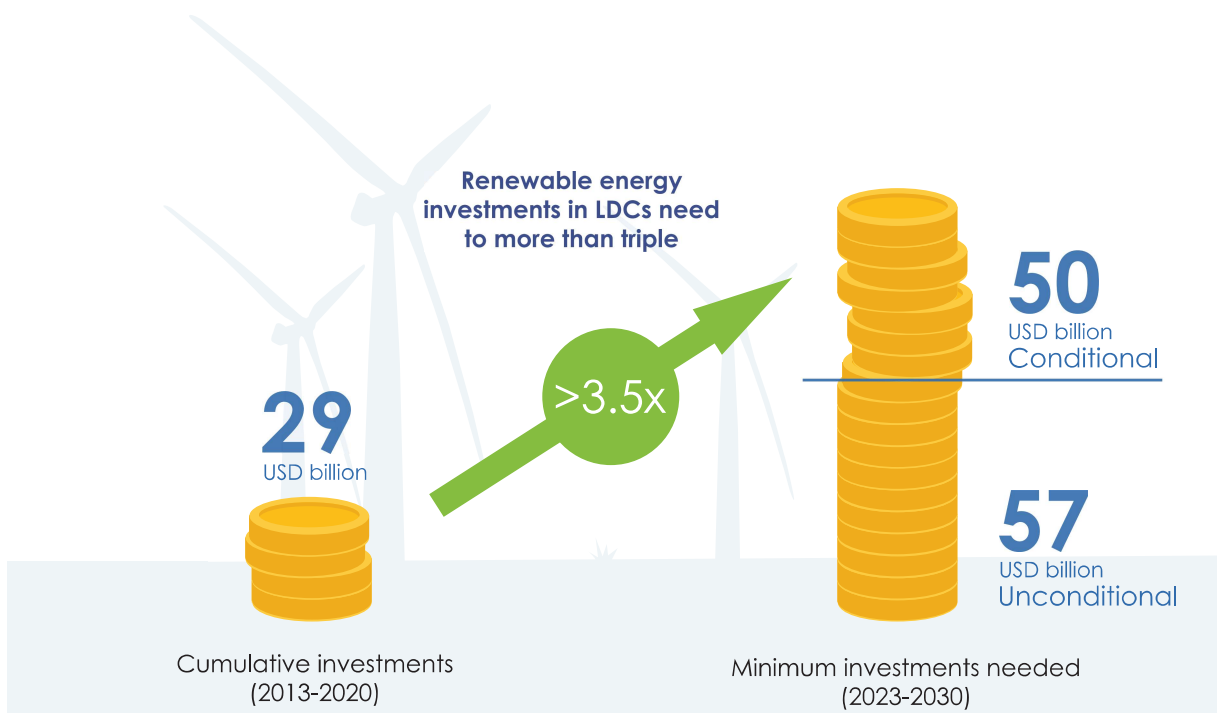
Renewable energy investments in LDCs must more than triple in the period 2023-2030 compared to 2013-2020, during which LDCs received fewer than 1% of global investments. Going forward, the international community must provide low-cost, affordable financing in the form of concessional loans and grants to enable LDCs to pursue a renewable-powered future and avoid locking into unsustainable fossil fuel infrastructure.

Scaling up affordable renewable energy financing to LDCs, including for off-grid applications, is of paramount importance to advance progress on energy access and achieve broader socioeconomic development goals. Currently, 481 million people lack access to electricity in LDCs, and this figure is expected to grow by 2030 (IEA, *et al.*, 2023). IRENA and CPI’s *Global landscape of renewable energy finance* report shows that LDCs have received less than USD 30 billion in renewable energy investments between 2013-2020, equivalent to less than 1% of the global total. Their share has likely dropped further since the pandemic as investments in 2021-2022 became further concentrated in advanced economies including China, Europe and North America (IRENA and CPI, 2023).

The international community must step up its efforts to address this inequality. Developed country governments should work with development partners, particularly multilateral development banks (MDBs), to expand the availability of capital for public investments in renewable energy and transform lending to LDCs by providing more grants and concessional financing (IRENA and CPI, 2023; IEA, *et al.*, 2023; Duma and Cabré, 2023) (see Box 6).

There is more than a USD 100 billion renewable energy investment opportunity in LDCs (Figure 7) as communicated through their NDCs. Failing to capture this opportunity could lock many countries into fossil fuel investments with lower upfront costs, and even more, it represents a key test for the international community to come through on their commitment to leaving no one behind.

Figure 7 Renewable energy investment in LDCs, historical investment (2013-2020) vs. future investment needs (2023-2030)



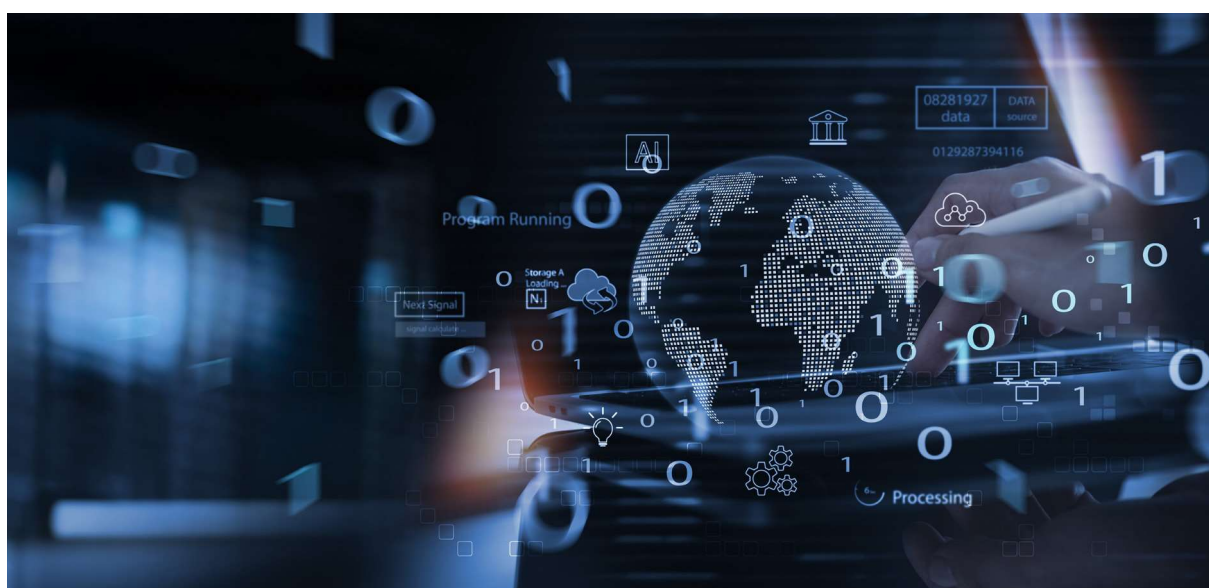
The international community must step up and scale up financing for a just and inclusive energy transition, part of which also includes honouring the USD 100 billion per year commitment of climate finance from developed to developing countries. As of 2021, this commitment had not yet been met, with climate financing totalling less than USD 90 billion that year. Preliminary findings suggest that this goal may have been met for the first time in 2022, but this is subject to confirmation at a later stage (OECD, 2023). From a macro perspective, this commitment is rather small. It is estimated that on average, around USD 9 trillion climate finance is needed globally until 2030 (up from around USD 1.3 trillion committed in 2021-2022) (Climate Policy Initiative, 2023). COP28 could set the stage for a commitment to a significantly higher New Collective Quantified Goal (NCQG), with the previous unmet target of USD 100 billion per year set as a lower limit (UNFCCC, n.d.a). However, more efforts are needed to increase international collaboration, and these can be incorporated as a key part of the commitments by parties to achieving global climate goals. This approach is illustrated in the UAE's NDC, which highlights investments undertaken in developing countries (Box 5).

Box 5. Commitment to support renewable energy deployment in developing countries in the UAE's NDC

The United Arab Emirates's (UAE) Nationally Determined Contribution (NDC) extends its climate-related commitments beyond domestic borders, by assisting developing countries in mitigation and adaptation efforts. The UAE's NDC highlights that the country has supported renewable energy projects in 70 countries, including in 27 island nations, through the provision of more than USD 50 billion dollars including in the form of aid and concessional loans. Over the next decade, an additional USD 50 billion is planned with the intent to deploy 100 GW. These projects are expected to mitigate 86 million tonnes of CO₂ emissions per year by 2030.

In addition, the UAE is a key financing partner to the Energy Transition Accelerator Financing (ETAF) Platform, providing more than USD 400 million in funding. Finally, other international collaborative efforts such as the Partnership for Accelerating Clean Energy (PACE) with the United States aim to mobilise USD 100 billion to deploy 100 GW of clean energy in the United States, United Arab Emirates and emerging economies by 2035.

Source: United Arab Emirates Ministry of Climate Change & Environment (2023).



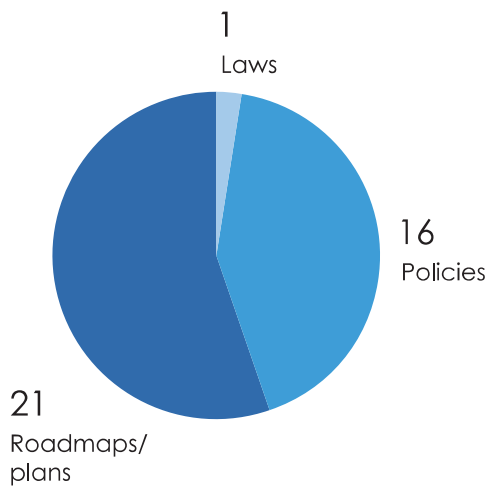
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Moreover, LDCs can further strengthen their NDCs by aligning them with national plans and policies. LDCs have committed to installing a total of 105 GW of renewable installed capacity by 2030 per their NDCs, compared to 111 GW in national plans and policies. Although these figures are close, a country-by-country analysis shows that only 11 have fully aligned their renewable targets in NDCs with targets in their national plans and policies. A total of 27 Parties had targets that were partially aligned while the remaining eight Parties had targets that were completely misaligned.

Among 38 LDCs that have full or partial alignment, only one target is reflected in a law, and an additional 16 targets are governed by policies. Most of the Parties' targets remain part of less binding roadmaps and plans (21) (Figure 8), which hints at why a significant portion of the targets are conditional on financial assistance. In other words, about 23.5 GW of the additional targeted capacity by 2030 is governed by policies; 24 GW is governed by plans, roadmaps and strategies; and only 90 MW is governed by a law, in the case of Gambia.

Figure 8 Renewable energy targets in the NDCs of least developed countries (LDCs), by type



Countries can also link NDCs to investment policies related to energy transition plans, thereby providing greater certainty regarding investment opportunities and potential projects available in the country. The United Nations Conference on Trade and Development (UNCTAD) has analysed 147 NDCs submitted by developing countries as of July 2023, and finds that only 48 provide information on investment requirements and 40 discuss prospective sources of investment (Box 6).



Box 6. Importance of international partnerships in financing renewables and achieving NDC targets

Significant investment is needed in developing economies to achieve the energy transition and limit global warming to 1.5°C. While many developing nations have outlined goals for their energy transitions in their Nationally Determined Contributions (NDCs), only around a third of these countries (48 in total) have identified investment needs. Even fewer countries (40) have proposed potential financing sources for their projects, among which the most frequently cited are multilateral development banks (MDBs) and international financial institutions (IFIs), in addition to domestic government funding and private investment from international sources.

In 2022, international project finance accounted for more than half of overall project finance for renewables globally. This share is higher in developing countries, exceeding 75% in LDCs. This highlights the importance of international investment in meeting NDC targets, particularly for developing economies. However, the majority of these nations still face challenges in attracting FDI outside of the extractives industry. To this point, 31 developing countries, including 11 LDCs, have not recorded any utility-scale renewable energy projects involving international investment. Moreover, other areas crucial for the transition, such as the enabling infrastructure (e.g. transmission and distribution), still see much lower involvement by international investors.

As real and perceived risks remain high in many developing contexts, this translates to a high cost of capital – a key barrier to attracting investments. Many developing countries, including LDCs, resort to tax incentives as they don't require immediate spending of limited public funds. But the forgone government revenue can be costly in the long-run. Moreover, they may not directly address the key challenges face by investors and keep overall costs of capital high.

Bringing in international investors can help lower the cost of capital. For example, bringing in international investors lowers the spread on debt finance (the difference between the interest rate charged on a loan and a benchmark interest rate such as the risk-free rate from a government treasury bond for instance) by 8%; adding in MDBs lowers it by 10%. A combination of international, MDB and government investments in public private partnerships shrinks the spread by 40%. Such partnerships are therefore crucial for funding renewable energy projects and related infrastructure in developing countries.

UNCTAD has proposed a Global Action Compact for Investment in Sustainable Energy for All, offering a comprehensive framework. This compact includes guiding principles addressing the trio of energy transition's objectives: achieving climate targets, ensuring affordable energy access for everyone, and maintaining energy security. Under the compact, there are six action areas: national and international investment policy-making; fostering global, regional, and South–South partnerships and cooperation; and developing financing mechanisms and tools, along with sustainable finance market

Source: UNCTAD (2023).



3.3 SIDS

SIDS have set ambitious renewable energy targets driven by objectives beyond climate, but almost half of this is conditional on international financial assistance. Providing this support represents a litmus test for the international community to honour its commitment to the Paris Agreement.

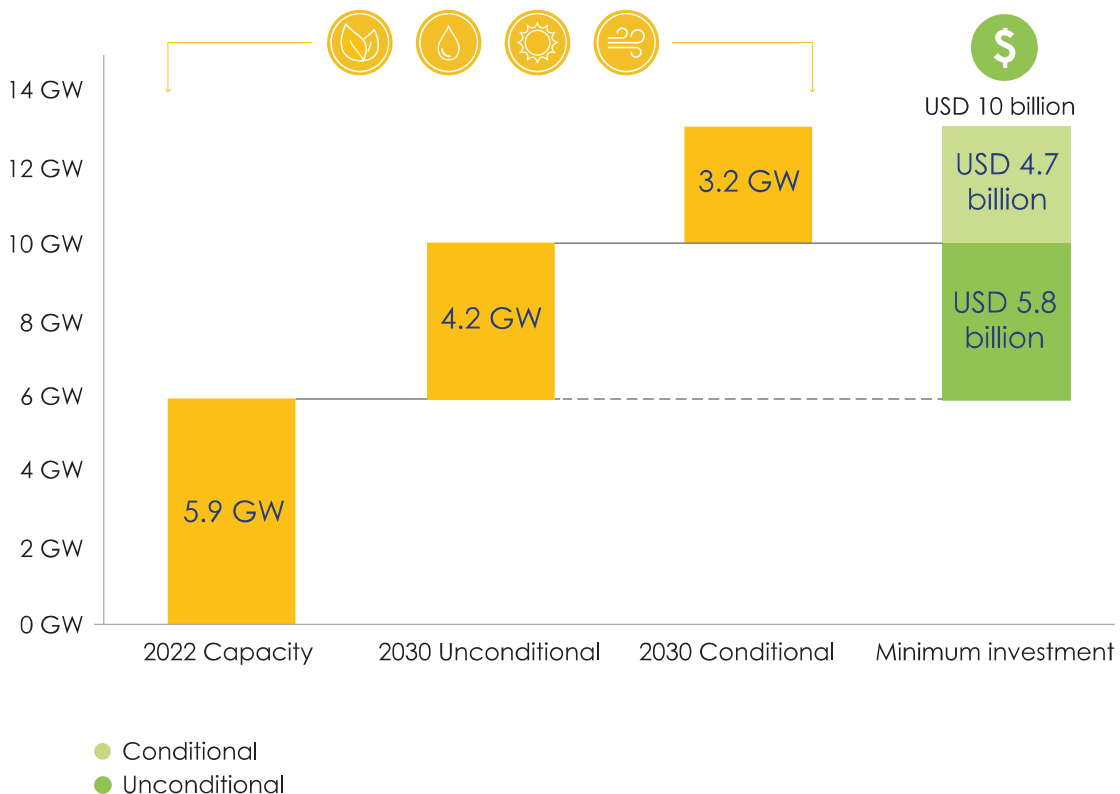
Although SIDS have the smallest contribution to GHG emissions (less than 1%), and therefore make up a small portion of the world’s GHG mitigation potential, they are increasingly capitalising on their renewable energy resources and capabilities to mitigate and adapt to climate-induced vulnerabilities while also ensuring energy security and sustainable socio-economic development. Thus, renewable energy ambitions in SIDS are mostly driven by objectives beyond climate.

Ambition with respect to national context and capacities is quite high in some SIDS, with many of these countries having set 100% renewable power targets by 2030 or beyond. A quantification of renewable energy targets in their NDCs finds that SIDS have committed to a total renewable installed capacity of more than 13 GW by 2030, up from almost 6 GW in 2022. However, almost half of the targeted capacity is conditional on international support in the form of financing, technical assistance, technology transfer, capacity building and other forms of support. IRENA estimates that SIDS will need a minimum of USD 10.5 billion to meet their NDC targets, almost half of which is in the form of financial assistance from international sources (Figure 10).

Over the last decade, commitments for energy-related development aid to SIDS have grown and gradually shifted towards renewables, particularly solar PV. But disbursement rates remain low, suggesting implementation problems. Furthermore, the distribution of aid is not only uneven, but also incongruent with areas facing the highest energy access deficits (Atteridge and Savvidou, 2019).



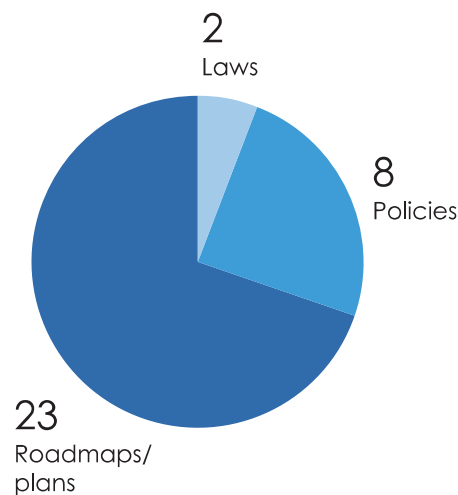
Figure 9 NDC targets in SIDS by conditionality and the minimum level of financing needed



Moreover, as in the case of LDCs, there are misalignments between NDCs and national policy documents. SIDS have committed to reaching more than 13 GW of renewable installed capacity by 2030 in their NDCs, compared to 14.6 GW in national policies. This would see renewable energy capacity more than double across SIDS, from less than 6 GW as of 2022. However, only 19 of the Parties have fully aligned their targets in national plans with their NDCs, while 14 are partially aligned, and six misaligned.¹³

Among the 33 SIDS that have targets in their NDCs and have at least partial or full alignment with national policy documents, 8 targets are governed by policies. Most (23) of the Parties' targets remain part of less binding roadmaps and plans, which again hints at why a significant portion of SIDS' renewable energy ambitions outlined in the NDCs are in fact conditional on financial assistance. In other words, about 2.3 GW of the additional targeted capacity by 2030 is governed by policies; 4.5 GW is governed by plans, roadmaps and strategies; and only 68 MW is governed by laws, in the cases of the Dominican Republic and Samoa.

Figure 10 Renewable energy targets in the NDCs of SIDS, by type



¹³The Federated States of Micronesia's NDC makes references to its state-level renewable energy plans; therefore, as in the case of Canada, Micronesia's alignment check is inconclusive and therefore has been excluded from this analysis.

4



4 CONCLUSIONS

Eight years after the Paris Agreement, climate commitments made by Parties are not sufficient to limit global temperature rise to the Paris goals of below 2°C and preferably below 1.5°C. Proposed mitigation measures primarily focus in the energy sector, which makes up more than three-quarters of GHG emissions globally. A total of 184 Parties have included renewable energy components in their NDCs, but only 148 of those have quantified targets. Of these targets, 113 focus on power. On the one hand, decarbonising power is both crucial – with more than half of energy coming from power in IRENA's 1.5°C Scenario – and more accessible, with power technologies like solar and wind achieving technological maturity. On the other hand, more concrete targets are needed for the decarbonisation of heating, cooling and transport, which together account for more than three-quarters of energy consumption.

The G20's commitments made in their NDCs are less than half of what they need to be to align with the proposed global goal of tripling renewables, and targets in national energy plans and policies fall short by 30%. This necessitates an urgent and significant escalation of commitments, while simultaneously aligning NDCs with national energy plans and policies.

Aligning renewable energy targets in NDCs and national energy plans would increase the effectiveness and credibility of both. It would also reinforce clear signals to investors, developers and other players across the supply chain, thus enabling further development of the renewable energy sector. In some cases, this will involve establishing or updating national targets. In other cases, it will mean including existing national targets in the next round of NDCs. G20 members must act in concert, raising their climate ambitions and fulfilling their enhanced pledges.

LDCs and SIDS have shown readiness to increase their ambition and accelerate the much-needed deployment of renewable energy, but to date, they continue to lack the resources needed to attract private finance. More than USD 100 billion in renewable energy investment opportunities exist in LDCs, as communicated through their NDCs. But LDCs attracted less than 1% of global investments in renewables in 2013-2020, and this is expected to have further decreased in the past couple of years.

The international community must step up and scale up financing for a just and inclusive energy transition. Part of this includes honouring the USD 100 billion per year commitment of climate finance from developed to developing countries (OECD, 2023). This has to be accompanied with a binding and robust framework for actual delivery of financing. In addition, donor countries need to integrate stronger elements of justice in their support, one way of which is by providing more grant-based and concessional financing.



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APPENDIX

A1. SIDS NOTE ON TARGETS IN NDCs VS. POLICY DOCUMENTS (LAWS, PLANS, ROADMAPS)

For the purpose of this brief, the targets in NDCs are treated differently from those in national plans and policies. This is because, relatively speaking, NDCs are inherently non-binding, while other national policy documents are to some extent more binding, depending on whether the target is part of a law, plan, roadmap etc. For this purpose, this brief first cross-checks renewable energy targets in NDCs that are reflected in national policy documents. It further checks whether these targets are part of a law, national policy, a roadmap or plan, or an announcement. Secondly, NDCs of developing countries can be conditional on international financial assistance, and it is useful to know how much of the targets are conditional. Thirdly, analysing NDCs separately helps directly inform the stakeholders of COP and the Paris Agreement framework.

A2. STUDY DESIGN

1. Data collection

- Typically, an NDC is said to have a target if the target is explicitly mentioned in the official NDC document. However, in some cases a country's NDC may not mention the target explicitly, but it may cite the policy document that includes a target. For example:
 - i. The United Kingdom's NDC does not mention a renewable energy target. However, it mentions the Energy White Paper, which has a number of renewable energy targets, and these are considered as contributing to the broader emission reduction target. The targets in the white paper are therefore implicitly linked to the NDC.
 - ii. Similarly, Liberia's NDC does not explicitly state renewable energy targets, but it does mention the National Renewable Energy Action Plan, which cites a target of reaching 95% renewable electricity capacity in 2030.
- For such cases, the NDC is considered to have a (implicit) target.

2. Analysis

- Once the NDC target is identified (either as explicitly mentioned or implicitly mentioned in the document), it is compared to the active renewable energy targets across all relevant national policy documents (laws, plans, roadmaps, policies etc.) to assess the alignment between what countries are communicating to the international community and what they are committing to within their own national frameworks.
- As targets are communicated in various different forms (e.g. percentage of total electricity generation or installed capacity by a certain year), all targets are quantified in terms of installed capacity using the methodology in Appendix A3.
- This allows for both a qualitative and quantitative comparison in case targets are communicated in different forms, but would eventually result in the same installed capacity.
- Wherever possible, unconditional targets are identified, and the level of minimum financing needed to achieve these targets is estimated based on the costs figures detailed in IRENA (2022b and 2023f).

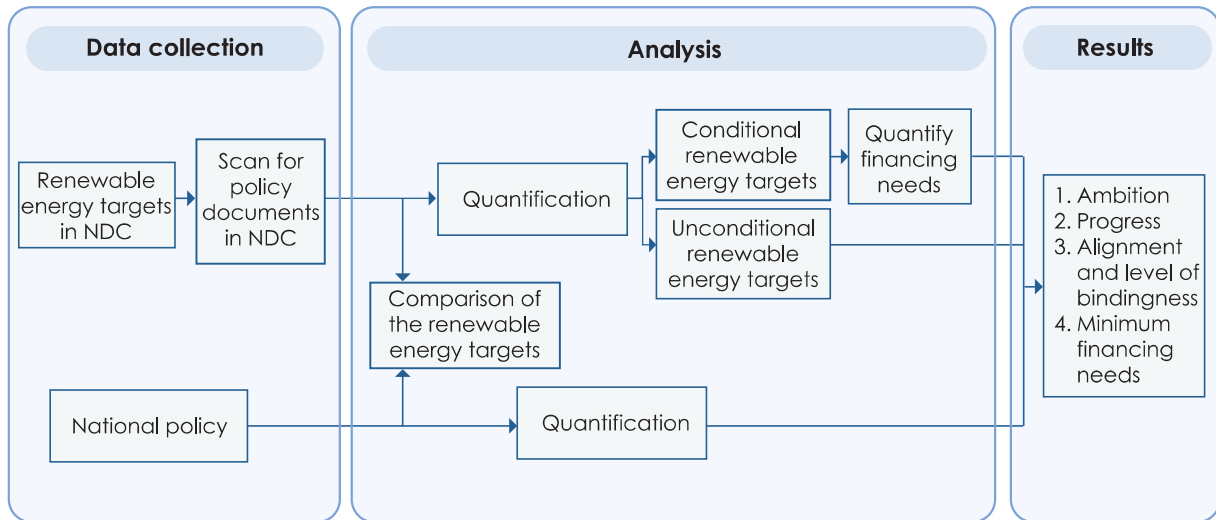


3. Results

- The results of this exercise have been compiled in this brief.

The study design has been summarised in figure A.1 below

Figure A1 Study design



A3. QUANTIFICATION METHODOLOGY

The methodology for the quantification of targets can be found in Rana and Abou Ali (2022) and at www.irena.org/Technical-Papers/Renewable-energy-targets-in-SIDS.

NDCs AND RENEWABLE ENERGY TARGETS IN 2023

Tripling renewable power
by 2030



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