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About IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future and serves as the principal platform for international co-operation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy, in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity. **www.irena.org**

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ABBREVIATIONS

AI	artificial intelligence
BESS	battery energy storage systems
BNEF	Bloomberg New Energy Finance
°C	degree Celsius
CAPEX	capital expenditure
CCUS	carbon capture, utilisation and storage
CIP	Climate Investment Platform
CO_2	carbon dioxide
COP	Conference of the Parties
CSP	concentrated solar power
EDGAR	Emissions Database for Global Atmospheric Research
ESCAP	Economic and Social Commission for Asia and the Pacific
ETA	energy transition assessment
ETAF	Energy Transition Accelerator Financing
EV	electric vehicle
FfD4	4th International Conference on Financing for Development
GCF	Green Climate Fund
GDP	gross domestic product
GHG	greenhouse gas
GST	Global Stocktake
$GtCO_2eq$	gigatonnes of carbon dioxide equivalent
GW	gigawatts
ICTU	Information necessary to facilitate Clarity, Transparency and Understanding
IEA	International Energy Agency
IEEFA	Institute for Energy Economics and Financial Analysis
IOT	internet of things
IRENA	International Renewable Energy Agency
ITMOs	Internationally transferred mitigation outcomes
kWh	kilowatt hour
LCOE	levelised cost of electricity
LT-LEDS	Long-Term Low Emission Development Strategy
MACC	marginal abatement cost curve
MEPS	minimum energy performance standards
MRV	measurement, reporting and verification
$MtCO_2eq$	million tonnes of carbon dioxide equivalent
MW	megawatt
NDC	Nationally Determined Contribution
NDCP	NDC Partnership
NECP	National Energy and Climate Plan
O&M	operation and maintenance
OECD	Organisation for Economic Co-operation and Development
OPEX	operating expenditure
PPA	power purchase agreement
ppm	parts per million
PPP	purchasing power parity
PV	Photovoltaic
SAF	sustainable aviation fuels
SDG	Sustainable Development Goal
SIDS	small island developing states
TES	total energy supply
TWh	terawatt hours
UAE	United Arab Emirates
UK	United Kingdom
UNDP	United Nations Development Programme
UNEP-CCC	United Nations Environment Programme – Copenhagen Climate Centre
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USD	United States dollar
VRE	variable renewable energy
W/m^2	watts per square metre
WMO	World Meteorological Organization

1. GLOBAL OUTLOOK

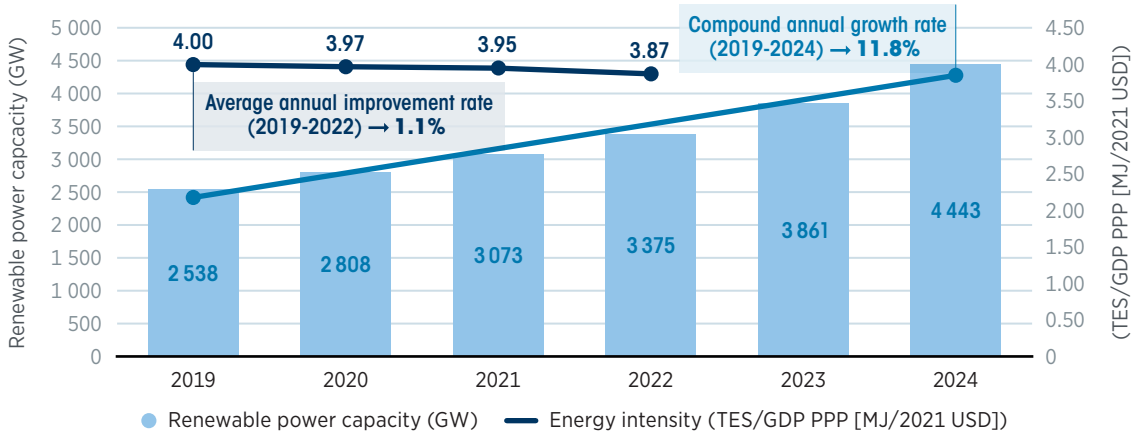
The years leading up to 2030 are critical to put the world back on course to keep global temperature rise to within 1.5°C of pre-industrial levels. According to the World Meteorological Organization's *State of the Global Climate 2025*, atmospheric concentrations of major greenhouse gases – carbon dioxide (CO_2), methane and nitrous oxide – reached their highest levels in 800 000 years in 2023 (WMO, 2025a). In 2024, the global average surface concentration of CO_2 reached 423.9 parts per million (ppm) - representing a year-on-year increase of 3.5 ppm, which is the largest one-year increase on record (WMO, 2025b). Equally alarming, 2024 has been confirmed as the warmest year in the 175-year global temperature record, surpassing all previous years and reinforcing the urgency of accelerating climate mitigation efforts (WMO, 2025a).

Reaching net-zero greenhouse gas (GHG) emissions by 2050 in accordance with the Paris Agreement remains possible, but it will demand accelerated and more ambitious levels of climate action, given that it appears inevitable that the world will overshoot the global emissions target. Scaling up renewables and improving energy efficiency are among the most economically realistic options that can be taken globally by 2030 if the world is to achieve net zero by 2050 and avoid dangerous climate change.

In 2024, global renewable power capacity grew by a record 582 gigawatts (GW) – 15.1% year-on-year growth from 2023 – bringing total installed capacity to 4 443 GW (Figure 1). Solar photovoltaic (PV) dominated, contributing 452.1 GW (77.8%), followed by wind at 114.3 GW. Other technologies like hydropower, bioenergy, concentrated solar power (CSP) and geothermal added a modest 15.4 GW combined (IRENA, 2025a). Asia led regional growth, adding 413.2 GW, mainly driven by China, which accounted for over 60% of new global solar and wind capacity. Other key contributors included the United States, India, Brazil and Germany. Moreover, global energy intensity recorded steady improvement to 3.87 (TES/GDP PPP) in 2022 from 3.95 in 2021, with a 1.1% annual energy efficiency improvement over the period 2018-2022 (IEA *et al.*, 2025).[1]

[1] *TES/GDP PPP = total energy supplied divided by gross domestic product in purchasing power parity terms.*

Figure 1 **Global progress on renewables and energy efficiency**



Notes: GDP = gross domestic product; GW = gigawatts; MJ = megajoules; PPP = purchasing power parity; TES = total energy supplied; USD = United States dollar.

Another positive trend is the increasing energy transition investment, driven by the declining cost of renewable energy. Global energy transition investment has exceeded USD 2 trillion for the first time in 2024, with record investment in solar PV (USD 521 billion), grids (USD 390 billion) and energy storage (USD 54 billion) (BNEF, 2025). The record-breaking expansion of renewable capacity in 2024 was strongly supported by the continued decline in technology costs. Since 2010, renewable energy costs have dropped dramatically due to technological advances, competitive supply chains and economies of scale. As a result, 91% of all new renewable power projects in 2024 were more cost-effective than any new fossil fuel-fired alternative (IRENA, 2025b). Notwithstanding global trends, it is noteworthy that power generation costs tend to be higher in developing countries, where elevated perceived risk of investment leads to higher financing costs (IRENA, 2025b).

Further cost and performance trends in renewable technologies are summarised below:

- New utility-scale solar PV reached a global average levelised cost of electricity (LCOE) of USD 0.043 per kilowatt hour (kWh), making it 41% cheaper than the least-cost fossil fuel option. Costs were particularly low in China (USD 0.033/kWh) and India (USD 0.038/kWh) thanks to strong domestic supply chains (IRENA, 2025b).

- Onshore wind also maintained its cost advantage with a global average LCOE of USD 0.034/kWh for newly installed capacity in 2024 – 53% lower than new fossil fuel-based equivalents. China and Brazil reported some of the lowest costs globally, benefiting from favourable conditions. Meanwhile, offshore wind costs rose slightly to USD 0.079/kWh due to a growing share of projects in emerging markets (IRENA, 2025b). Additionally, developed countries, such as in the European Union (USD 0.08/kWh) and the United States (USD 0.123/kWh), are facing substantially higher LCOE from offshore wind than China (USD 0.056/kWh).

However, despite recent growth, the current pace remains insufficient to meet the 28th Conference of the Parties (COP28) UAE Consensus target of tripling global renewable energy capacity to over 11 000 GW by 2030. Achieving this goal will require annual capacity additions exceeding 1 000 GW — representing an average annual increase of approximately 16.4% over the next five year — along with substantial investments in grid and energy storage infrastructure.

Achieving global net-zero emissions by 2050 will require nearly tripling energy transition investment: total investment in 2024 reached just USD 2.1 trillion, far short of the USD 5.6 trillion needed each year in the period 2025-2030 under the BloombergNEF Net Zero Scenario (BNEF, 2024a, 2025). Requirements continue to climb sharply beyond 2030, peaking at around USD 7.8 trillion/year in 2036-2050 (BNEF, 2025). Further accelerating the energy transition is imperative in order to mitigate climate change with diversified energy portfolios, combining solar, wind, hydropower and geothermal with emerging technologies such as energy storage to ensure energy security with renewables while managing the impacts of intensifying climate variability (IRENA and WMO, 2025).

Infrastructure and complementary energy transition technologies are also essential to drive the energy transition. Enhancing physical grid infrastructure is crucial to fully harness the potential of integrating renewables, including variable renewable energy (VRE) and other energy transition technologies into energy systems (IRENA, 2024a). Energy storage systems, particularly battery energy storage systems (BESS), are also an important enabling technology for forward-looking planning of modernised grid infrastructure, offering significant flexibility to the power system. Costs for BESS fell to USD 192/kWh in 2024, which is a 93% decline since 2010 (IRENA, 2025b). In addition, zero- and low-carbon renewable fuels, such as biofuels, and green hydrogen and its derivatives, can play an important role in decarbonising hard-to-abate and energy-intensive sectors like steel, chemicals, long-haul transport, shipping and aviation.

Another key emerging area is digitalisation. Digital technologies – predictive maintenance, real-time performance monitoring, AI-enabled asset management, *etc.* – are improving operational efficiency across renewable assets, allowing for lower operation and maintenance (O&M) costs and extended asset lifetimes. For solar PV and onshore wind, in particular, digitalisation enables granular optimisation of performance, enhancing competitiveness in merchant and auction-based markets. Innovations in digital platforms are also supporting advanced forecasting and grid services, helping to align variable generation with system needs (IRENA, 2025b).

Box 1. A pivotal moment in climate negotiations to scale up climate finance and advance the energy transition

COP30 represents a crucial moment for countries to negotiate and adopt the political decisions to fill the implementation gap of the Paris Agreement. Through the New Collectively Quantified Goal on Climate Finance decided at COP29, the UNFCCC Parties agreed that developed countries take the lead to mobilise an annual USD 300 billion by 2035 for developing countries with a recognition of the need for all actors to further mobilise an annual USD 1.3 trillion from all public and private sources (UNFCCC, 2025a). Furthermore, through the Seville Commitment as an outcome of the 4th International Conference on Financing for Development (FfD4) of the United Nations in June 2025, countries also committed to addressing barriers to investment in renewable energy and zero- and low-emission technologies while highlighting the importance of strategically using public finance to catalyse private finance, among other commitments (UN, 2025). To further facilitate stronger and more clearly defined commitments and financing mobilisation, the forthcoming COP30 decision on the "Baku to Belém Roadmap to USD 1.3T" will become an important driver for scaling up climate finance to align the emission pathway with the Paris Agreement's objectives. Another important opportunity at COP30 is the conclusion of the negotiation on the modality of the UAE Dialogue on implementing the Global Stocktake outcomes, through which the UNFCCC Parties can agree on strengthening the delivery of action to ensure the implementation of the commitments made in the COP28 First Global Stocktake as part of the UAE Consensus.

2. TRANSLATING THE AMBITION OF THE FIRST GLOBAL STOCKTAKE INTO NDCs

To accelerate the energy transition collectively, setting high-ambition national climate and energy targets is an essential step for governments to facilitate mobilising investment on the ground. Parties to the Paris Agreement are mandated by Article 4 of the agreement to enhance their Nationally Determined Contributions (NDCs) every five years, with 2025 as the year for submitting the third generation of NDCs (NDCs 3.0). Reflecting the Outcome of the First Global Stocktake, and it's inclusion in NDCs, is a new and important consideration for UNFCCC Parties during this round of NDC development – one that was not present in previous NDC cycles. Moreover, ambitious energy transition targets in NDCs can lower geopolitical risks and energy price volatility by committing to increase renewable energy, which can lead to the enhancement of energy security (IRENA, 2024b; OECD and UNDP, 2025).

According to the UNFCCC Secretariat's NDC Synthesis Report that reviewed 64 new NDCs submitted from 1 January 2024 to 30 September 2025 (UNFCCC, 2025b), the total GHG emission level resulting from the implementation of Parties' new NDCs is projected to be around 13.0 gigatonnes of carbon dioxide equivalent ($GtCO_2eq$) in 2035 (with minimum estimate of 12.0$GtCO_2eq$ and maximum estimate of 13.9 $GtCO_2eq$), which is 6% below the projected 2030 level reported in those Parties' previous NDCs and implies that their GHG emissions will peak before 2030. However, the level of the targets is still behind the ambition required for reaching Paris Agreement goals in 2050.

Energy sector action is among the most significant drivers for reducing emissions. The NDC targets and measures for the energy transition are important commitments for countries' actions to implement the First Global Stocktake, especially the energy sector component of the UAE Consensus. According to IRENA's recent assessment of the NDCs submitted as of 1 October 2025, NDC targets collectively need to almost double in order to meet the goal of tripling renewable capacity in less than five years by 2030 (IRENA, COP30 and GRA, 2025).

The remainder of this chapter delves into the review of the submitted NDCs 3.0 to distil countries' efforts to integrate the UAE Consensus into their NDCs 3.0, as well as new and emerging trends on the drivers highlighted in NDCs 3.0 for mobilising action to implement the targets.

INTEGRATING THE UAE CONSENSUS INTO NDCS 3.0

UNFCCC Parties began submitting their NDCs 3.0 in late 2024, and those that have yet to submit theirs are expected to do so in due course. The development and communication of NDCs 3.0 presents a unique opportunity for Parties to reflect the highest possible ambition in their climate change mitigation targets. To that end, Parties are mandated to prepare NDCs 3.0 that are informed by the outcome of the First Global Stocktake – the UAE Consensus (UNFCCC, 2023). Among the 180 UNFCCC Parties (comprising 179 countries and European Union) that have submitted their NDCs so far under the Paris Agreement, a total of 104 NDCs 3.0 have been communicated as of 6 November 2025.

Setting ambitious and consistent NDC targets – both at the overall climate mitigation level and across individual sectors – is essential for Parties to ensure that sectoral contributions to national goals are clearly defined and aligned. It is also recommended that Parties include in their NDCs 3.0 the quantification of sector targets for GHG and/or non-GHG targets (IRENA, 2022a). Moreover, committing clear mitigation options, such as policies, measures and actions, can actuate the sectoral NDC targets on the ground by translating targets into implementation measures (IRENA, 2024c).

Paragraph 28 of the First Global Stocktake concerns the energy transition options for deep, rapid and sustained reductions in emissions. The energy sector components of the options globally agreed by the Parties through the UAE Consensus include, amongst others (UNFCCC, 2023):

- Tripling renewable energy power capacity and doubling average annual rates of energy efficiency improvement globally by 2030.
- Accelerating efforts globally towards net-zero emission energy systems, utilising zero- and low-carbon fuels, well before or by around mid-century.
- Transitioning away from fossil fuels in energy systems in a just, orderly and equitable manner, accelerating action in this critical decade.
- Accelerating zero- and low-emission technologies (such as renewables, removal technologies, hydrogen for hard-to-abate sectors, and others).
- Accelerating the reduction of emissions from road transport on a range of pathways (such as zero- and low-emission vehicles) and others.

The global commitments described in First Global Stocktake can be considered at a national level with reflections on different national circumstances and capabilities.

Trends in energy sector component of NDC 3.0 commitments[2]

In their NDCs 3.0, an increasing number of countries include targets that are relevant to the UAE Consensus energy component (paragraph 28 as described above), including renewable power, energy efficiency and other various energy transition technologies including fuels, transport measures and others.[3] While the way countries formulate their commitments in relation to the UAE Consensus varies, certain commonalities can be seen in NDCs 3.0:

- **Tripling renewables and doubling energy efficiency** has been the most frequently mentioned element of the UAE Consensus energy package in the assessed NDCs 3.0, as a certain number of countries refer to this global target. There are countries committing to ambitious overall renewable power installation targets, such as Nepal (increase in renewable power capacity to 28.5 GW by 2035 from 2.3 GW in 2022) and Singapore (2 GW of solar PV by 2035 from less than 500 MW in 2021). A few countries, such as Zimbabwe and Belize, specified renewable power capacity targets with a breakdown of the renewable energy sources into solar, wind and others.[4]

- Mitigation measures on **transport** are also mentioned in most submitted NDCs 3.0. There are countries committing to a quantified target on electric vehicles (EVs), such as Saint Lucia committing to increase the EV share to 40% by 2035, as well as Nepal setting a target to increase the EV share of new private passenger vehicle sales to 95% by 2035. Biofuels for transport and public transport measures for mass transit are also among the targeted measures that are relatively frequently mentioned in NDCs 3.0. Blending mandates or thresholds for biofuels are among the examples of policy instruments described in NDCs 3.0 to enforce increased use of biofuels.

- A number of NDCs 3.0 also highlight planned efforts on **zero- and low-carbon fuels** as enablers for decarbonisation, energy security and economic diversification. Biofuels are widely promoted in transport, especially for road and aviation, with sustainable aviation fuels (SAF) gaining traction in countries like Brazil and Chile. Green hydrogen is emerging as a strategic fuel for industry, power and heavy transport, with commitments from Switzerland, Singapore and Colombia. Countries such as Singapore, Sri Lanka, Colombia, Bangladesh and Morocco share an interest in looking into the potential of green hydrogen and its derivatives, such as ammonia, to use as potential power generation source.

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[2] 104 NDCs 3.0, including the European Union (27 members), submitted by 6 November 2025 have been reviewed.

[3] The UNFCCC Secretariat's NDC Synthesis Report (UNFCCC, 2025b) reviewed 64 new NDCs submitted during the period from 1 January 2024 to 30 September 2025. According to the UNFCCC report, 1) the new NDCs include responses to the outcomes of the first global stocktake, with 88% of Parties indicating that their NDCs were informed by the outcomes of the gloabal stocktake and 80% specifying how; 2) 44% of the Parties indicated the quantitative targets for installed renewable-based electricity capacity by 2030; 3) 5% communicated the targets for improving annual energy efficiency rate by 2030; 4) 47% of the Parties indicated quantified targets of reducing the share of unabated fossil fuels in electricity generation by 2030; and 5) 89% of Parties indicated that they plan to or may use at least one of the scopes of voluntary co-operation under Article 6, in comparison with 64%in the previous NDCs. The UNFCCC report also confirmed that the most frequently cited elements of the global stocktake outcome was tripling renewable energy capacity by 2030, followed by doubling the average annual rate of energy efficiency improvement by 2030 and transitioning away from fossil fuels in energy systems.

[4] There are also other good practices for quantifying NDC targets. Some counties specify quantified targets for renewable energy in other forms instead of power capacity, such as the share of renewable energy in power systems as committed by the Maldives (33% by 2035), Cuba (conditional target of 49.3% by 2035), Cambodia (conditional target of 80% by 2035) and Niue (80% by 2030); and an energy sector GHG emission target as committed by Saint Lucia, Moldova and other countries.

- **Clean cooking** is a recurring theme in NDC 3.0 submissions, reflecting efforts to reduce emissions and improve health outcomes and gender equality. Many countries commit to transitioning households from traditional biomass to modern cooking solutions, electric cookstoves, biogas systems and improved. Interestingly, while Nigeria used to prioritise non-electric cooking (IRENA, 2023a), its new NDC 3.0 proposes that electricity accounts for the largest share of cooking in urban households (55%) and commercial setting (37%) by 2035, with other energy sources intended for rural households (Government of Nigeria, 2025). Other countries, such as Kenya, Nepal, Cambodia, Pakistan, Liberia and São Tomé and Príncipe, also include electric cooking as part of their NDC actions.

- Countries are also highlighting **zero- and low-emission technologies** in their NDCs for action in the industrial sector, such as green hydrogen, ammonia and synthetic fuels for hard-to-abate sectors like steel, cement and chemicals. Countries such as Japan, Switzerland and the United Arab Emirates highlight hydrogen roadmaps. There are also NDCs 3.0 highlighting the use of carbon removal technologies such as carbon capture, utilisation and storage (CCUS), as mentioned by Canada, the United Arab Emirates, the United Kingdom, Brazil and Pakistan.

- Some countries also specified measures to **transition away from fossil fuels**. While the United Kingdom achieved its coal power phase-out in 2024, other countries also intend to reduce the use of fossil fuels in power systems or other parts of the energy system. For instance, Bangladesh, Canada, Mauritius, Morocco and Pakistan intend to replace fossil fuels with renewables and other clean alternatives in their power systems, with Bangladesh specifying the replacement of liquid fuel-based peaking capacity power and Morocco intending to phase out coal-fired plants by 2040. Brazil intends to replace fossil fuels with direct electrification and biofuels.

- Beyond these elements, there are NDCs that comprehensively elaborate on each element of the UAE Consensus energy component, such as those submitted by Australia, European Union, Nigeria, Morocco, Singapore, Switzerland and the United Kingdom.

Table 1 highlights selected good practices made in the submitted NDCs 3.0, reflecting the UAE Consensus elements.

Table 1. **Examples of NDC 3.0 commitments relevant to the UAE Consensus**

UAE Consensus elements (selected)	Examples
Tripling renewables and doubling energy efficiency by 2030	• **Australia**'s NDC 3.0 commits to a 62-70% reduction in emissions by 2035 from 2005 levels. The NDC highlights the commitment to deliver 40 GW of renewable energy generation capacity by 2030 alongside grid modernisation and a capacity investment scheme. The NDC also highlights that 90% of existing coal-fired plant capacity could be closed by 2035, and the entire coal fleet before 2040 (Government of Australia, 2025). • **China**'s NDC 3.0 target reaches 3 600 GW of solar and wind power capacity by 2035, which represents sixfold increase from a 2020 level (Government of China, 2025). • **Morocco**'s NDC 3.0 sets the target of tripling its installed renewable energy capacity by 2030, bringing it to over 15 GW, in line with the COP28 UAE Consensus outcome (Government of Morocco, 2025). • **South Africa** mentioned in its NDC 3.0 that a total of 44 GW of new renewable energy capacity will be installed by 2035 in line with the country's Integrated Resource Plan (Government of South Africa, 2025).
Zero- and low-carbon fuels	• **Switzerland** has developed a national hydrogen strategy to create a hydrogen market, while the country also aims to develop robust supply paths for sustainable fuels and base chemicals for Switzerland, notably for aviation and industrial processes (Government of Switzerland, 2025). • **Pakistan** and **Jordan** also highlight their priority to develop green hydrogen (Government of Jordan, 2025; Government of Pakistan, 2025). • **Nigeria** specifies clear targets for efficient cooking fuels, highlighting higher shares of electric cooking in urban households (55%) and commercial settings (37%) by 2035, while other energy sources are intended for rural households (Government of Nigeria, 2025).
Transition away from fossil fuels	• **Brazil** seeks to gradually replace the use of fossil fuels with electrification and advanced biofuels, including SAF. The country intends to expand biofuel production associated with carbon capture and storage to meet the demand for negative emissions (Government of Brazil, 2024). • **Barbados'** NDC 3.0 mentions its aspirational goal to reach a fossil fuel-free economy with net-zero emissions around 2040 (Government of Barbados, 2025). • **Pakistan**'s NDC 3.0 recognises an upcoming gradual phase-down of fossil fuels in its capacity mix as natural gas and furnace oil are set to decline, with net reductions of 2 147 MW and 430 MW respectively, while renewable power capacity is targeted to reach 43 202 MW by 2035 (Government of Pakistan, 2025). • **The United Kingdom**, as the first G7 economy to achieve coal power phase-out, intends to contribute to facilitating the replication of the phase-out, particularly through the UK co-chaired Powering Past Coal Alliance (Department for Energy Security and Net Zero, 2025). • **Mauritius** is targeting the phase-out of coal in electricity production by 2035, with reference to the National Biomass Initiative to convert the existing coal/bagasse independent power plants to run on biomass (Government of Mauritius, 2025). • **Bangladesh** intends to replace 95% of its liquid fuel-based peaking capacity power plants with cleaner alternatives, including BESS paired with renewables (Government of Bangladesh, 2025).

Zero- and low-emission technologies	• **Somalia** intends to improve energy efficiency through cleaner production and integration of renewable energy, as well as waste to heat recovery by capturing and reusing heat for lower emissions in industry and its industrial processes (Federal Government of Somalia, 2025). • **Uruguay**'s NDC 3.0 mentions its intention to substitute fossil fuels with cleaner alternatives, such as biomass and green hydrogen, in pulp production and the cement industry (Government of Uruguay, 2024).
Zero- and low-emission vehicles	• **Nepal** has a quantified and set a timebound target for transport sector decarbonisation to reduce heavy dependence on imported fossil fuels. Its NDC 3.0 sets a target for battery EVs to account for 90% and 95% of private passenger vehicle sales in 2030 and 2035 respectively; and the electrification of public transport such as electric bus and rail networks (300 kilometre [km] by 2035) for public commuting and freight (Government of Nepal, 2025). • **Eswatini**'s NDC 3.0 specified various measures for zero- and low-emission vehicles, such as 10% ethanol fuel blending by 2035, at least 100 registered EVs by 2035 with improved EV charging networks, and hybrid and plug-in hybrid vehicles comprising up to 1% of nationally registered vehicles by 2035 (Government of Eswatini, 2025).

Note: UAE Consensus elements on the energy transition are based on Paragraph 28 of the First Global Stocktake Outcome (UNFCCC, 2023, pp. 5-6).

Drivers for NDC implementation

The submitted NDCs 3.0 also highlight the drivers for implementing the target commitments. Countries specify enabling frameworks, such as policies, regulations and financial incentives, that are key to mobilising investment. Another driver is energy infrastructure and associated technologies that enable the integration of renewables, which are indispensable. With these conditions met, human and institutional capacities are also the essential drivers to improve policies and develop projects.

The assessed NDCs 3.0 demonstrate broader coverage of energy transition technologies. These include not only renewables, energy efficiency and clean cooking that have been widely mentioned in the previous NDCs, but also various emerging technologies such as grid modernisation and resilience, energy storage, hydrogen, EVs and others, showing the countries' commitment to energy sector transformation. The following are examples of the variety of objectives seen in NDCs 3.0:

- Facilitating an enabling environment that allows financial flows to support NDC implementation is essential. **Effective co-ordination** across government bodies, including NDC lead ministry (ministry of environment), line ministries and agencies such as energy, agriculture and others, and the active involvement of national financial institutions and relevant ministries during the planning and drafting processes help to identify budgetary constraints early on. This enables timely interventions to address these barriers, while also highlighting potential solutions and the policy and regulatory measures required to unlock the necessary levels of investment.

- To accelerate financial flows, it is important to identify and implement measures that **address systemic barriers to investment**. This includes the design of fiscal instruments and incentives, and the deployment of financial de-risking mechanisms. Equally critical is ensuring project bankability, by strengthening project pipelines, improving risk-return profiles and aligning financial structures with investor requirements. Together, these interventions should contribute to transformational change by targeting critical sectors and enhancing investor confidence in the long-term stability and predictability of climate-related policies and regulatory frameworks (GCF and NDCP, 2024). Tax incentives for transport sector measures, such as tax credits for EVs and carbon pricing instruments, are seen in NDCs 3.0 to incentivise energy transition technologies.

- **Setting up or improving regulatory frameworks**, including legislation and policy instruments, helps ensure the enforcement of targets and measures committed to in NDCs 3.0 (Bakhtiari, Hinostroza and Puig, 2018). For instance, pricing measures such as feed-in tariffs, competitive bidding/auctions and long-term power purchase agreements (PPAs), as well as the simplification of licensing and permitting, are among the instruments for renewable energy identified in NDCs 3.0. For energy efficiency, MEPS and the labelling of appliances and building codes are frequently mentioned by countries.

- Moreover, **upgrading physical energy infrastructure** is a priority area that many Parties highlight in their NDCs 3.0. Grid modernisation with improved capability for flexibility is important to integrate higher share of VRE, as mentioned in Brazil's NDC. There are countries, for example Cambodia's NDC 3.0, which mention specific infrastructure-related technologies for efficient and reliable operation of grid infrastructure, such as energy storage systems and efficient conductors like high-temperature low-sag. Some countries, such as Belize, Eswatini, Nepal and Zimbabwe, elaborate on quantified targets to reduce transmission and distribution losses or electricity interruption on their grid infrastructure.

- **Developing a skilled workforce** is indispensable for accelerating the speed of the energy transition, as well as ensuring a just transition. Some NDCs 3.0 specify the need to improve education and vocational training in renewable energy technologies, project development and proposal writing, among others. Upskilling is also an important element of overall efforts to create a local value chain and the ensuing economic and supply chain resilience. To that end, international collaboration is essential for building a resilient supply chain of technologies and critical materials, as well as collectively pursuing energy transition in a just and equitable way.

- Relevant to international co-operation and finance, most NDCs 3.0 also mention the possibility of exploring the use of **Article 6, carbon market mechanisms**, although some countries are adopting a careful approach. For instance, the United Kingdom does not currently intend to use co-operative approaches involving the transfer of internationally-transferred mitigation outcomes (ITMOs) towards its NDC, but reserves the right to do so. Similarly, the Republic of the Marshall Islands and Lebanon do not currently envisage the use of Article 6 while not excluding the option of using it. Barbados continues to support the position of the Alliance of Small Island States that seeks to limit the use of market mechanisms to less than actual domestic effort. While this aspect is not specified in NDCs 3.0, it is noteworthy that countries are increasingly developing a national Article 6 framework on carbon markets to specify eligible project activities that are aligned with national priorities, additionality and environmental integrity (see Box 3).

- Countries are also starting to look into the opportunities for **digitalisation** as an accelerator of NDC implementation. Smart grids with the internet of things (IOT), blockchain and AI are among such opportunities as indicated in countries' NDCs 3.0. For instance, Angola highlights its interest in the digitalisation of energy technologies, including digital solutions for grid modernisation; Pakistan mentions blockchain and IOT for smart grids; Eswatini sees the importance of smart grid infrastructure integrated with battery storage and enhanced management of demand-side energy storage systems; Nepal and Bangladesh refer to smart meters for better demand-side management and reduced power losses; and the United Arab Emirates and the Maldives anticipate the role of AI in driving efficient climate action.

Table 2 highlights selected countries' examples that elaborate on the drivers for implementing NDC 3.0 commitments.

Table 2. **Drivers for implementing commitments described in selected NDCs 3.0**

Drivers	Examples
Policy, regulation and finance	• **Belize**'s NDC 3.0 exemplifies a proactive approach to financial planning and transparency in climate mitigation efforts. For the period 2021-2035, mitigation costs were estimated using sector-specific assumptions, reflecting a tailored and nuanced methodology. Importantly, Belize has identified a significant financing gap, with around 75% of the total costs yet to be mobilised by 2035 (Government of Belize, 2025). This clear articulation of costs and funding gaps, supported by detailed assumptions documented in the NDC 3.0, may enable the country to prioritise investment areas and engage international actors effectively. • **Cambodia**'s NDC 3.0 demonstrates a comprehensive and methodologically robust approach to climate finance planning, setting an example of good practice in aligning investment frameworks with national climate goals. Using the UNDP's Investment and Financial Flows methodology, Cambodia costed its mitigation, adaptation and enabling sector needs over a ten-year horizon (2026-2035), arriving at a total investment requirement of approximately USD 32.2 billion. This structured approach draws on real project data, national strategies and regional benchmarks, enabling the disaggregation of costs by sector, timeline and expenditure type (CAPEX and OPEX) (Government of Cambodia, 2025). • **European Union**'s NDC 3.0 highlighted the possibility of using adequate contributions of high quality international carbon credits under Article 6 to achieve its NDC 3.0 target (European Union, 2025). • **Moldova**'s NDC 3.0 states that simplifying the authorisation, certification and licensing procedures for renewable power projects can encourage private investment. Moldova also considers fiscal tax incentives for stimulating EV growth (Government of Moldova, 2025). • **Singapore** considers international partnerships essential for successful domestic decarbonisation and intends to catalyse investment into low-carbon solutions in other countries to contribute to global emissions reductions. Accordingly, the country is engaged in the Article 6 market mechanism as part of its international partnership approach to reduce global emissions (Government of Singapore, 2025). • The **Kyrgyz Republic**'s NDC 3.0 highlighted the country' intention to create a favourable investment environment for climate and renewable energy projects, providing investment support measures for businesses through tax and financial incentives, public-private partnership mechanisms and climate finance, streamlined regulatory procedures and supporting national businesses access to international carbon markets (Government of the Kyrgyz Republic, 2025).

	• **Zimbabwe** is targeting a reduction in transmission and distribution losses to 11% in 2030 from 16% in 2022. Measures taken to reach the target include the use of 'large voltage transmission' with more energy-efficient transmission and distribution cables. The promotion of microgrids is also expected to result in improved access to electricity without increasing transmission and distribution losses (Government of Zimbabwe, 2025).
Energy infrastructure	• **Brazil** intends to expand energy transmission networks to incorporate intermittent renewable source like wind and solar, as well as deploy battery and other storage solutions for flexibility (Government of Brazil, 2024). • **Eswatini** specifies a target to reduce electricity supply interruption triggered by climate-related events by 20% by 2035 and to enhance the resilience and reliability of the national electricity supply, while also committing to the modernisation of infrastructure through smart grid infrastructure integrated with battery storage and demand-side management tools (Government of Eswatini, 2025).
Institutional capacities	• **Niue**'s NDC 3.0 recognises a growing need to strengthen higher education with skills-based technical courses particularly in tourism and energy (Government of Niue, 2025). • **Barbados** intends to create a Renewable Energy Skills Council to guide implementation and to make recommendations for a just transition in the renewable energy sector (Government of Barbados, 2025). • The **United Kingdom** will also accelerate the delivery of an Energy Skills Passport to support oil and gas workers to transition to renewable energy, alongside a comprehensive suite of training to align with national and regional skills needs (Department for Energy Security and Net Zero, 2025).

With the targets and measures committed to in their NDCs 3.0, countries will need to move ahead with the implementation of NDCs. Integrating these targets and measures into regulatory frameworks, legislation and policy instruments can assist with implementation on the ground by complementing the non-legally binding nature of NDCs. Regulatory and policy intervention includes not only the development and improvement of specific instruments, but also the harmonisation of NDCs' energy transition targets and those relevant targets in other national energy policies. Specifying the implementation roadmap through sector planning for NDCs can also support actuating concrete actions, as well as signalling clear priorities to international and regional stakeholders that can support the implementation of conditional targets. International and regional partnerships continue to be important sources of opportunity for collaboration towards efficient and effective NDC implementation. Countries are also encouraged to take into account the forthcoming COP30 decision emerging from the UAE Dialogue on the implementation of Global Stocktake outcomes, as a strategic reference point for enhancing NDC implementation measures in alignment with the collective global ambition.

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3. IRENA'S CLIMATE ACTION SUPPORT

IRENA provides support for developing countries to advance the energy transition towards the global achievement of the UAE Consensus – particularly the global target of tripling renewable power capacity – as a crucial milestone on the way to the world meeting the 2050 temperature goal set out in the Paris Agreement.

NDC support from IRENA is deployed to assist its Members and other countries to that end. Aligned with the 1.5°C Scenario consistent with its flagship *World Energy Transitions Outlook* analysis, IRENA assists countries to strengthen the enabling environment and national capacities to plan and implement energy transition action. IRENA offers such support through various domains, including energy transition assessment, resource assessment of renewables, policy and finance analysis, project facilitation and matchmaking, support on developing and monitoring robust energy data and statistics, energy transition technologies and infrastructure assessment, long-term energy planning support, and other activities to respond to countries' needs. IRENA also provides capacity building and deep dive workshops in these domains, targeting government institutions, policy makers and regulators, project developers and financiers to strengthen countries' energy transition enablers.

As of October 2025, IRENA's country-level engagement for climate action has cumulatively covered 102 countries with 240 activities since 2020, to support the climate commitments – including NDC enhancement and implementation – of Members that are party to the 2015 Paris Agreement (Figure 2). The supported countries as a whole cover a population of 6.0 billion and encompass total greenhouse gas emissions of 31 984 million tonnes of carbon dioxide equivalent ($MtCO_2eq$) (Crippa *et al.*, 2025; World Bank, n.d.).[5]

[5] *The annex at the end of this report highlights the profiles of the countries that IRENA has engaged with to provide climate action support.*

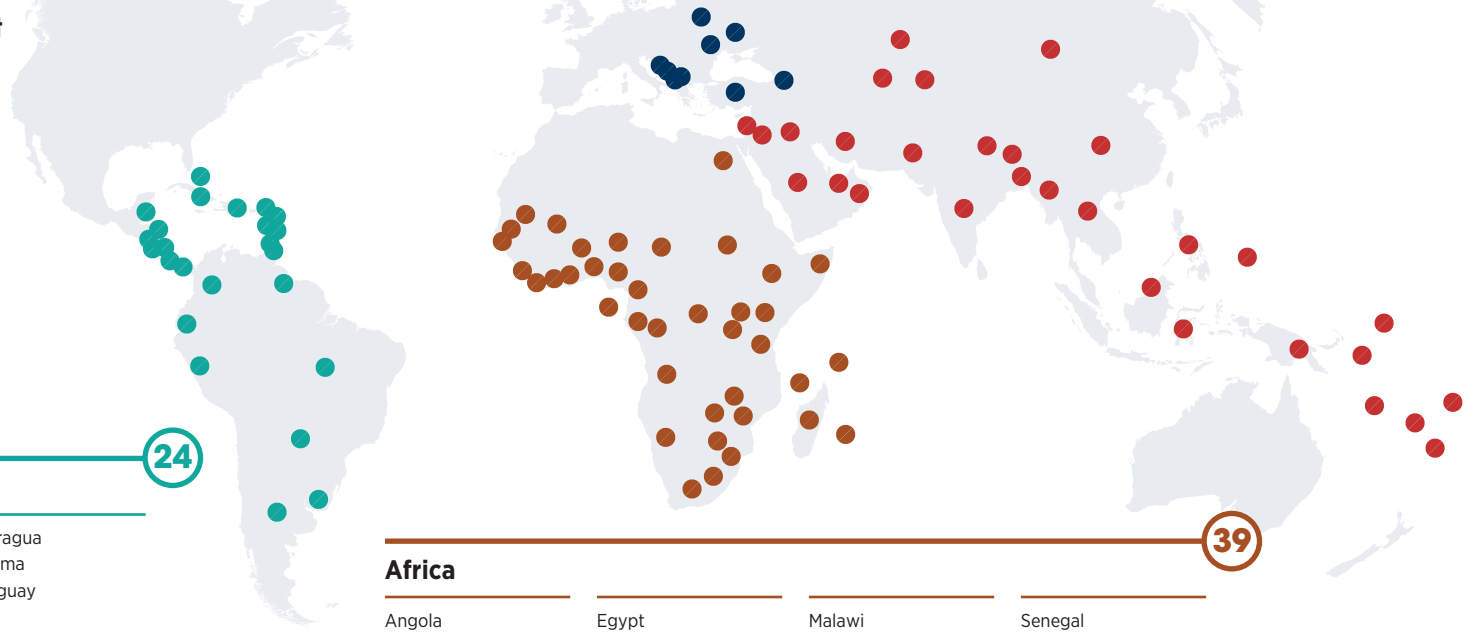
Figure 2 **Countries with which IRENA has engaged to provide climate action support**

102 **Countries engaged**

189 **Activities completed**

42 **Implementation of support**

9 **Scoping of support**



Europe (9)

Albania
Belarus
Bosnia and Herzegovina
Georgia
Moldova
Montenegro
North Macedonia
Türkiye
Ukraine

Asia and the Pacific (30)

Bangladesh
Bhutan
Brunei Darussalam
China
Fiji
India
Indonesia
Iran (Islamic Republic of)
Iraq
Jordan
Kazakhstan
Kyrgyz Republic
Lao People's Democratic Republic
Lebanon
Mongolia
Myanmar
Nauru
Nepal
Oman
Pakistan
Palau
Papua New Guinea
Philippines
Samoa
Saudi Arabia
Solomon Islands
Tonga
United Arab Emirates
Uzbekistan
Vanuatu

Latin America and the Caribbean (24)

Antigua and Barbuda
Argentina
Bahamas
Belize
Brazil
Colombia
Costa Rica
Cuba
Dominica
Dominican Republic
Ecuador
El Salvador
Grenada
Guatemala
Guyana
Honduras
Nicaragua
Panama
Paraguay
Peru
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and Grenadines
Uruguay

Africa (39)

Angola
Benin
Burkina Faso
Cameroon
Chad
Comoros
(Republic of) Congo
Côte d'Ivoire
Democratic Republic of Congo
Egypt
Eswatini
Ethiopia
Gabon
The Gambia
Ghana
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritius
Mauritania
Mozambique
Namibia
Niger
Nigeria
Rwanda
São Tomé and Príncipe
Senegal
Seychelles
Sierra Leone
Somalia
South Africa
Sudan
United Republic of Tanzania
Uganda
Zambia
Zimbabwe

Disclaimer: This map is provided for illustration purposes only. Boundaries and names shown on this map do not imply the expression of any opinion on the part of IRENA concerning the status of any region, country, territory, city or area or of its authorities, or concerning the delimitation of frontiers or boundaries.

Box 2. **IRENA NDC 3.0 support**

IRENA is building upon its partnership with the United Arab Emirates, Denmark and the NDC Partnership to provide countries with support on NDC 3.0 development. The supported countries are spread across all geographic regions to reflect the COP28 UAE Consensus decision in NDCs 3.0. Through its support, IRENA is contributing towards achieving the tripling of renewable power capacity and doubling energy efficiency by 2030 at the global level as the Custodian Agency for tracking and reporting these two goals. The support provided includes technical recommendations for the energy sector component of NDCs, such as targets, options and means of implementation that are relevant to the energy transition, assessment of cost-effective climate change mitigation options, grid flexibility analysis, energy data and statistics analysis and capacity building, among others (see Annex I for further detail).

Every global region is making progress towards an energy transition aligned with the global goal, as illustrated in Table 3. The rest of this section addresses regional-level energy transition progress and IRENA's collaboration with countries to advance climate action.[6]

Table 3. **Regional status of renewable power capacity addition and energy efficiency improvement**

Region	Renewable energy capacity (MW, 2023)	Renewable energy capacity (MW, 2024)	Capacity addition from 2023 to 2024 (MW)	Energy intensity (TES/GDP PPP, 2021)	Energy intensity (TES/GDP PPP, 2022)	Rate of improvement - energy intensity, 2021-2022
Africa	65 241	69 951	4 711	3.98	3.91	1.76%
Asia and the Pacific	2 059 815	2 485 681	425 866	Asia: 4.37 Oceania: 3.54	Asia: 4.31 Oceania: 3.34	Asia: 1.37% Oceania: 0.20%
Latin America and the Caribbean	309 213	332 114	22 901	2.92	2.86	2.05%
Europe	778 323	850 245	71 922	3.06	2.84	7.19%

Notes: Renewable energy capacity data are based on Regional Trends (IRENA, 2025c) with underlying IRENA renewable energy statistics (IRENA, 2025a); energy intensity data are sourced from the 2024 SDG 7 progress report (IEA *et al.*, 2025). Regional classification follows each data source. Asia and the Pacific category covers Asia, the Middle East and Oceania in IRENA's classification of regional statistics; and Latin America and the Caribbean covers South America, Central America and the Caribbean. Energy intensity data follow the regional category of SDG 7.3.1 Energy efficiency indicator. For Asia and the Pacific, energy intensity data are represented by Asia and Oceania separately as per the SDG 7.3.1 dataset. GDP = gross domestic product; MW = megawatts; PPP = purchasing power parity; TES = total energy supplied.

[6] *The following section reflects by region IRENA's country support status as of 31 October 2025.*

AFRICA

Climate change is affecting Africa. The average temperature in the region in 2024 was around 0.86°C higher than the average for 1991-2020, while the region also faces intensifying extreme weather events such as torrential rains in West and Central Africa as well as prolonged drought in Southern Africa (WMO, 2025c).

The region is making progress in the energy transition. Africa added 4.7 GW of renewable power capacity in 2024, while it increased its renewable electricity generation by 4.5% in 2023 to 216 TWh, amounting to 24.1% of the electricity generation mix (IRENA, 2025a). While the region's progress towards SDG 7 still remains off track, one positive regional development in 2025 is that 48 African countries politically committed to expanding access to reliable and affordable electricity, including both on-grid and distributed renewable energy, across the continent with the Dar es Salaam Energy Declaration at the Africa Energy Summit in 2025.[7]

Although Africa as a region is seeing steady growth in renewable energy, Sub-Saharan Africa remains critically behind in installed renewables-based capacity at 40 watts (W) per capita, which is significantly lower than the global average among developing countries (341 W/capita) (IEA *et al.*, 2025). Given that Africa records an elevated weighted average cost of capital for renewable power (for instance, 12% for solar PV and 10.8% for onshore wind), the LCOE from renewables tends to be higher than other regions (IRENA, 2025b). As public finance can play a role in de-risking investment in Africa, it is important to expand international public finance flows to the region. Africa's unified energy planning process and the Continental Power System Masterplan also aim to de-risk renewable energy investment, develop a pipeline of bankable projects, attract financing and drive continent-wide climate action. The Second Africa Climate Summit (AC2) in September 2025 drove the political commitment to accelerate energy transition with the adopted Addis Ababa Declaration that includes commitments to accelerate the deployment of renewable energy, with 300 GW as a collective goal for the region towards 2030, in line with the first Africa Climate Summit.

[7] *The Dar es Salaam Declaration by the Africa Heads of State Energy Summit on providing access to electricity for 300 million people in Africa by 2030 www.nishati.go.tz/uploads/documents/sw-1738564587-DAR%20ES%20SALAAM%20DECLARATION.pdf*

IRENA's recent country engagement on climate action support includes:

Sub-Saharan Africa

- **Angola**: IRENA is supporting zoning analysis for renewable resource assessment to identify the areas with the highest renewable energy potential to expand renewable power capacity in support of the UAE consensus.

- **Chad**: IRENA has been working with the government of Chad to undertake an Energy Transition Assessment (ETA) to assess the challenges and opportunities relating to renewable power, energy access and other energy transition aspects to identify recommended actions for the country. Moreover, IRENA worked on an NDC technical analysis for Chad to provide recommendations for targeted actions on energy transition-relevant climate action. Solar PV is expected to have a leading role in expanding renewable power in Chad over the short to medium term, while other renewable energy sources, including wind, biomass and hydro, also hold potential to add varying levels of renewable power to Chad's power systems. Regarding the transport sector, zero- and low-carbon fuels, such as biofuels, can be an important source of energy for the vehicle fleet, while renewables-powered public transport can also advance Chad's climate change mitigation efforts.

- **Malawi**: IRENA is conducting a cost-effectiveness analysis of mitigation options in the power sector, with a focus on renewable energy technologies, to inform the energy component of Malawi's NDC 3.0. Based on this analysis, IRENA is preparing a Power Sector Investment Blueprint – outlining capital needs, priority technologies and phased timelines – to strengthen the investment-readiness of the NDC 3.0.

- **Namibia:** IRENA is undertaking a technical review of the NDC with an emphasis on energy-related mitigation measures and their cost-effectiveness. The analysis serves as an input to NDC 3.0 and the development of sector plans for power and other relevant sectors. In addition, IRENA has contributed to the technical review of the Long-Term Low Emission Development Strategy (LT-LEDS).

- **Nigeria**: The energy transition is key to Nigeria's ambitious climate change mitigation efforts as underscored by IRENA's NDC technical recommendation report submitted to its National Council on Climate Change Secretariat. Transformation to a renewables-based energy system can be driven through the accelerated deployment of hydro, diverse solar PV applications, and wind together with the support of battery energy storage, as the report suggested. Nigeria could utilise blended finance and results-driven incentives for mini-grids and utility projects, as well as consider making the Renewable Purchase Obligation mandatory, and adopt transparent tariffs and auctions (IRENA, 2023b). Key infrastructure improvements involve modernising and digitalising the grid to cut transmission and distribution losses.

- **Senegal**: Renewable energy resource assessment is an important step to develop bankable renewable energy projects. IRENA is providing site assessment support for renewable resources, such as solar and wind in Senegal. The assessment includes a technical and financial pre-feasibility analysis that identifies the most viable sites for solar and wind project development in the country.

- **South Africa:** IRENA's work centres on power system flexibility analysis with a focus on meeting reserve requirements under high-VRE system penetration, directly supporting ambitious renewable energy target integration within the NDC 3.0. The output will also contribute to the NDC implementation in line with global UAE Consensus ambition to scale up renewable power.

- **Tanzania**: Through the assessment of cost-effective climate change mitigation options, IRENA supported Tanzania with a robust, data-driven analysis of economical pathways to reduce emissions. This work directly contributes to Tanzania's NDC 3.0 update and aligns with both the UAE Consensus call to triple renewable power capacity by 2030 and the country's Power System Master Plan 2024. With electricity demand expected to rise rapidly, the analysis identified a portfolio of cost-effective options, including renewable power generation — particularly solar PV, onshore wind, hydropower and geothermal — as well as grid infrastructure improvements such as reducing transmission and distribution losses through reactive compensation. Together, these measures deliver significant emissions reduction potential while demonstrating strong economic viability, supporting Tanzania's sustainable development and climate goals.

- Project facilitation support has been provided to **Ethiopia**, **Ghana**, **Kenya**, **Namibia**, **Rwanda**, **Sierra Leone** and **Zimbabwe**, through ETAF and CIP, which IRENA manages to help mobilise funds for NDC implementation through partner investors.

- NDC capacity building is being scoped for **Benin** and **Burkina Faso**.

North Africa

- **Mauritania**: IRENA is providing capacity-building activities related to enhancing energy data to support improvements in the transparency and implementation of Mauritania's NDC in alignment with the UAE Consensus. Support includes the assessment and improvement of data and data collection processes required for NDC enhancement and monitoring.

- **Somalia**: IRENA launched an ETA for Somalia in June 2025, which was developed in collaboration with the Ministry of Energy and Water Resources in Somalia. Although Somalia has abundant renewable energy resources, few have been evaluated hence resource assessment will be the important first step to develop them. Solar and wind atlases can be prioritised to that end as per IRENA recommendations, followed by biomass, bioenergy, hydropower and geothermal. Strengthening institutional frameworks, policies and human resources is also an essential effort for Somalia to bring private sector engagement to renewable energy projects (IRENA, 2025d).

Atlantic, Indian Ocean and South China Sea Small Island Developing States (SIDS)

- **Seychelles**: IRENA supported Seychelles' NDC 3.0 by delivering a cost-effectiveness analysis of renewable energy mitigation options, including Marginal Abatement Cost Curves (MACCs) for 2030 and 2040 to identify least-cost measures. It provided technical input to the Information necessary to facilitate clarity, transparency and understanding (ICTU) and NDC Update Roadmap and analysed EV hosting capacity, offering evidence to shape the power and transport sectors and guide a balanced pathway between no-regret measures and higher-potential options over time.

- **Mauritius**: IRENA is supporting Mauritius by reviewing its Renewable Energy Roadmap and modelling mitigation options for the power and transport sectors. The country's NDC acknowledges IRENA work with the government (Government of Mauritius, 2025). This includes developing a MACC and GHG emission trajectories to identify the most cost-effective pathways, as well as the additional generation capacity required to achieve 60% renewable energy in the electricity mix by 2035, under three different scenarios of coal and biomass (including bagasse) usage. IRENA has prepared a preliminary capacity deployment timeline for the 2025-2035 period, along with investment estimates. In addition, IRENA has assessed the impacts of increased electric mobility on electricity demand and GHG emissions under low and medium EV penetration scenarios, as well as the partial electrification of the national bus fleet.

- Project facilitation support has been provided for **Comoros**.

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ASIA PACIFIC

Asia Pacific is among the world's most climate-vulnerable regions and home to 60% of the world's population (UNDP, 2025). While the region has been accounting for the largest share of global GHG emissions (IPCC, 2022), it is also leading the increase in renewable energy deployment. More than 426 GW of renewable power capacity was added in 2024 taking, Oceania and the Middle East together (IRENA, 2025a).

According to the SDG 7 tracking status (IEA *et al.*, 2025), almost half of the global year-on-year increase in modern uses of renewable energy took place in East Asia in 2022, especially China with its dominant wind and solar PV growth, followed by significant additions of solar PV, wind and to a lesser extent geothermal energy capacity in East and Southeast Asia. While Oceania also expanded its renewable energy use, Central and South Asia recorded the largest growth in the modern use of bioenergy. Western Asia, largely including the Middle East, more than doubled its installed renewable energy capacity per capita in the period of 2013-2023.

Despite the progress in the Asia Pacific region, emissions will need to peak and rapidly reduce if the world is to achieve the goals of the Paris Agreement (BNEF, 2024b). With a potential peak in CO_2 emissions in China in 2025 ahead of the official target of 2030 (World Economic Forum, 2025), the overall region's emissions could also peak shortly thereafter. Accelerated deployment of renewable energy can further reduce emissions. Nevertheless, as the region faces the challenges of rising energy demand, reliance on coal-fired power generation, energy import dependence and the depth of energy-intensive manufacturing, plus hard-to-abate sectors such as aluminium, cement, shipping and trucking, the energy transition in the region will be crucial for global net-zero targets (ADB, 2025).

With regard to investment, although the Asia Pacific region is the top recipient of investment relating to the energy transition – USD 940 billion was invested in 2023, accounting for over 45% of the global total – the amount remains far below the level of investment required for SDG 7 which is an annual USD 2.2-2.4 trillion by 2030 (ESCAP *et al.*, 2025). Gender, equality and the engagement of youth and marginalised communities have been integrated in the NDCs of many countries, although little can be seen in implementation. According to UNWOMEN, 37 out of 49 Asia Pacific countries with updated NDCs included gender references (as of 2023) (ESCAP *et al.*, 2021).

IRENA's recent country engagement on climate action support includes:

- **Bangladesh**: Building upon the ongoing energy transition assessment, IRENA provided NDC technical recommendations for Bangladesh. In line with the updated Renewable Energy Policy in 2025 (IEEFA, 2025), it is essential for the country to set an ambitious target for the energy sector component and accelerate renewable energy deployment. To meet a 20% share for renewable power in the generation mix by 2030, solar PV, bioenergy and others would need to further expand.

- **China**: IRENA has created a solar city simulator for Chongli in China to assess the solar energy resource. The simulator can facilitate the further deployment of solar PV by offering better understanding on the solar PV potential in specific areas in Chongli.

- **Kyrgyz Republic**: IRENA undertook an assessment of the regulatory recommendations, incentive mechanisms and public-private partnership models to deepen private sector participation in energy sector NDC implementation, encompassing both enhancement and implementation, as part of an input into the Kyrgyz Republic's NDC 3.0 development in co-ordination with the NDC Partnership. The assessment found that well-designed public-private partnership frameworks can facilitate private sector participation with the key elements as follows: on-time/budget delivery; optimal risk management; efficiencies from the integration of design, construction, financing and O&M; competition and greater private participation; and accountability for the provision of renewable energy. Supportive policy instruments, such as long-term PPAs, will also be important enablers to facilitate private sector investment in renewable power and associated physical infrastructure.

- **Indonesia**: The acceleration of the renewable power deployment and energy efficiency improvement in Indonesia through NDC implementation will contribute to the global energy transition goal, including the global goal of tripling renewable power and doubling energy efficiency by 2030, as agreed by the UNFCCC parties at COP28. As IRENA's NDC technical analysis report for Indonesia highlighted, if Indonesia remains on course with the global net-zero emissions pathway towards 2050 (IRENA, 2022b), Indonesia's emissions could peak in the mid-2030s and more than halve by 2050 as compared to the emissions level of 2020 with the key solutions of renewables, electrification and energy efficiency. It is important to create a level playing field for renewables through full-cost award feed-in tariffs for utility-scale renewable projects, as well as streamlining permitting processes, reforming renewable PPA design, setting competitive renewable energy auctions, integrating decentralised renewable energy, and building and expanding resilient power infrastructure. Electrification is the most viable transition pathway to decarbonise the transport sector.

- **Nepal**: IRENA is undertaking capacity-building activities related to enhancing renewable energy data collection and reporting to support the country's NDC updates and implementation. The support covers a gaps and needs assessment, with recommendations on energy auditing and energy data collection as well as capacity building activities.

- **Pakistan**: With a surge of solar PV in recent years, Pakistan has been increasingly deploying renewable power with a compound annual growth rate of around 7.8% during 2012-2024 (IRENA, 2025a). IRENA worked on an NDC technical analysis report for Pakistan showing that supportive policy measures can further unlock the large-scale deployment of renewables. These measures could include the restructuring of electricity tariffs, introducing competitive bidding for feed-in tariffs, reduction/elimination of electricity tariff subsidies, permitting streamlined project development and grid connection, and adopting integrated energy planning. Physical infrastructure upgrading can also support the integration of VRE: such measures include modernisation of grids (expansion, reduction of transmission and distribution losses, energy storage), net metering, and flexibility and frequency solutions, as well as use of digitalisation.

  Pakistan's NDC 3.0 recognises an upcoming gradual phase-down of fossil fuels in its capacity mix as natural gas and furnace oil are set to decline while increasing renewable power capacity. Digitalisation, such as the use of blockchain, the IoT and smart grids, is mentioned among the technology needs (Government of Pakistan, 2025)

- **The Philippines**: The Philippines has recorded steady growth and improvement in renewable power deployment and energy efficiency. The country's efforts to accelerate renewables and boost energy efficiency through NDC implementation will advance global energy transition objectives, aligning with the UAE Consensus goals of tripling renewable power and doubling energy efficiency by 2030. Particularly, as IRENA's NDC technical recommendations outline, utility-scale and rooftop solar PV can drive the Philippines' energy transition in the power sector, while hydropower, geothermal and wind also play important roles. To deploy renewables in line with the Philippines Energy Plan III targets, the upgrading of physical grid infrastructure, including transmission and distribution networks, interconnection and utility-scale energy storage, can support the integration of a larger share of renewables into the power system. For the industrial sector, growing domestic demand will increase energy consumption, especially in manufacturing and mining. The transition from fossil fuels to electrification and bioenergy is important, as seen in the Philippines' shift from coal to electricity in certain process activities in industry.

Pacific SIDS

- **Papua New Guinea**: IRENA, through the SIDS Lighthouses Initiative and the National Energy Authority of Papua New Guinea, is undertaking a country-led ETA to evaluate the current landscape for renewable energy development and identify strategic actions to accelerate the national energy transition. The assessment includes analysis and recommendations in the domains of rural electrification, nexus opportunities between the energy transition and other sectors, resource assessment and prioritisation, clean cooking, energy efficiency and sustainable transport.

  Moreover, IRENA provided technical recommendations for Papua New Guinea's NDC 3.0 development While solar PV is expected to play a key role in clean power supply in the medium term, a common challenge across renewable technologies (except solar) is that an in-depth resource assessment will be needed to assess their potential, including wind energy (land and offshore), geothermal energy sites, small hydro and biofuel technologies. Renewables and the energy transition can also bring a range of co-benefits beyond climate change mitigation. These include socio-economic benefits for rural communities using decentralised renewable energy, healthcare facility electrification through renewables, and climate resilient infrastructure and biodiversity by reducing polluting fuel use.

- **Samoa**: IRENA is supporting Samoa to improve its energy database and dissemination and data collection tools to assist in robust NDC development with an enhanced data repository.

Middle East

- **Iraq**: Iraq stands at a critical juncture in its energy transition, with significant renewable energy potential but a continued heavy reliance on fossil fuels. Developing Iraq's renewable energy sector is crucial for enhancing the country's energy security, reducing carbon emissions and creating economic opportunities, as highlighted in IRENA's ETA recommendations for Iraq (IRENA, 2025e). With the highest solar irradiance levels in the region (exceeding 2 000 kWh/m^2/year), solar PV is among the essential energy transition technologies for Iraq.

  IRENA's NDC technical recommendations for Iraq also underscored the role of renewables in the country's contribution to global efforts on climate change mitigation. Prioritising the development of utility-scale solar and wind farms in high-resource regions, fostering distributed renewable energy generation, and integrating energy storage solutions are necessary steps to ensure long-term sustainability (Carbon Limit, 2022). Improved policy measures and energy sector planning can support accelerated renewables deployment, such as auctions for renewable energy, streamlined licensing and permitting processes, electricity subsidy reform and tariff setting, and integrated energy planning with resource assessment. Modernisation of physical infrastructure is also an essential element to integrate increasing VRE such as solar and wind.

- **Lebanon**: Deploying more renewable energy will strengthen Lebanon's energy security, reduce GHG emissions, particularly from the power sector, and ease the financial strain of fuel imports, as IRENA's outlined in NDC technical analysis provided for Lebanon. Renewable energy can play a role in addressing the energy system challenges Lebanon is facing, such as dependence on imported fuels, fuel shortages and frequent blackouts. The expansion of renewables demonstrates strong local demand, considering the high compound annual growth rate (14%) of renewable power capacity addition over the period 2012-2024. Notably, solar PV capacity has surged from 92 MW in 2020 to over 1 081 MW in 2024 (IRENA, 2025a). Prioritising the development of utility-scale solar and wind farms in high-resource regions, fostering distributed renewable energy generation, and integrating energy storage solutions are necessary steps to ensure long-term sustainability.

- **United Arab Emirates:** IRENA assisted in the development of a qualified NDC 3.0 and the First Biennial Transparency Report of the United Arab Emirates by engaging in the review process, as well as supporting engagement to enhance climate transparency in the NDC implementation process.

EUROPE

The European Union has set ambitious goals to combat climate change. Through the European Green Deal and the European Climate Law, it has committed to reducing net domestic GHG emissions by at least 55% by 2030 compared to 1990 levels, and to achieving climate neutrality by 2050. As an intermediate step toward this goal, the European Commission published a communication in February 2024 (European Commission, 2024a) recommending a further reduction in GHG emissions by 90% by 2040, relative to 1990, and the EU's NDC 3.0 has confirmed the target in 2025 (EU, 2025). According to the Emissions Database for Global Atmospheric Research (EDGAR), the EU27's GHG emissions (excluding land use, land-use change and forestry) in 2023 were 33.9% lower than in 1990, amounting to 3.22 $GtCO_2eq$. In that year alone, EU27 emissions fell by 7.5% (a reduction of 261 $MtCO_2eq$), and the EU share of global emissions declined from 6.8% in 2022 to 6.1% in 2023 (European Commission, 2024b).

Between 2022 and 2024, Europe experienced significant shifts in its energy landscape. In 2022, total energy supply decreased by around 5%, while GDP grew by 2%, leading to a more than 4% improvement in energy intensity – a sign of increased energy efficiency during the global energy crisis (IEA *et al.*, 2025). In 2023, renewable electricity generation in Europe reached 1 626 TWh, an 11.4% increase from the previous year, driven by growth in hydropower, solar and wind, which offset declines in other sources. In 2024, a milestone was reached as solar power generation surpassed coal in the European Union, with clean sources, including renewables and nuclear power, making up over two-thirds of total electricity generation (Eurelectric, 2025).

Despite these advances, cost pressures remained. The LCOE for solar PV increased in the European Union in 2024 due to permitting delays, interconnection bottlenecks and higher balance-of-system costs – structural issues that are likely to keep costs elevated (IRENA, 2025b).

At a country level in the European region, IRENA has been supporting Southeast European countries to ensure the alignment of ambitions between their National Energy and Climate Plans (NECPs) and NDCs. IRENA's country engagement on climate action support includes:

- **Albania**: IRENA is providing technical support to align the NDC and NECP and to formulate ambitious energy sector targets aligned with the UAE Consensus and implementation measures in the NDC. The support intends to ensure coherence between the NDC and NECP and formulate ambitious energy sector targets and implementation measures within the revised NDC.

- **Georgia**: IRENA's ETA and zoning assessment of renewable resources support the development of an ambitious NDCs 3.0.

  The ETA recommends an implementing body for the energy transition, in addition to empowering municipalities to take an active role in deploying renewables, also calling for the facilitation of consolidated energy and climate planning. In the immediate term, it aims to inform the development of the upcoming NDC 3.0 (IRENA, 2025f).

The zoning assessment identified favourable zones in Georgia for utility-scale solar PV and onshore wind projects, along with their associated techno-economic parameters. The assessment concluded that 87 GW for solar PV and 5.4 GW for onshore wind projects were possible, considering an installation density of 50 megawatts per square kilometre (MW/km^2) and 5 MW/km^2 for solar PV and onshore wind, respectively, and maximum concentration capacities of 5 000 MW per zone for both solar PV and onshore wind, given a land utilisation factor of 20-30% for solar PV and 15-20% for onshore wind (IRENA, 2025g).

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LATIN AMERICA AND THE CARIBBEAN

Latin America and the Caribbean recorded the highest global share of modern renewable energy in total final energy consumption, reaching 28% in 2022. This achievement was primarily driven by the widespread use of bioenergy in industrial processes, biofuels in transport and extensive hydropower generation across the region (IEA *et al.*, 2025).

In terms of electricity generation, South America generated 1009 TWh of renewable power in 2023, marking a 6.0% increase compared to 2022 (IRENA, 2025a). This growth was supported by gains across all major generation technologies. In contrast, Central America and the Caribbean generated 52 TWh of renewable power, representing an 8.0% decline from the previous year (IRENA, 2025a). The electricity mix also varies significantly within the region. South America leads with 76.8% of electricity generation coming from renewable sources, primarily hydropower, which alone contributes nearly three-quarters of this total. By contrast, Central America and the Caribbean reported a significantly lower share, with only 20.0% of electricity generation coming from renewables (IRENA, 2025a).

Despite this progress, there are notable disparities in installation costs across the region. For example, in 2024, Central America and the Caribbean recorded the highest weighted average total installed cost for onshore wind projects at USD 2108/kW, compared with USD 1307/kW in Brazil and an average of USD 1492/kW in other South American countries (IRENA, 2025b).

Nevertheless, the region continues to benefit from strong renewable energy resources. Notably, Argentina and Peru achieved the highest weighted average capacity factor for onshore wind, reaching 45% in 2024, highlighting the favourable wind conditions and performance potential in these markets (IRENA, 2025b). However, financial support has shown signs of weakening. In 2023, international public financial flows to Latin America and the Caribbean in support of clean energy projects fell to USD 3.47 billion, signalling a downward trend in external investment in the sector (down 9% from 2022)(IEA *et al.*, 2025).

IRENA's recent country engagement on climate action support includes:

- **Brazil**: The COP30 President, Brazil, has strengthened collaboration with IRENA. IRENA's analysis highlights Brazil's experience in the energy transition, emphasising its strong reliance on renewable energy sources, which account for around 50% of its energy mix; above the global average. Brazil's country analysis is based on good practices derived from long-term energy policies that prioritise security, extensive government support through incentives, and effective co-ordination. This foundation allows the country to continue pursuing ambitious plans to expand renewables like solar, wind, and bioenergy while maintaining energy affordability and security. Key enablers include competitive renewable resources, supportive financial and governance structures, and robust infrastructure. Project facilitation and support has been provided to Brazil.

- **Colombia**: Country-level analysis under the tripling renewable energy goal by 2030: IRENA's analysis aims to develop a strategic framework to accelerate the deployment of non-conventional renewable energy sources in Colombia's electricity sector, supporting the global goal of tripling renewable capacity by 2030, as outlined in the UAE Consensus. The analysis identifies key investment needs, associated risks and potential financing sources, while recommending targeted actions to overcome barriers that hinder investment in the sector.

  NDC 3.0 technical recommendations: IRENA's NDC technical recommendations for Colombia provide an overview of the efforts required to achieve various planned scenarios and ambitious national goals, including reaching carbon neutrality by 2050 and reducing emissions by 51% by 2030. The recommendations examine the energy sector's role in cutting greenhouse gas emissions, outline adaptation measures for the sector, and highlight the importance of Indigenous communities in the development of renewable energy projects and the increasing opportunities for clean cooking technologies, among other critical enablers that could be considered when structuring Colombia's NDC 3.0.

- **Ecuador**: Building on IRENA's support for Ecuador's first NDC update – where IRENA recommended methodologies to reduce emissions from three unconditional initiatives (hydroelectric development, optimisation of electricity generation and energy efficiency, and the efficient cooking programme) and supported the development of a monitoring, reporting and verification (MRV) system – the current support aims to build on this foundation by integrating additional mitigation actions into the existing MRV framework.

- **El Salvador**: IRENA is supporting El Salvador in strengthening the resilience of its renewable energy systems to help the country achieve its climate goals. This technical assistance focuses on enhancing adaptation measures, aligning national climate plans with renewable energy development, and accelerating the deployment of resilient, clean energy infrastructure. As part of this effort, IRENA is conducting an analysis to identify potential climate hazards that may impact the power sector – particularly renewable energy generation and transmission infrastructure. The initiative also includes research on case studies highlighting sector vulnerabilities to climate risks and effective resilience measures. Additionally, the support aims to build capacity-building programmes for key national stakeholders on climate risk assessment methodologies, resilience planning for renewable energy systems, and the integration of climate factors into energy sector policy and regulation.

Caribbean SIDS

- **The Bahamas**: Solar City Simulator support has been undertaken to assess solar power potential with the objective of contributing to enhancement of its NDC 3.0.

- Project facilitation support has been provided for **Dominica**.

Box 3. **IRENA dialogue on carbon markets and the energy transition**

Carbon markets can help address financing gaps to accelerate the deployment of renewables and energy transition technologies. Renewables have been accounting for the largest share of the carbon market credits issued in the last four years.

IRENA launched a virtual dialogue in 2025 to facilitate in-depth exchange on renewables in carbon markets, to shed light on the experiences and lessons learnt through international carbon market mechanisms. The dialogue discussed the role of international carbon market mechanisms, including Article 6, in advancing climate action through renewables and energy transition, as well as the way to ensure environmental integrity and contribute to climate finance and sustainable development in developing countries, including SIDS and least-developed countries.

Renewables and energy transition projects are the areas where carbon market mechanisms have a role to play in mobilising investment to meet the global target of tripling renewables and the Paris Agreement climate goals. To ensure additionality and environmental integrity, governments can clarify the prioritisation of project areas for the application of market mechanisms. It is essential for countries to address financial additionality — meaning that market-based instruments should be applied to renewable energy and energy transition projects that would not occur without a carbon market approach. In practice, an increasing number of countries are developing their national framework on Article 6/carbon market with a positive (white) list of eligible project activities to ensure alignment with national priorities, additionality and environmental integrity.

Emerging energy transition areas in carbon markets include renewable energy projects with utility-scale BESS and renewables-based electric cooking, the use of carbon credits to facilitate the replacement of coal-fired plants with renewables, and policy crediting.

With the conclusion of guidance for Article 6.4, or Paris Agreement Crediting Mechanisms (PACM), as an outcome of COP29, countries are increasingly looking into the climate change mitigation opportunities through Article 6 implementation, with over 1000 prior notifications of PACM activities informed by countries to the UNFCCC Secretariat as of 14 August 2025 (UNEP-CCC, 2025).

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[13] Latin America and the Caribbean electricity capacity statistics are a total of the renewable electricity capacity of South America, Central America and the Caribbean in IRENA statistics (IRENA, 2024b).

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ANNEX I.
IRENA NDC 3.0 DEVELOPMENT SUPPORT

Through its partnership with the United Arab Emirates, Denmark and the NDC Partnership, IRENA has been supporting countries' efforts on the development of NDCs 3.0. The support contributes to the integration of the first Global Stocktake Outcome into NDCs 3.0, especially regarding the global target of tripling renewables and the associated enabling drivers such as policies, incentives, energy transition technologies, infrastructure and capacity.

Country	Support description
Albania	Technical support for aligning the NDC and National Energy and Climate Plan (NECP).
Angola	Zoning analysis for resource assessment to identify the areas with the highest renewable energy potential.
Bahamas	Solar City Simulator support undertaken to assess solar power potential with the objective of contributing to enhancement of NDC 3.0 in line with the UAE Consensus.
Bangladesh	Energy Transition Assessment (ETA) and NDC 3.0 technical analysis and recommendation report.
Benin	Scoping underway for NDC capacity building.
Burkina Faso	Scoping underway for NDC capacity building.
Bosnia and Herzegovina	Alignment support for NDC and NECP.
Brazil	Case study on biofuels and energy transition.
Chad	ETA and NDC 3.0 technical analysis and recommendation report.
Colombia	NDC 3.0 technical analysis and recommendation report.
Ecuador	Energy data and statistics support.
El Salvador	Analysis for strengthening climate resilience of power infrastructure.
Georgia	Aligning energy and climate planning, including NDC and NECP.
Indonesia	NDC 3.0 consultation dialogue and technical recommendation report.
Iraq	ETA and NDC 3.0 technical analysis and recommendation report.

Kyrgyzstan	Technical analysis of NDC 3.0 with a focus on energy transition measures with private sector engagement.
Lebanon	Development of NDC 3.0 technical recommendation report.
Malawi	Cost-effectiveness assessment of renewable energy technologies.
Mauritania	Support for enhancing capacities for renewable energy data collection and reporting.
Mauritius	Assessment of cost-effective mitigation options for renewable energy roadmap.
Moldova	Alignment support for NDC and NECP.
Namibia	Cost-effectiveness assessment of renewable energy technologies.
Nepal	Capacity-building activities related to enhancing renewable energy data collection and reporting.
Nigeria	NDC 3.0 consultation dialogue in line with UAE Consensus, based on the specific inputs to NDC targets, measures and means of implementation.
Pakistan	NDC 3.0 recommendation report and the following consultation dialogue.
Papua New Guinea	ETA and NDC 3.0 technical analysis and recommendation report.
Philippines	NDC 3.0 technical analysis and recommendation report.
Samoa	Support for strengthening energy database and data collection for assisting robust NDC development.
Senegal	Assessment of the technical and economic viability of specific solar and wind sites.
Seychelles	Cost-effectiveness of renewable and energy transition technologies.
Somalia	ETA.
South Africa	Power system flexibility analysis with a focus on meeting reserve requirements.
Tanzania	Assessment of cost-effective climate change mitigation options.
Tonga	Capacity building on climate action, NDC targets and implementation, and the energy transition with renewables.
United Arab Emirates	Support for institutionalising the national capacity for managing the processes required in the Paris Agreement, including NDC development, implementation and Enhanced Transparency Framework (ETF).

Note: The table covers the countries with the support under implementation as of 31 October 2025. Activities under scoping are excluded from the table.

ANNEX II.
COUNTRY PROFILES SUPPORTED BY IRENA ON CLIMATE ACTION

IRENA has been engaged in climate action support in 102 countries since 2020.

Country	Membership since	GHG emissions ($MtCO_2$, 2024)[1]	Renewable power (MW, 2024)[2]	Renewable power capacity target in the latest NDC[3] (as of 6 November 2025)
Albania	13.08.2010	7.12	2 827	Not specified in updated first NDC
Angola	14.01.2012	69.92	4 142	Solar PV (large grid): 1 693 MW by 2035; Hydro 2 863 MW; (unconditional); Biomass (500 MW); Mini hydro (100 MW); Solar PV (small isolated grid): 131 MW (conditional) (NDC 3.0)
Antigua and Barbuda	10.10.2010	0.43	16	100 MW of renewable generation capacity available to the grid by 2030 (updated first NDC)
Argentina	15.06.2013	374.34	15 637	Not specified in second NDC
Bahamas The	03.05.2014	1.84	23	10 MW of installed distributed generation through a Renewable Energy Rider for Bahamas Power and Light customers in New Providence (updated first NDC)
Bangladesh	25.09.2014	220.83	1 184	Implementation of renewable energy projects of 911.8 MW (unconditional); and 4 114.3 MW (conditional) by 2030 (updated first NDC)
Belarus	27.02.2011	87.49	614	Not specified in updated first NDC
Belize	27.01.2013	1.03	98	100 MW of utility-scale solar power and 20 MW of onshore wind power by 2035 (NDC 3.0)

Benin	21.11.2012	17.77	36	By 2030, install 843 MW of renewable capacity (updated first NDC)
Bhutan	01.06.2016	2.81	2 456	80 kW solar PV plant (2022- 2028); 71.11 MW of utility-scale solar and wind energy; roof-mounted solar PV on 300 rural households (second NDC)
Bosnia and Herzegovina	12.01.2011	27.63	2 310	Not specified in updated first NDC
Brazil	State in Accession	1 299.18	213 864	Not specified in NDC 3.0
Brunei	20.05.2011	11.87	5.2	Not specified in first NDC
Burkina Faso	25.07.2013	34.92	241	Not specified in updated first NDC
Cameroon	20.08.2011	40.62	877	600 MW hydropower plant (updated first NDC)
Chad	24.05.2018	101.17	5	A solar power plant with storage with a capacity of 65 MW; PV power plants for a total of 240 MW in the very short term (2025) and 400 MW by 2030; two biomass-fired power plants (2x 15 MW each); 100MW of wind power plants (updated first NDC)
China	02.01.2014.	15 536.12	1 817 956	Reach 3 600 GW of solar and wind power capacity by 2035 (NDC 3.0)
Colombia	07.02.2015	217.59	15 039	Not specified in updated first NDC
Comoros	08.11.2015	0.95	5	Not specified in updated first NDC
Costa Rica	18.05.2018	17.08	3 171	Achieve and maintain 100% renewable electricity generation by 2030 (updated first NDC)
Côte d'Ivoire	16.09.2013	38.03	919	Not specified in NDC 3.0
Cuba	29.04.2012	35.99	816	Not specified in updated first NDC
Dominica	08.11.2020	0.15	8	Reach 100% share by 2050 using geothermal, solar, wind and hydropower as well as biofuels, hydrogen and ammonia (updated first NDC)

Dominican Republic	09.07.2010	51.58	2 564	Not specified in updated first NDC
DRC	State in Accession	58.49	3 280	Not specified in updated first NDC
(Republic of) Congo	State in Accession	24.62	227	Off-grid mini hydroelectricity: 5 MW by 2025 and 10 MW by 2030; PV solar house: 175 000 W by 2025 and 200 000 W by 2030; solar PV, large grid: 600 MW by 2025 and 625 MW by 2030; solar cottage PV: 10 000 W by 2025 and 13 750 W by 2030; 12 MW cogeneration of electricity (from biomass); Onshore wind turbines: 3 MW for 2025 and 10 MW for 2030 (updated first NDC)
Ecuador	12.02.2011	74.41	5 481	Not specified in second NDC
Egypt, Arab Rep.	11.07.2012	386.60	7 752	Installation of 300 MW to generate electric power (conditional) (updated first NDC)
El Salvador	21.06.2017	14.75	1 858	Increase renewable energy capacity by 50% compared to 2019, to reach 2 222 MW by 2030 (updated first NDC)
Eswatini	03.04.2011	2.93	197	Solar: 100 MW by 2035: hydropower: 100 MW by 2035; biomass: 110 MW by 2035; battery energy storage: 50 MW (NDC 3.0)
Ethiopia	10.03.2012	192.70	5 989	Not specified in updated first NDC
Fiji	02.12.2010	2.75	226	100% of electricity from renewables by 2030 (updated first NDC)
Gabon	11.06.2015	21.78	332	Hydraulic energy of 260 MW by 2030 and 630 MW by 2050 (unconditional); solar power plant with a capacity of 115 MW by 2030 (conditional) (second NDC)
Gambia The	31.03.2011	1.86	26	6 MW of solar PV rooftop systems by 2024; 89 MW of utility-scale solar PV capacity (conditional) (second NDC)

Georgia	30.06.2010	19.60	3 568	Not specified in updated first NDC
Ghana	06.02.2014	48.09	1 780	Not specified in updated first NDC
Grenada	15.07.2011	0.24	4	Not specified in second NDC
Guatemala	17.08.2023	43.47	2 703.6	Not specified in updated first NDC
Guyana	13.02.2014	8.73	65	100% renewable power supply by 2025 (first NDC)
Honduras	19.09.2021	24.39	1 966	Promotion of renewable energy (first NDC)
India	04.05.2010	4 371.17	204 485	Renewable capacity from 35 GW (up to March 2015) to 175 GW by 2022; solar PV from 20 GW to 100 GW by 2022 (updated first NDC)
Indonesia	07.09.2014	1 323.78	14 440	Not specified in NDC 3.0.
Iran (Islamic Republic of)	21.02.2013	1 054.77	12 961	Not specified in first NDC
Iraq	30.12.2012	413.28	1 599	Not specified in first NDC
Jordan	02.08.2014	34.86	2 725	By the end of 2021, 1 600 MW of PV and 715 MW of wind energy are scheduled to be grid connected; introduction of concentrated solar power (CSP) of 100 MW and CSP 300 MW (Updated first NDC)
Kazakhstan	05.07.2013	330.39	5 554	Not specified in updated first NDC
Kenya	22.05.2009	102.84	3 051	100% renewable electricity generation in the national grid by 2035 (NDC 3.0)
Kyrgyz Republic	14.05.2021	22.37	3 258	Hydro (471 MW in total) (unconditional); solar (2 520 MW); wind (200MW); hydro (4 414.7 MW) (conditional) (NDC 3.0)
Lao PDR	Non-member	41.55	10 370	13 GW total installed hydropower capacity (domestic and export use) in the country by 2030 (unconditional); 1 GW of solar and wind, and 300 MW of biomass (conditional) (updated first NDC)

Lebanon	04.11.2017	18.79	1 373	Not specified in updated first NDC
Lesotho	16.10.2010	3.05	104	Not specified in second NDC
Liberia	State in Accession	4.46	96	Installation of 150 MW of on-grid renewable energy plants (20 MW of medium-sized hydro and 100 MW of solar PV with BESS); and 50 MW of distributed renewable energy projects (NDC 3.0)
Madagascar	State in Accession	35.79	251	Not specified in second NDC
Malawi	State in Accession	19.02	520	Not specified in updated first NDC
Mali	18.11.2010	48.01	635	Install 1 416 MW of renewable energy capacity by 2039, out of 58.3% of installed power capacity (updated first NDC)
Mauritania	12.04.2012	17.51	294	Not specified in NDC 3.0
Mauritius	24.04.2011	6.47	302	Not specified in updated first NDC
Moldova	03.08.2011	11.66	538	Wind parks with 390 MW and solar PV systems with 560 MW (NDC 3.0)
Mongolia	11.04.2010	104.35	328	Use renewable energy sources (first NDC)
Montenegro	03.07.2010	3.48 (2022)[4]	845	Not specified in NDC3.0
Mozambique	28.04.2011	33.63	2 375	Not specified in NDC 3.0
Myanmar	Non-member	117.79	3 544	increasing the total share of renewable energy (solar and wind) to 53.5% (from 2 000 MW to 3 070 MW) by 2030 (conditional) (updated first NDC)
Namibia	28.12.2013	14.21	597	Not specified in updated first NDC
Nauru	09.09.2010	0.06 (2022) [5]	3	Not specified in updated first NDC
Nepal	14.12.2017	41.47	3 475	Expand renewable electricity generation capacity to 14 031 MW by 2030 and 28 500 MW by 2035 (NDC 3.0)

Nicaragua	23.10.2010	19.16	766	Not specified in updated first NDC
Niger	16.12.2010	41.15	83	Reach 402 MWp of solar PV (large grid), 100 MWp (small, isolated grid), and 24 MWp (mini-grid) by 2030 (conditional); electricity production from bagasse: 12 MW (by 2030) (conditional); hydroelectricity connected to the main network: 130 MW (conditional); 100 MW of off-grid capacity by 2030 (Updated first NDC)
Nigeria	30.09.2010	350.56	3 079	Achieve 52% of on-grid and off-grid generation capacity from renewable energy sources through installed capacity of 10 400 MW hydro, 5 700 MW solar and others (NDC 3.0)
North Macedonia	29.12.2010	9.81	1 633	Not specified in updated first NDC
Oman	05.08.2010	132.26	722	Not specified in second NDC
Pakistan	23.06.2013	525.88	17 525	By 2035, renewable energy (including hydropower) and clean energy are expected to reach about 38 472 MW and 43 202 MW (NDC 3.0)
Palau	27.12.2009	1.53	20	Not specified in first NDC
Panama	15.01.2012	19.22	3 031	1.7 GW of renewable energy capacity by 2030 (second NDC)
Papua New Guinea	03.06.2022	10.76	384	On-grid renewable electricity generation to 78% by 2030 (second NDC)
Paraguay	02.03.2018	41.44	8 867	Not specified in first NDC
Perú	21.11.2013	103.81	7 369	Not specified in first NDC
Philippines	10.07.2011	266.60	9 300	Not specified in first NDC
Rwanda	24.06.2012	8.35	182	68 MWp of solar mini-grids to be installed in off-grid rural areas by 2030 (conditional) (updated first NDC)

Saint Kitts and Nevis	20.06.2013	0.19	7	25 MW of geothermal; 35.7 MW of utility-scale solar; PV 6.6 MW of wind (conditional) by 2030 (updated first NDC)
Saint Lucia	31.03.2016	0.47	5	32 MW geothermal power plan by 2030 is among NDC 3.0 target
Saint Vincent and the Grenadines	09.11.2012	0.19	11	Not specified in first NDC
Samoa	04.08.2010	0.52	33	100% renewable electricity generation by 2025 (second NDC)
Sao Tome and Principe	01.11.2014	0.41 (2022) [6]	2	55MW will be added between 2025 and 2035 (NDC 3.0)
Saudi Arabia	29.01.2012	838.88	4 743	Not specified in updated first NDC
Senegal	18.11.2010	31.72	481	50 MW biomass by 2030 (conditional); 314 MW in hydroelectricity in 2030 (unconditional); 50 MW of CSP by 2030 (conditional); 235 MW of solar capacity (unconditional); and 100 MW of solar capacity by 2030 (conditional) (first NDC)
Seychelles	02.06.2011	0.98	24	37.4 MW solar PV for meeting demand of EVs (updated first NDC)
Sierra Leone	25.03.2011	7.93	115	Not specified in updated first NDC
Solomon Islands	04.08.2013	0.62	7	59 MW of renewable energy by 2035 from 7 MW in 2018 (NDC 3.0)
Somalia	13.12.2013	34.42	49	Not specified in NDC 3.0
South Africa	30.12.2010	569.81	13 516	A total of 44 GW of new renewable energy capacity will be installed by 2035, according to the country's integrated resource plan (IRP). (NDC 3.0)
Sudan	18.06.2011	128.1 (2022) [7]	1 871	Not specified in updated first NDC
Tanzania	28.08.2024	102.53	1 478	Not specified in updated first NDC
Tonga	06.03.2010	0.29	17	Not specified in second NDC

Türkiye	01.04.2012	579.51	68 984	To reach battery and electrolyser capacity of 2.1 GW and 1.9 GW by 2030, respectively; 35 GW of installed hydroelectric power capacity; 33 GW of installed solar power capacity for 2030; 18 GW of installed wind power capacity (updated first NDC)
United Arab Emirates	18.07.2009	264.15	6 815	Triple the country's renewable power generation capacity and increase the proportion of clean energy to 30% by 2030 (NDC 3.0)
Uganda	17.05.2012	57.30	1 818	Not specified in updated first NDC
Ukraine	24.02.2018	196.96	7 150	Not specified in updated first NDC
Uruguay	28.08.2011	44.63	4 129	No quantified renewable energy target (NDC 3.0)
Uzbekistan	24.08.2017	227.49	5 166	Increasing renewable energy capacity to 25 000 MW by 2030 (NDC 3.0)
Vanuatu	01.03.2013	0.63	13	300 kW of BESS in Lolowai and 20 kW of BESS in Sola are among energy sector targets (NDC 3.0)
Zambia	22.06.2013	38.52	3 404	2 354 MW of hydropower and 17.7 MW of geothermal by 2030 (NDC 3.0)
Zimbabwe	17.09.2014	30.78	1 285	Expansion of grid-connected solar (additional 300 MW by 2035); expansion of microgrids (2 MW by 2035); biogas energy production (additional 4.1 MW by 2035) (NDC 3.0)

Sources: 1. (Crippa M. *et al.*, 2025); 2. IRENA, 2025a; 3. (Climate Watch, 2025); 4. (Climate Watch, n.d.a); 5.(Climate Watch, n.d.b); 6. (Climate Watch, n.d.c); 7. (Climate Watch, n.d.d).

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