NDC PARTNERSHIP

Tripling Renewables

Powering Climate Action Across Sectors

MAY 2025

Contents

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This policy brief was prepared by the NDC Partnership's Support Unit to help countries in developing the next round of Nationally Determined Contributions (NDCs), or NDCs 3.0, with a specific focus on the energy outcomes of the first Global Stocktake (GST) concluded at COP28 in 2023. The GST focuses significantly on energy and calls, among other priorities, for tripling the global share of renewable energy capacity and transitioning away from fossil fuels. Recent estimates indicate that, to meet this goal, annual additions will need to average 1,044 gigawatts (GW) from 2024 to 2030, doubling current market trends (IRENA et al., 2024).

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SECTION 1

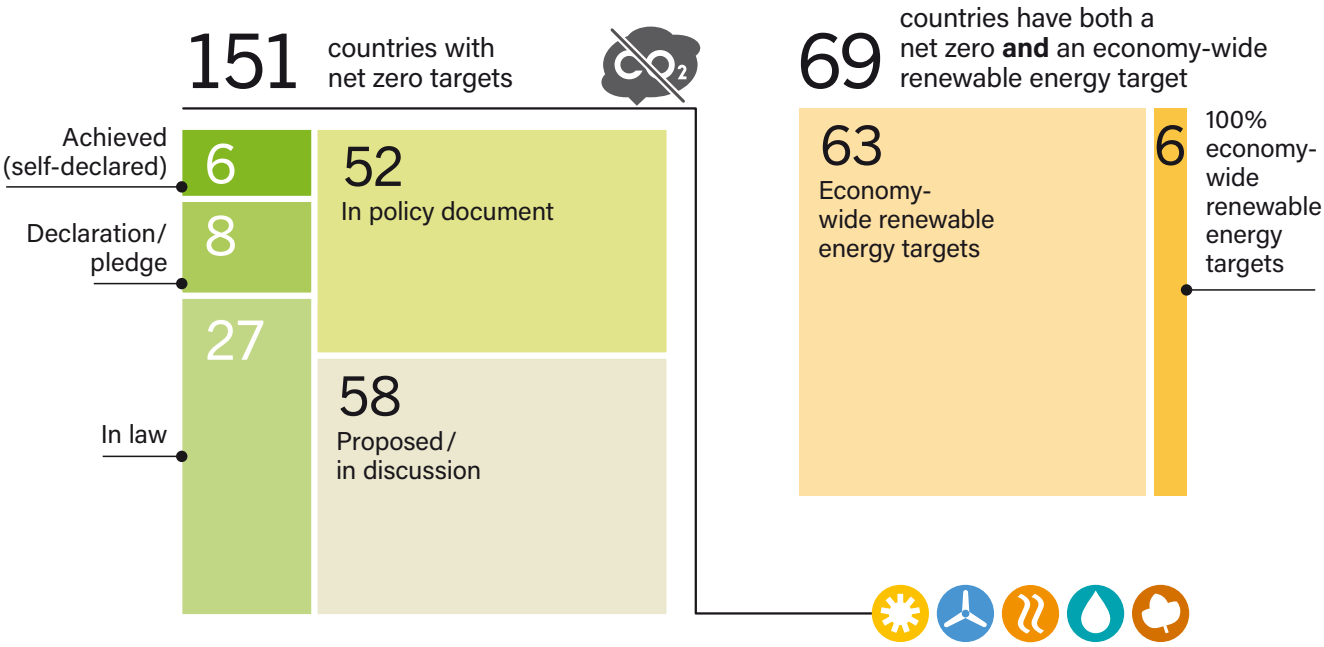
Renewables in NDCs

The Paris Agreement adopted in 2015 requested each UNFCCC Party to outline and communicate their post-2020 climate actions. The next round of NDCs (new or updated) were to be submitted by 2020 and every five years thereafter. Since the initial round of NDC submissions, there has been a marked increase in the integration of renewable energy in climate action strategies. In the first round of NDCs (NDC1), approximately 45% of UNFCCC Parties included renewable energy in their climate pledges, often focusing on broad goals for reducing greenhouse gas emissions and enhancing energy security. The next version of NDCs (NDC2) showed significant progress, with over 65% of Parties incorporating specific, measurable targets for renewable energy expansion.

In comparing NDC1 to NDC2, there are several developments of note:

- **Quantitative Commitments:** NDC2 show an increase in measurable renewable energy targets. Percentages of total energy generation to be derived from renewable sources or the number of gigawatts to be added by 2030 are specified by 148 Parties (IRENA, 2023).
- **Technology Specificity:** While NDC1 often contained generic commitments, NDC2 tend to identify specific renewable energy technologies that Parties plan to deploy (International Energy Agency [IEA], 2023).
- **Adaptation Strategies:** Parties are increasingly including adaptation and developing resilient renewable energy systems to withstand climate extremes.

FIGURE 1 Countries with Net Zero and Renewable Energy Targets, as of 2023



Source: REN21

Notwithstanding these positive developments, significant gaps remain. The latest tracking report on tripling renewable capacity shows that current NDC targets would achieve 5.4 terawatts (TW) by 2030, while national plans and policies project 7.4 TW for the same period (IRENA et al., 2024). This discrepancy highlights inconsistencies across national policy documents and underscores the need for comprehensive roadmaps for renewable energy implementation across sectors. Moreover, resilience and adaptation strategies involving renewables are underrepresented in NDCs, with fewer than 40% of countries including such measures. Significant opportunities for action therefore are being missed—as are market signals and incentives that could drive innovation in technologies, policies, and business models.

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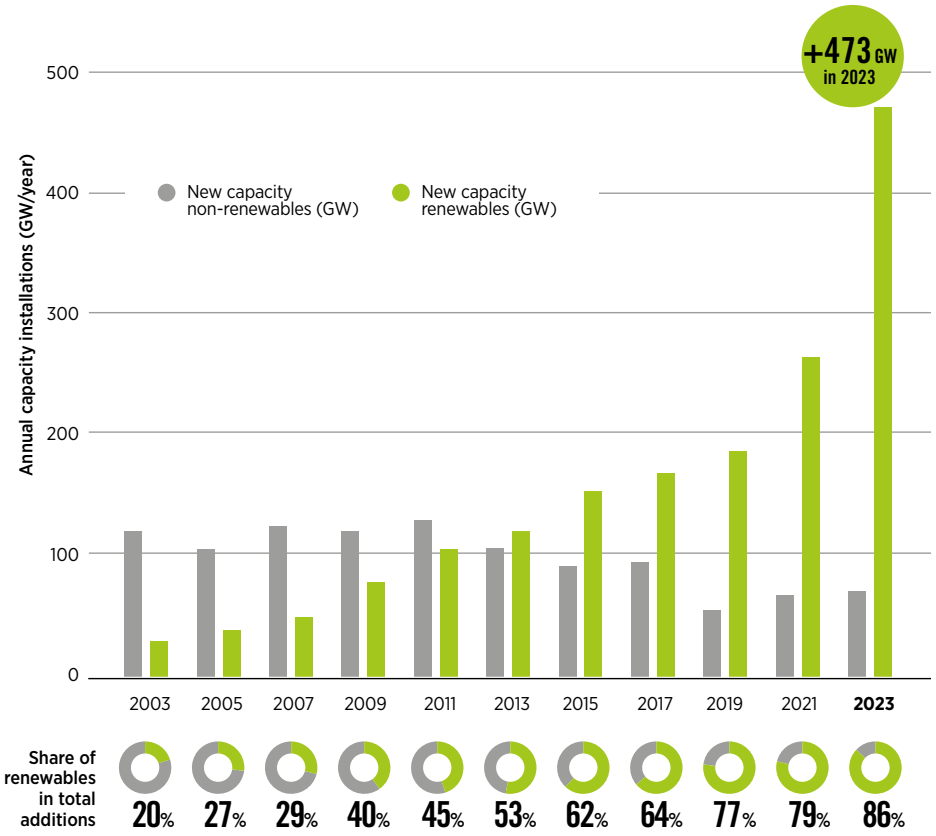
SECTION 2

Current Landscape and Key Trends

Over the past 20 years, renewable energy has moved from niche applications to the mainstream. Thanks to technological advancements, cost competitiveness, and supportive policies, renewables have become the “energy of choice” in a growing number of countries. In 2023, renewables totaled 86% of new energy capacity globally, with the remaining 14% comprised of fossil fuels and nuclear power combined (IRENA, 2024). Solar and wind are now among the most affordable energy sources, making them viable options even in markets traditionally dominated by fossil fuels (BloombergNEF, 2023). As a result, one third of the global power generation is currently renewable.

FIGURE 2 Share of Renewals in New Energy Capacity Globally



Note: GW = gigawatt.

Source: IRENA et al, 2024

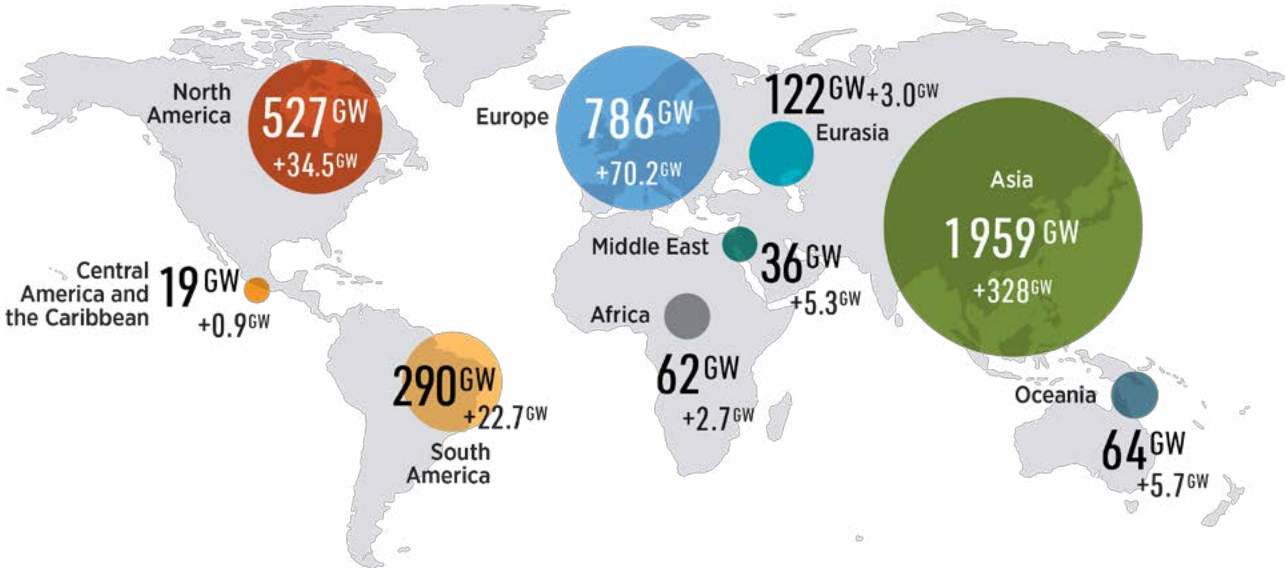
The technologies needed for large-scale deployment are mature and available, making the goal of tripling renewable capacity set out in the GST achievable. Managed properly, this goal would bring benefits across economic, social, and climate priorities. In 2023, clean energy added approximately USD 320 billion to the global economy, accounting for 10% of global GDP growth (Cozzi et al., 2024).[1] Some 16.2 million people were employed in the renewable energy sector alone, more than tripling the number from a decade ago (IRENA ILO, 2024). Advancing the deployment of clean energy has significant health benefits also, not least from reducing air pollution. The World Health Organization estimates that every US dollar invested in targeted climate and health interventions yields an average return of four dollars (WHO, 2018).

All of this makes a compelling argument for the rapid deployment of renewables in line with the GST and the 1.5°C pathway. However, it will matter not only whether this goal is realized but also how—in particular whether transitioning away from fossil fuels toward renewables-based systems also leads to more inclusive and resilient societies and economies.

1. The estimate is based on an assessment of the manufacturing of clean energy technologies, deployment of clean power capacity, and sales of clean equipment (electric cars and heat pumps).

Current trends indicate this is not happening. Deployment remains concentrated in a few regions and countries—namely China, Europe, and the United States. Other regions, including those where energy needs are growing, lag behind. For instance, Africa, where approximately 600 million people still lack access to energy (IEA, 2024), accounted for only 0.5 percent of new power capacity in 2023 (IRENA, 2024). This uneven pattern needs to change, especially considering the impact on the achievement of Sustainable Development Goals.

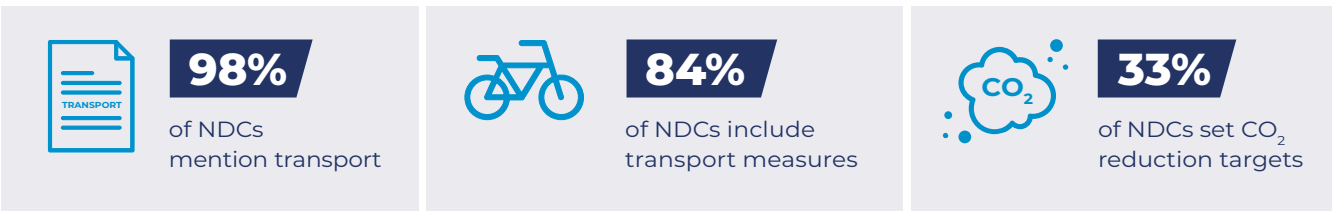
FIGURE 3 Renewable Power Capacity and Additions by Region in 2023



Source: IRENA et al, 2024

In addition to geographical concentration, the deployment of renewables is also sectorally concentrated, with most innovation, development, and deployment to date occurring in the power sector. Some sectors are starting to build on this progress—most notably transport, as electrification has become the backbone of mitigation strategies. In 2024, 20% of all car sales globally were electric (EVs) (Yale Environment 360, 2024). Integrated models of renewable energy and EVs—such as solar-powered charging stations, Vehicle-to-Grid (V2G) systems, and renewable microgrids—are becoming more common, reshaping how power is generated, distributed, and consumed. However, EV deployment patters reflect those of renewables more generally, with sales heavily concentrated in China, Europe, and the US (Yale Environment 360, 2024).

FIGURE 4 NDC Targets and Transport

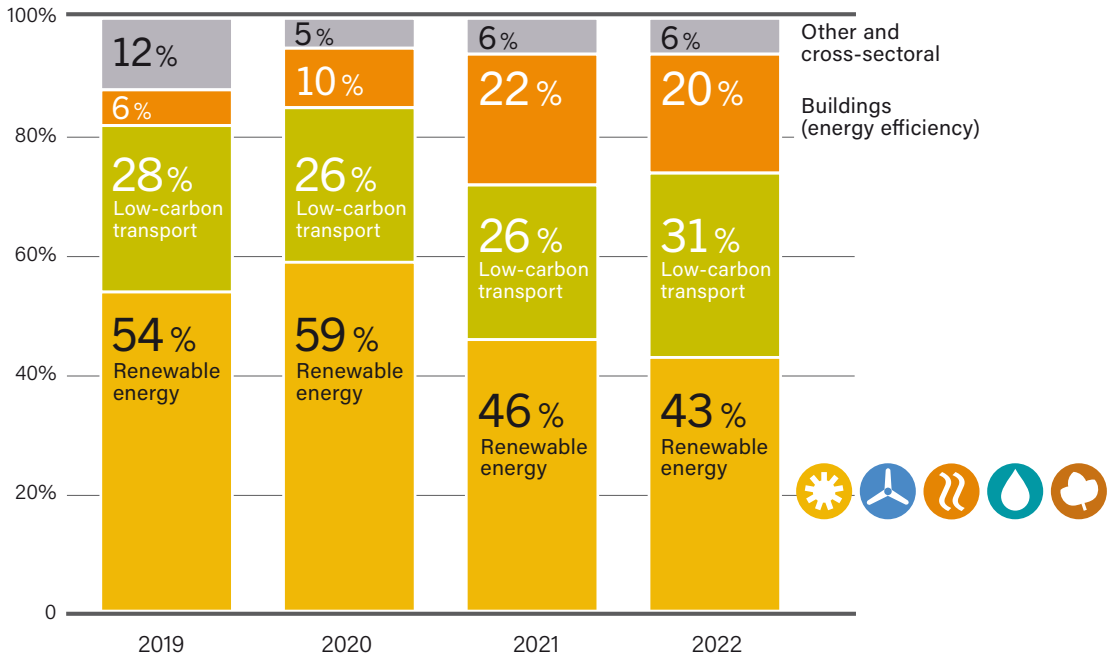


Source: ITF-OECD, 2025

The tripling renewables goal must be realized in a way that is inclusive, geographically widespread, and accessible to all—improving lives and livelihoods along the way. The next round of NDCs (NDCs 3.0) offers an opportunity to incorporate a broader range of technologies, innovations, and solutions that expand the use of renewables into not only mitigation but also adaptation and resilience strategies.

Renewables are bringing a systemic shift that also requires a shift in thinking about energy security and independence. Rather than treating energy as a commodity, which is necessarily tied to volatile and costly fossil fuel markets, adopting an "energy-as-a-service" approach that focuses on end-uses can lead to energy systems tailored to local needs and resources. Such an approach differs from the traditional supply-side focus; applying multidimensional thinking to the development of resilient and secure energy systems, this demand-side approach prioritizes human security as climate change impacts intensify. In essence, this shifts energy from being merely a tradable commodity to a strategic enabler, emphasizing value creation through energy management, efficiency, and sustainability.

FIGURE 5 Estimated Share of Mitigation Finance by Sector, 2019-2022



Note: The "Other and cross-sectoral" category includes: Agriculture, Forestry and Other Land Use (AFOLU), Industry, Information and Communications, Waste, and Water and Wastewater.

Source: REN21.

Ensuring that such approaches are embedded within NDCs will accelerate the deployment of renewables across sectors, contributing to the goal of tripling renewables in the global mix. This is especially relevant for critical systems, such as agrifood, water, and health, all of which significantly contribute to climate change and are increasingly vulnerable to its impacts. These sectors can greatly benefit from larger investment in modern renewable technologies, making them both cleaner and more resilient.

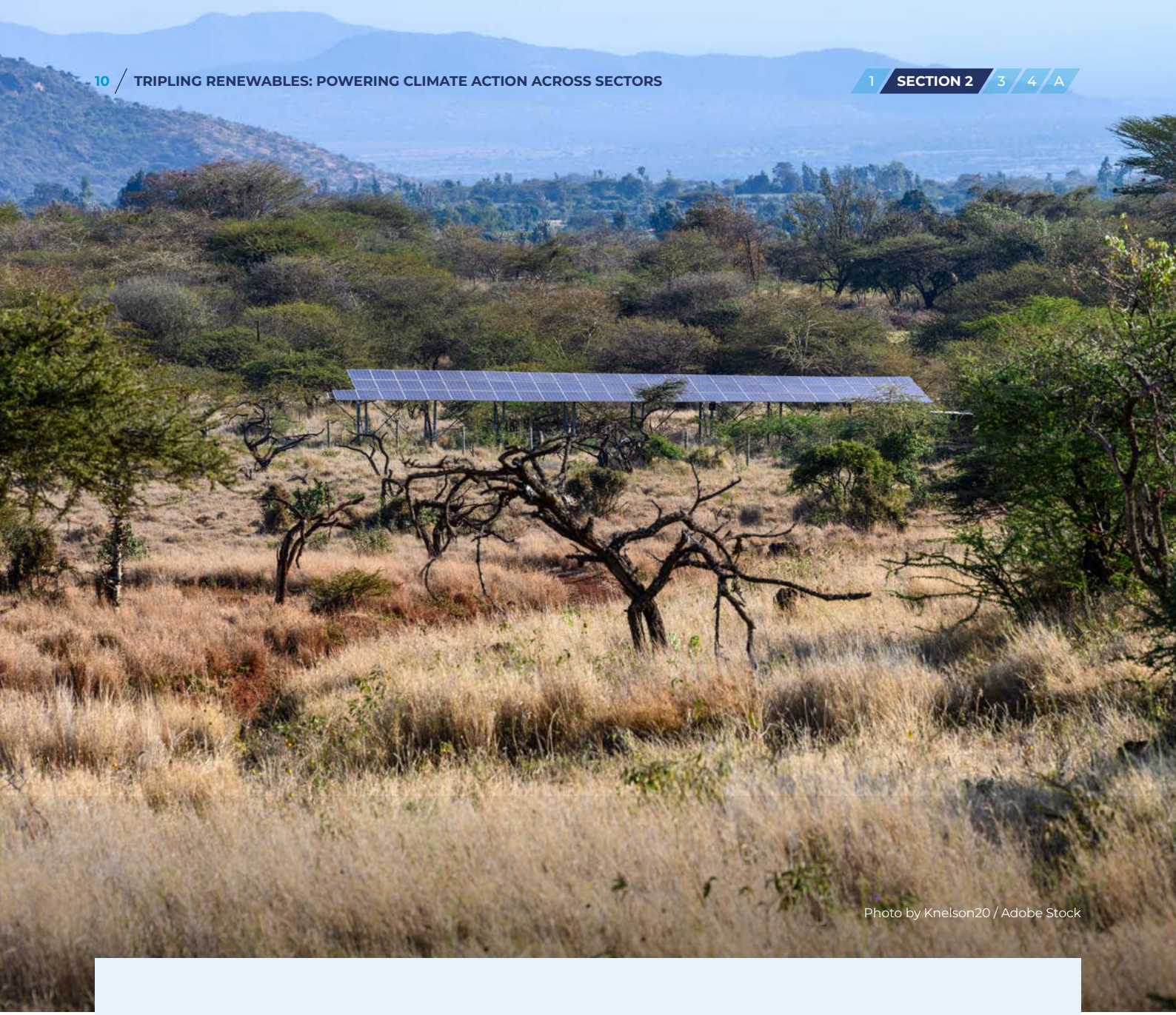


Photo by Knelson20 / Adobe Stock

Energy in the Agrifood Chain, Water, and Health Systems

Agrifood systems consume about 30% of the world's energy, and a third of their greenhouse gas emissions stem from energy use. Global energy consumption in agrifood systems increased by more than 20% between 2000 and 2018, driven largely by the rapid deployment of irrigation pumps, farm machinery, processing equipment, and fertilizers in Asia. In contrast, Africa—home to around 15% of the global population—accounted for only 4% of global energy consumption in agrifood systems due to low energy access (IRENA and FAO, 2021).

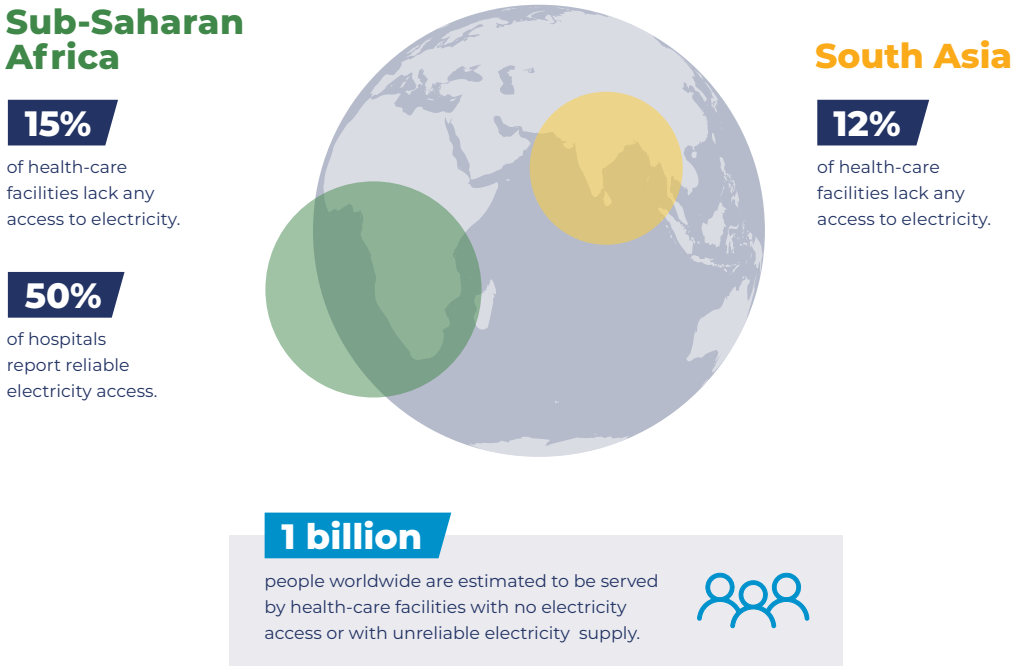
Today, 2.3 billion people live areas experiencing water stress, and four out of five people living in poverty are in rural areas, relying on agriculture. Looking ahead to 2050, global food demand is expected to rise by over 50% compared to 2010 levels in order to feed a projected population of 10 billion. At the same time, water demand is anticipated to increase by up to 30%.

Energy use in agriculture and food production still relies heavily on fossil fuels, with relatively limited deployment of renewables in these sectors to date.

In 2023, the global energy system accounted for around 10% of global freshwater withdrawals (Bredariol, 2023). Conversely, the water sector consumes 4% of global electricity, but its energy use is expected to more than double by 2040 due to the rise in desalination projects driven by climate change, economic growth, and population expansion (IEA, 2017). Climate change is expected to create a 40% gap between water demand and supply by 2030, disproportionately affecting the agricultural sector, the largest consumer of water (WWF and BCG, 2023). Meanwhile, food demand is expected to grow 50% by 2050 (World Bank Group, 2024), creating a vicious circle that threatens food, water, and energy security.

Energy is also deeply intertwined with the health sector. Energy-related fossil-fuel combustion and biomass burning generates 85% of airborne respirable particulate pollution (IEA, 2016). The WHO finds 99% of the global population breathe air that exceeds acceptable limits, and 2.3 billion people rely on polluting fuels for cooking. Combined, these pollutions are linked to 6.7 million premature deaths annually, disproportionately affecting women and children in developing countries (WHO, 2024a). Moreover, close to 1 billion people are estimated to be served by health care facilities without reliable electricity access and, in South Asia and sub-Saharan Africa, some 12% and 15% of health care facilities, respectively, have no access to electricity (WHO, 2024b).

FIGURE 6 Access to electricity of health care services



Source: WHO, 2023

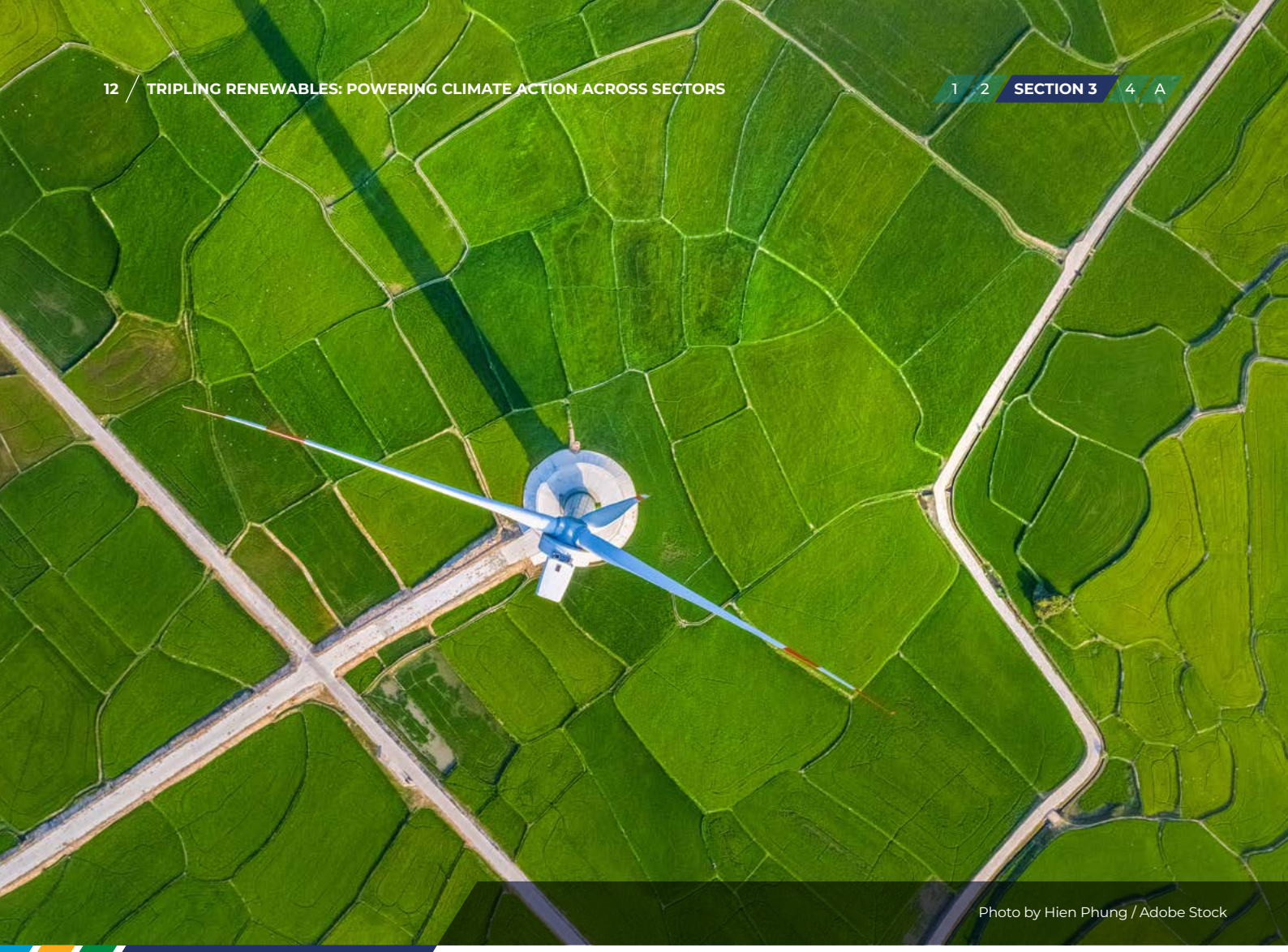


Photo by Hien Phung / Adobe Stock

SECTION 3

Tripling Renewables in NDC 3.0: Unlocking Systemic Potential

There is a growing body of analytical and empirical work on cross-sectoral solutions enabled by renewables, and an increasing number of national strategies, collaborative efforts, and initiatives are embracing these solutions. This cross-sectoral approach leverages the increasing affordability, flexibility, and low environmental impact of renewables to ensure access to and provision of essential services while shielding communities against climate-related and other risks.[2] To date, some 40% of countries also included renewables in their adaptation strategies, though plans were primarily restricted to the energy sector. Moreover, country requests for support submitted to the NDC Partnership often include multisectoral projects in critical areas discussed in this paper.

2. Potential solutions in this regard were particularly visible during the COVID lockdown, which triggered innovations and collaborations.

FIGURE 7 NDC Partnership countries are requesting cross-sectoral support on energy

Of the 1,320 total energy requests received by the NDC Partnership from 84 countries

12% are in the transport sector

11% are in the agriculture sector

10% are in the water sector

The goal of tripling renewable energy capacity can anchor the systemic integration of renewable technologies, policies, and strategies across sectors. Successive rounds of NDCs can be a powerful mechanism for scaling innovations, fostering collaboration, and ensuring that successful models are financed at scale, shared, adapted, and replicated to meet diverse local needs.

Each Party will decide how to contribute to the tripling of renewable capacity in the global energy mix. National circumstances, energy sector profiles, and renewable energy potentials are among the factors that will influence how renewable energy is positioned in each NDC revision. Experience to date has shown that ambitious renewable energy targets are only the first step. Moreover, the concentration of action within the energy sector underestimates the wider impact that renewables can have economy-wide. A comprehensive approach that integrates renewable energy across sectors and highlights key milestones, financing needs, and policy mechanisms can strengthen coordination, foster stakeholder engagement, and support the effective delivery of NDC targets. The NDC 3.0 Navigator offers a framework for countries to raise ambition and accelerate implementation of the next round of NDCs, drawing on the latest science and informed by the outcome of the first Global Stocktake.

Photo by Carolina Jaramillo / Adobe Stock

NDC 3.0 Navigator

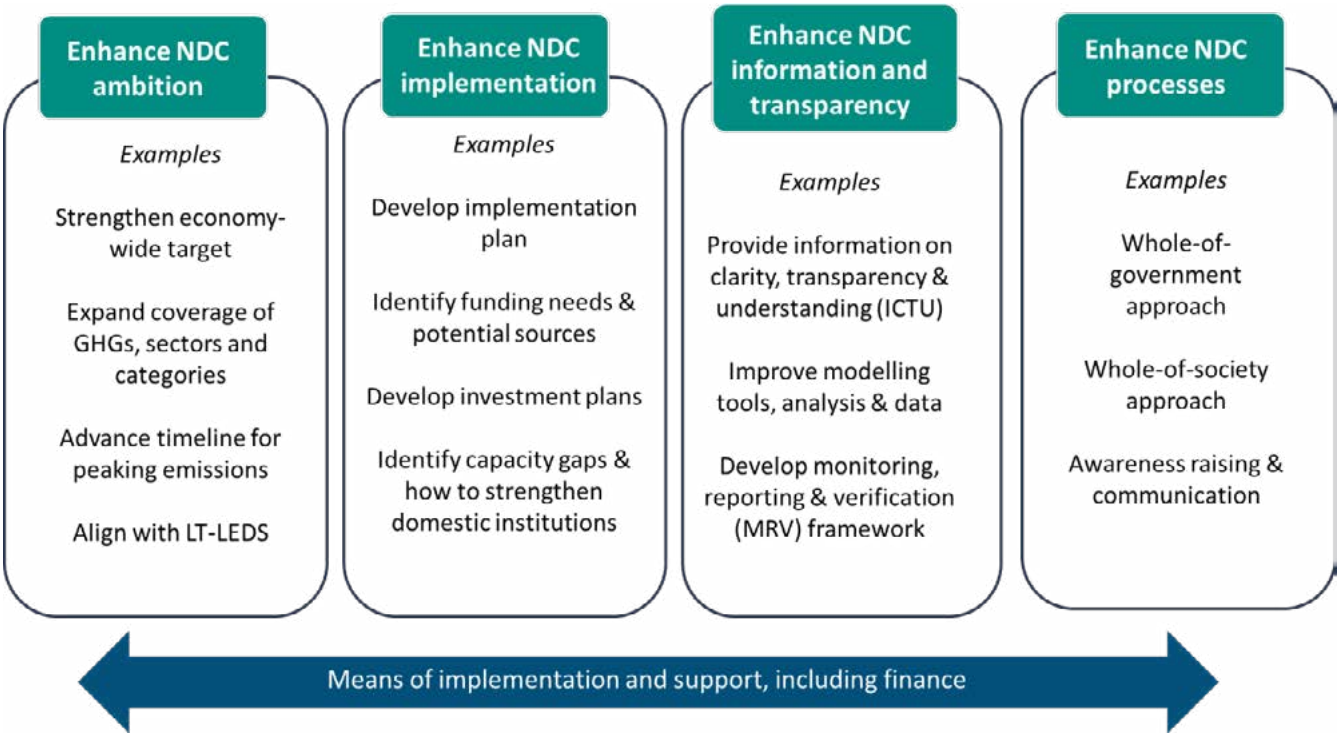
The NDC Partnership and the UNFCCC secretariat launched the NDC 3.0 Navigator in 2024. It provides easy-to-understand summary information and a nonexhaustive menu of options that can be considered by countries to enhance ambition and accelerate implementation. These are complemented by case studies showing practical applications, with links to relevant guidance, resources, and support.

The NDC 3.0 Navigator presents seven 'routes to ambitious and implementable NDCs' for users to explore. These routes encourage reflection on national circumstances and priorities to enhance ambition and accelerate implementation. Within each route are examples of opportunities that can help raise ambition and strengthen implementation in that area. Each opportunity contains example strategies that provide inspiration for action. Case studies and a set of further resources allow for deeper exploration.

Renewable energy opportunities are featured throughout the Navigator, including for enhancing mitigation efforts, strengthening adaptation and resilience, mainstreaming a just transition, leveraging different approaches to technology transfer and uptake, and unlocking finance.

The OECD/IEA Climate Change Expert Group has also provided useful pointers on informing, implementing, and investing in NDCs 3.0 across sectors. Recognizing that NDCs provide clear guidance on countries' climate ambitions, this work points to the need for a more granular breakdown of how governments plan to translate NDCs into concrete action in different sectors. The report suggests that "more granular information at the sector level to support NDCs could be set out in separate documents, e.g. in a dedicated sector-specific NDC implementation plan, or could be integrated in existing planning documents, e.g. infrastructure plans and investment plans in key sectors, technology-specific roadmaps, or strategic documents such as long-term development strategies, climate, finance, energy transition and industry decarbonisation strategies" (Jeudy-Hugo et al., 2024).

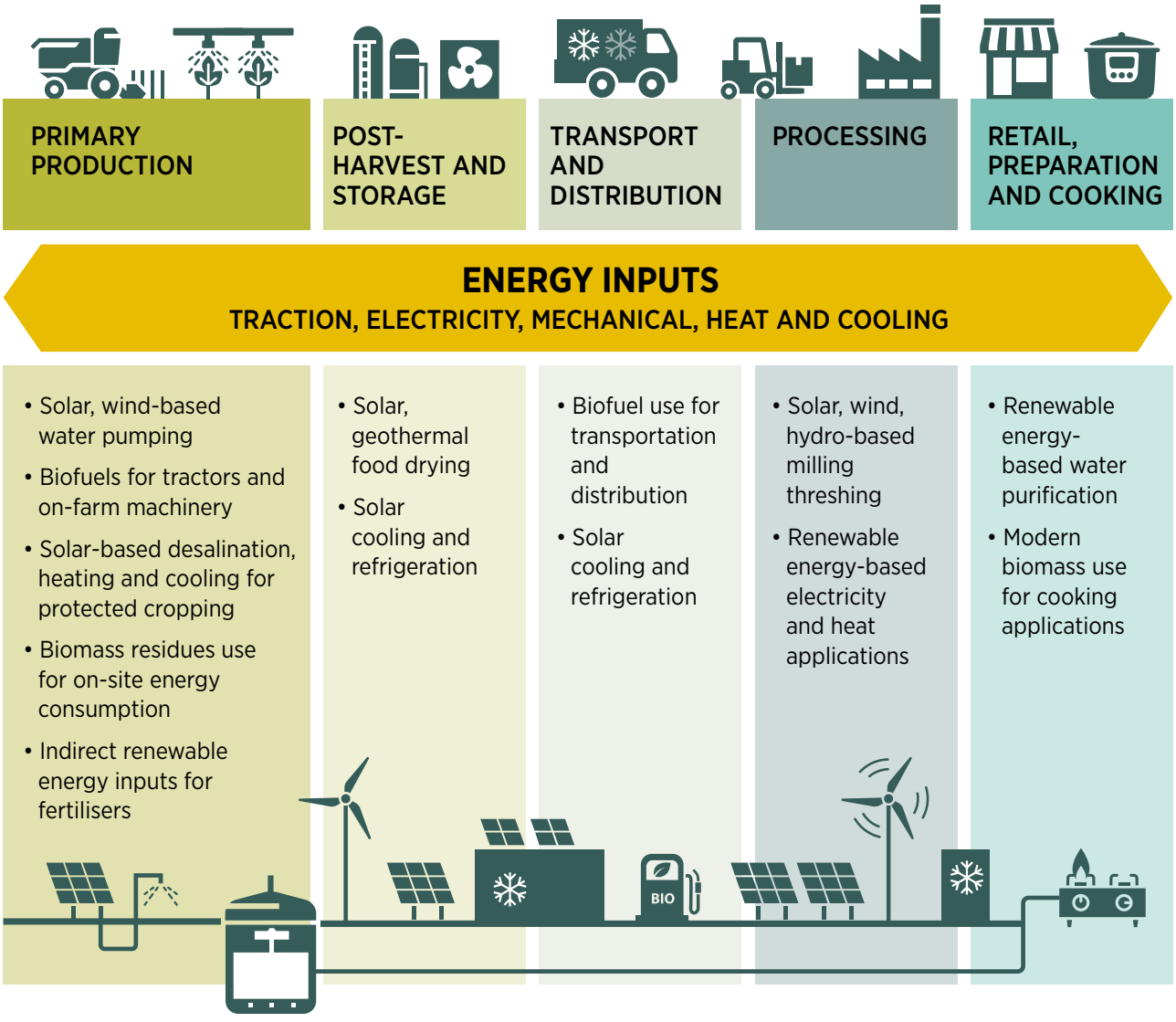
FIGURE 8 Potential Elements of NDC Enhancement



Source: OECD/IEA, 2024

There are ample examples of renewables-based solutions across sectors that are critical for both climate action and wider social and economic objectives. In the agrifood sector, for instance, renewable energy can support sustainable food production and processing, from solar-powered irrigation to electrified transport to renewable-powered cold storage that reduces food spoilage. This enhances food security by protecting crops, reducing food waste, and providing farmers with affordable energy to implement modern, sustainable practices.

FIGURE 9 Renewables-Based Solutions in the Agrifood Sector



Source: IRENA, 2024

In water management, renewables can power water systems via, for example, solar-powered water pumps or desalination plants that deliver water to arid regions. These renewable solutions allow communities to better manage water resources in the face of drought, floods, and shifting rainfall patterns—challenges expected to intensify as climate change progresses. Moreover, by reducing the energy costs associated with water treatment and distribution, renewables also make clean water more affordable and accessible over the long term.

By ensuring power for essential services like hospitals and mobile health units, renewables enable resilient health care systems. This is particularly vital in remote, underserved, or disaster-prone areas, where renewable energy can provide a reliable power source for the refrigeration of medicines, emergency equipment, and life-saving medical technologies. Cleaner air from renewable energy also reduces respiratory issues, improving public health in the areas impacted by pollution from fossil fuels.

Cross-sectoral integration of renewables not only supports NDC mitigation goals but also enhances resilience, adaptation, and socioeconomic benefits. Renewables-based systems can thus support multiple priorities, promoting financial efficiency and holistic policymaking. Setting ambitious targets, or clear policies and strategies across these areas, are vital to their implementation and delivery.

TABLE 1 Cross-Sectoral Options for Tripling Renewables: Selected Examples

Sector	NDC alignment	Renewable option[3]
Agriculture Energy-intensive irrigation, mechanization, and processing (often reliant on diesel and coal)	**Including targets for renewable-powered agricultural practices**	Solar systems for irrigation and watering livestock. Renewable-powered cold storage and agroprocessing. Biogas systems from agricultural waste.
Fisheries Energy for processing and for resilience against climate impacts.	**Including policies/strategies for renewable energy in fisheries**	Renewables-based cold storage, drying, and processing. Sustainable fuels for fishing boats. Renewable power for early warning systems and recovery.
Health Uninterrupted power for medical devices, cold chains, and diagnostics.	**Including health system policies/strategies to improve service delivery**	Hybrid Renewable Energy Systems (HRES) for clinics and hospitals. Renewable energy for cold chain systems (vaccine storage, medicine refrigeration). Mobile health units powered by renewable energy.
Industry High energy demand for industrial heating, cooling, and processing	**Including policies and strategies for renewable integration into industrial processes**	Solar thermal for industrial heating. Renewable-powered microgrids for industrial hubs. Green hydrogen for relevant industries.
Transport High energy demand and reliance on fossil fuels	**Including targets for sustainable fuels and electrification of transport**	Renewable-powered EV infrastructure. Renewable-powered rail systems. Sustainable fuels for aviation and shipping.
Water Energy-intensive water pumping, desalination, and treatment	**Including policies/strategies for energy-efficient water management**	Solar-powered water pumps for irrigation and drinking water. Solar-powered desalination plants. Renewable-powered wastewater treatment and recycling systems.

3. Listed renewable options are samples of what is already commonly deployed worldwide. Many technical institutions provide detailed information on these, including FAO, GIZ, IEA, IRENA, WWF, among others.

Photo by Serhii / Adobe Stock

SECTION 4

Policy Considerations for NDCs 3.0

Considerations for policymakers, which draw on extensive experience in renewable energy deployment and lessons from previous NDC versions, are outlined here. These considerations are not prescriptive but are intended to support and accelerate renewable energy deployment across diverse geographies, especially in view of the slow uptake of renewables in many parts of the world. While an array of structural and systemic barriers, most notably limited access to affordable finance, hinder renewable energy deployment, the actions outlined below may help to shift these trends and accelerate progress toward tripling renewable capacity by 2030.

- **Harmonize renewable energy targets in NDCs, national energy plans, and wider strategies to ensure that targets are coherent and mutually reinforcing.** There is a significant misalignment between renewable energy targets in national energy plans and NDCs, with the former being more ambitious. Setting consistent and ambitious targets, along with clear milestones, provides stakeholders with clarity and direction, ultimately facilitating effective implementation.
- **Establish mechanisms for collaboration on renewable energy to enhance sectoral deployment, improve programmatic and fiscal efficiency, and maximize benefits.** Renewable energy is not just an energy-ministry issue; it impacts ministries such as agriculture, water, health, education, finance, and infrastructure as well. A whole-of-government approach ensures that these ministries incorporate renewables into their plans and NDC strategies. Such coordination facilitates transparency in finance and resource allocation, making climate investment more attractive. Moreover, such collaboration can play a key role in improving business models, especially in the effort to attract private finance, for climate change adaptation.
- **Assess sectoral value chains and stakeholders so that policymakers can identify pathways for renewable energy to underpin climate action economy-wide.** Renewables can provide multiple benefits simultaneously, at once addressing adaptation, mitigation, and development needs. Aligning energy and other sectoral policies can help identify synergies for renewable energy projects, reduce policy implementation costs, and ensure that vulnerable communities, areas, and sectors receive attention.

Photo by Simonmayer / Adobe Stock

- **Develop roadmaps that outline technology and financing needs for renewable energy integration across key sectors.** While they may not constitute an integral part of NDC submissions, roadmaps can play a crucial role in supporting an informed revision process. They can serve as a tool for effective tracking of achievements, identification of bottlenecks, and timely course corrections.
- **Raise public awareness and secure the active participation of subnational governments in the design and implementation of renewable energy strategies to meet community needs and gain local acceptance.** Subnational governments play a central role in tailoring deployment plans, mobilizing communities, and integrating renewable energy solutions into subregional strategies. Capacity-building programs and dedicated funding can strengthen local governments' ability to deliver, while community engagement offers opportunities to incorporate local knowledge and share benefits equitably. This approach is particularly relevant in sectors such as agriculture, in which renewable energy can drive economic growth and improve energy access for the bottom of the pyramid.
- **Support innovation ecosystems to foster new technologies and business models that make renewable energy more adaptive to local contexts.** A key advantage of renewable energy is that it is decentralized. This feature has triggered the creativity of innovators worldwide, particularly in developing countries focused on productive uses and sectoral applications. However, these innovations often result in small-scale, locally tailored solutions that, for lack of resources, cannot be scaled up. Supporting innovation and entrepreneurship thus requires targeted policies and initiatives to foster the development and scaling of these technologies and business models. Integrating these policies and initiatives into the NDC implementation plans can help encourage greater participation, forge public-private partnerships, and accelerate the commercialization and deployment of renewable energy solutions that meet local needs.

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ANNEX

Renewable Energy in Adaptation—Selected Nexus Solutions

Positioning renewable energy as an adaptation measure can unlock new investment opportunities and attract climate and carbon finance, enabling greater resources for adaptation actions. The tables below outline some of the solutions that can be deployed for different climate impacts. They have been adapted from IRENA's *Bracing for Climate Impact: Renewables as a Climate Change Adaptation Strategy* report (2021).

TABLE 2 Renewable Energy and Water: Selected Solutions

Climate impact	Needs	Energy-related measures	Renewable energy solutions
Water scarcity	· Stable freshwater supply · Water resource management	· Desalination · Distillation · Groundwater or aquifer pumping	· Renewable energy systems for underground water pumping · Solar- or wind-powered desalination plants · Hydro-dams to increase water-reservoir capacity · Floating photovoltaics to reduce evaporation
Increased water pollution and contamination	· Water quality enhancement · Water purification and sanitation	· Water clearing pumps · Remote and small-scale water purification systems	· Renewable-powered water clearing pumps · Solar-powered small-scale purification units for remote areas
Wastewater treatment and recycling	· Wastewater, sewage, and sludge treatment	· Treatment and recycling plants (energy-intensive processes)	· Biogas plants for wastewater treatment and energy generation · Renewable-powered wastewater recycling systems
Flood or drought disruption	· Flood control and drainage · Water conveyance and distribution	· Water distribution and drainage systems	· Hydro-dams for flood control · Solar or wind-powered water pumps for drought resilience

TABLE 3 Renewable Energy and Agrifood: Selected Solutions

Climate impact	Needs	Energy-related measures	Renewable energy solutions
Food supply chain disruption due to high temperatures	· Food processing, storage, distribution, and sales	· Cooling, chilling, freezing · Drying, pasteurization · Cooking fuel supply	· Renewable-powered cooling systems · Renewable-based freezers, refrigerators, dryers, and pasteurizers · Renewable fuels
Reduction in crop and livestock production	· Adequate food production · Animal health and disease control	· Air cooling systems (indoor and outdoor) · Water spray for cooling · Soil fertilizer	· Renewable-powered food processing, storage, and distribution · Renewable energy systems for groundwater pumping · Agricultural waste fertilizer
Climate-related extreme events	· Food system stability enhancement	· Early warning systems for preemptive crop protection	· Climate information services powered by renewable energy · Renewable energy–based greenhouse horticulture and vertical farming
Water scarcity	· Water supply for agricultural use	· Groundwater or aquifer pumping and irrigation · Solar irrigation pumps	· Renewable energy systems for groundwater pumping · Agro-photovoltaics (dual-use farming with solar panels)

TABLE 4 Renewable Energy Solutions: Natural Disaster Response

Climate impact	Needs	Energy-related measures	Renewable energy solutions
Life and health loss caused by climate catastrophes	· Risk reduction and preparation against climate hazards · Disaster response and recovery · Emergency health services · Cooling infrastructure	· Early warning systems - Quick recovery infrastructure · Communication-network power supply · Aid conditioning	· Renewable-powered weather forecasting and early warning systems · Renewable energy for lighting, cooling, emergency housing, etc. · Hydropower dams for flood control
Migration, displacement, and relocation	· Disaster response and recovery · Resource-efficient resettlement support	· Energy generation and distribution in emergency settlements	· Off-grid renewable energy generation for disaster-hit regions · Renewable energy for communication and infrastructure repairs · Solar- or wind-powered lighting and emergency housing
Energy system disruption caused by extreme weather events	· Climate-resilient energy systems · Energy system recovery and reconstruction	· Decentralized energy generation for rapid restoration	· Microgrids and decentralized renewable systems for grid-independent recovery · Battery storage for energy resilience during outages

List of abbreviations

CO_2	Carbon Dioxide
COP	Conference of the Parties
EVs	Electric Vehicles
FAO	Food and Agriculture Organization
GW	Gigawatts
GST	Global Stocktake
HRES	Hybrid Renewable Energy Systems
IEA	International Energy Agency
IRENA	International Renewable Energy Agency
ITF	International Transport Forum
MW	Megawatts
NDC	Nationally Determined Contribution
OECD	Organisation for Economic Co-operation and Development
SDGs	Sustainable Development Goals
TW	Terawatts
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
V2G	Vehicle-to-Grid
WHO	World Health Organization

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