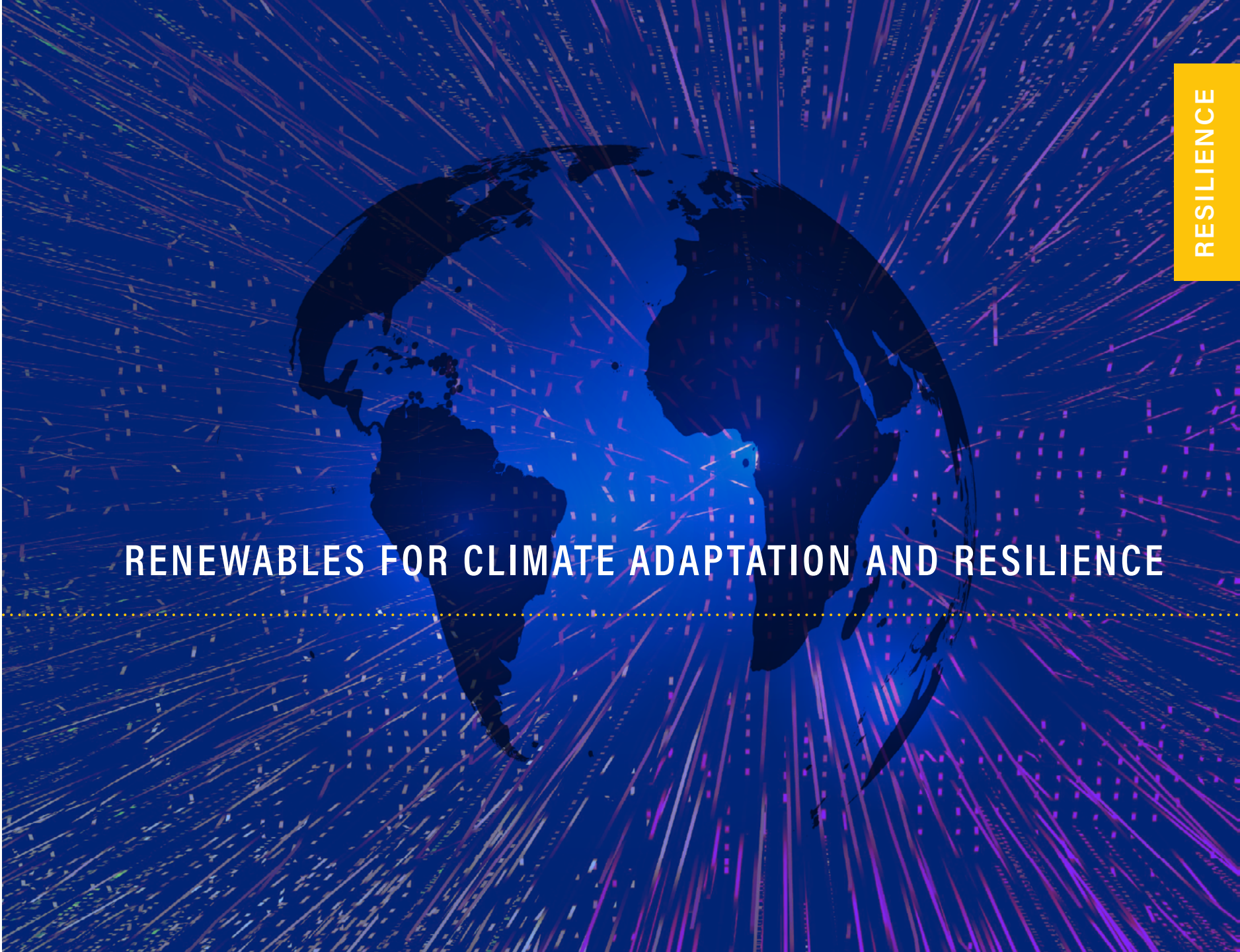




RENEWABLES FOR CLIMATE ADAPTATION AND RESILIENCE

**STRATEGIC
INTELLIGENCE
BRIEFS** 



KEY MESSAGES

CLIMATE ADAPTATION IS AN ECONOMIC NECESSITY



- ➔ Without effective adaptation, up to **23%** of global GDP could be lost by 2050.
- ➔ Investing in adaptation could increase global GDP up to **15%** by 2050 compared with a no-adaptation scenario.



RENEWABLE ENERGY IS RECOGNISED AS AN ADAPTATION SOLUTION



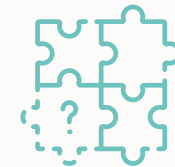
- ➔ 83 of 113 countries (**74%**) with National Adaptation Plans (NAPs) or Nationally Determined Contributions (NDCs) cite renewables for adaptation.
- ➔ Developing countries account for over **80%** (72 of 83) of the countries integrating renewables into adaptation planning.



POLICY FRAMEWORKS STILL LARGELY OVERLOOK RENEWABLES



- ➔ Despite its central role in building resilience, renewable energy remains absent from many NAPs and NDCs.
- ➔ The current draft Global Goal on Adaptation (GGA) indicator framework does not include energy indicators.



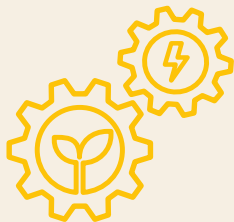


RENEWABLES AT THE HEART OF CLIMATE ADAPTATION AND RESILIENCE

» As climate change intensifies, adaptation has become a central pillar of economic and social resilience. Without effective adaptation, 18-23% of global GDP could be lost by 2050, exposing nearly 20% of the global population to high climate risks.¹ Communities around the world are already facing severe impacts from extreme weather, disrupting infrastructure, supply chains and essential services, as well as their socio-economic consequences.

Renewable energy is not just a climate mitigation measure; it can form the foundation for integrated, resilient, and cross-sectoral strategies for climate adaptation. Accessible everywhere and relying on established technologies, renewables reduce dependence on fuel supply chains while sustaining essential services during climate shocks, supporting communities and economies alike.

This Strategic Intelligence Brief explores how renewable energy contributes to climate adaptation, how this is reflected in key adaptation frameworks and where gaps in policy and finance persist. It highlights opportunities to embed renewables into adaptation governance, ensuring that energy transitions strengthen both climate action and resilience.



GLOBAL ADAPTATION GOVERNANCE



Climate change adaptation is governed at the international level under the UNFCCC. Recognising countries' increased vulnerability, Parties adopted the Cancun Adaptation Framework at COP16, elevating adaptation as a core pillar of climate action alongside mitigation. Start with this part in a new line below 2015 Paris Agreement introduced the Global Goal on Adaptation (GGA) to enhance adaptive capacity, strengthen resilience, and reduce vulnerability. To translate the Goal into action, countries outline their priorities through National Adaptation Plans (NAPs) and, in many cases, Nationally Determined Contributions (NDCs).



INTERNATIONAL ADAPTATION POLICY FRAMEWORKS

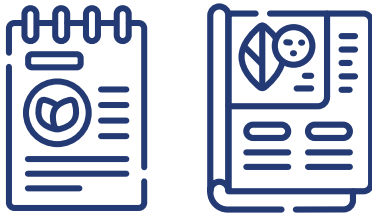


NATIONAL ADAPTATION PLANS (NAPS)

Established under the Cancun Adaptation Framework at COP16 in 2010, NAPs are the primary vehicle for guiding national adaptation efforts. They include risk and vulnerability assessments, help governments identify medium- and long-term needs, and mobilise support for resilience-building.² Globally, 76 NAPs were submitted by the end of September 2025.³

NATIONALLY DETERMINED CONTRIBUTIONS (NDCS)

Introduced under the Paris Agreement in 2015, NDCs set out countries' climate commitments.⁴ They are submitted in successive cycles, with the third round of submissions (Third NDCs) due by early 2025; only 13 countries submitted on time, while 64 had done so by the end of September.⁵ Though not the primary framework for adaptation, many NDCs include adaptation measures alongside mitigation targets and commitments. Aligning NAPs and NDCs is an opportunity to strengthen climate resilience, reduce policy gaps, and ensure that actions contribute coherently to global adaptation.



THE GLOBAL GOAL ON ADAPTATION (GGA)

Defined in Article 7 of the Paris Agreement, the GGA seeks to enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change. NAPs and NDCs are central to translating this global vision into national implementation. Since 2015, Parties have advanced the GGA through a series of work programmes aimed at building a framework for measuring and tracking the progress on global adaptation.



UAE Framework for Global Climate Resilience (COP28, 2023):

Established a standard structure for assessing adaptation progress through seven thematic targets (water, food, health, biodiversity, infrastructure and human settlements, poverty eradication, cultural heritage) and four process dimensions (assess → plan → implement → monitor/evaluate)

THE ROLE OF RENEWABLES IN ADAPTATION



Renewable energy plays a crucial role in climate adaptation by ensuring a reliable, decentralised and diversified energy supply. Renewables can reduce dependence on fossil fuels and safeguard energy access during extreme weather and climate shocks.

Renewable energy can support the continuity of essential services—such as water, food, health, communication and transport—enhancing resilience to both climate change impacts and future social and economic disruptions.



RENEWABLE ENERGY SOLUTIONS FOR ADAPTATION

» Climate adaptation strategies often focus on disaster risk reduction, emergency response and resource management. Complementing these measures, decentralised and diversified renewable energy infrastructure, particularly when designed to high-quality standards, can support the continuity of essential services during extreme weather events and any other kind of shocks – all without relying on global fossil fuel supply chains.

Concrete Renewable Energy Solutions for Climate Change Adaptation and Resilience

Climate change impacts	Associated risks	Renewable energy solutions for adaptation
Extreme weather events (cyclones, storms, etc.) 	Supply chain disruption	Distributed technology-based energy systems for supply chain continuity, independent from fuel supply
	Energy supply disruption	Mini-grids and microgrids for electricity supply
	Communication	Radio, telecom towers, and portable chargers to maintain telecommunications infrastructure
	Forced displacement	Decentralised, standalone systems for emergency power supply
	Health risks	Early warning systems, emergency services, vaccine cold chains and healthcare facilities Solutions for clean cooking and space heating

Climate change impacts	Associated risks	Renewable energy solutions for adaptation
Drought and floods 	Water shortage	Desalination, pumping and irrigation solutions
	Degraded water quality	Wastewater treatment solutions Drinking water services
Rising temperatures 	Heatwaves	Cooling solutions for food, housing and healthcare facilities
	Food insecurity	Agrivoltaics for electricity production, farming, and heat protection
Sea-level rise 	Flooding and coastal erosion	Water pumps to manage water levels Hydropower plants and reservoirs for flood prevention
	Saltwater intrusion	Purification and wastewater systems

RENEWABLES IN CLIMATE ADAPTATION POLICY



Recent UNFCCC plans increasingly position renewable energy as a tool for adaptation. To understand how this is reflected in practice, we reviewed the NAPs and NDCs submitted by September 2025. The analysis shows that developing countries are at the forefront of incorporating renewable energy into their adaptation strategies. It also shows that renewable strategies for adaptation are prominent through diversification, distribution and decentralised systems to build resilience across economic sectors and society.

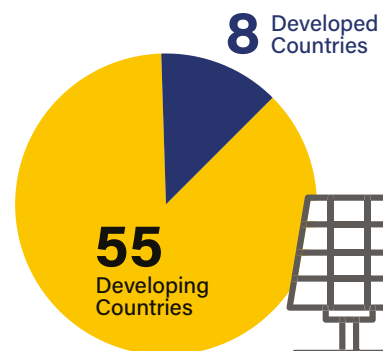


RENEWABLES FOR ADAPTATION IN NAPS AND NDCs

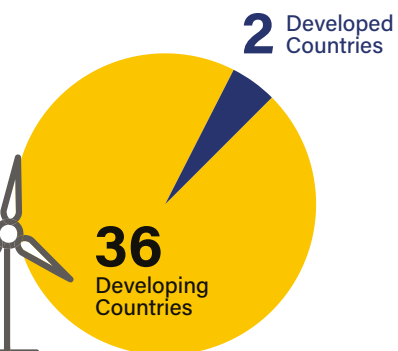
» By the end of September 2025, 113 countries out of 198 UNFCCC Parties had submitted either a NAP, a Third NDC,⁶ or both. While some countries have considered renewables in both NAPs and NDCs, of these 113 countries, 83 countries (around 74%) referenced renewables for adaptation, 72 of them being developing countries, demonstrating leadership in building climate resilience.

— NAPs and Third NDCs referencing renewables for adaptation, as of September 2025

Out of the **63 National Adaptation Plans (NAPs)** referencing renewables for adaptation



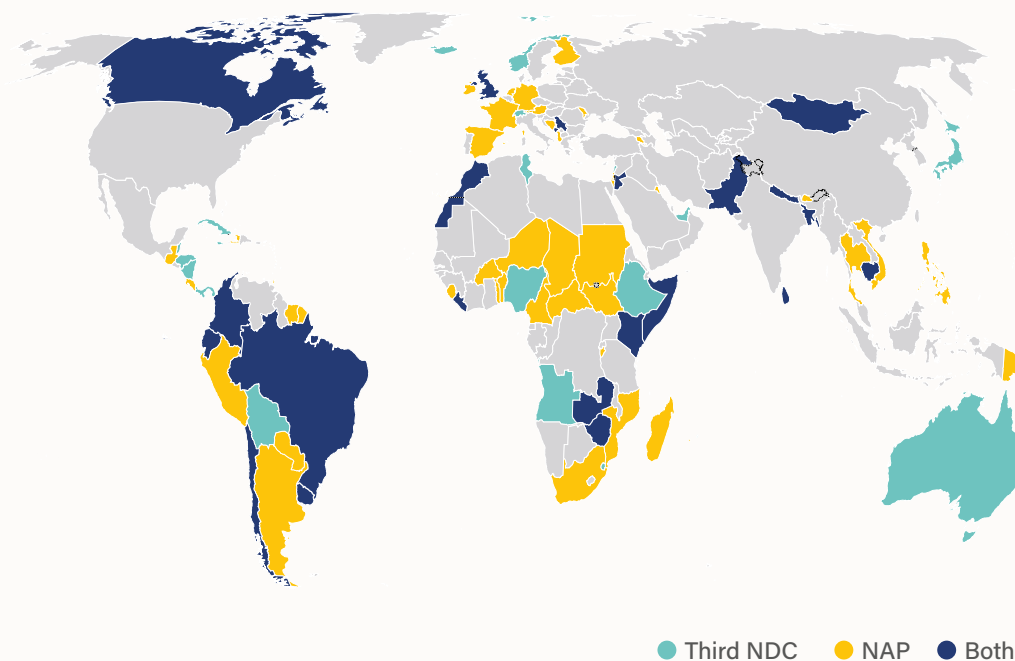
Out of the **38 Nationally Determined Contributions (NDCs)** referencing renewables for adaptation



Source: UNFCCC NAP Tracking Tool; UNFCCC NDC Registry



— Third NDC and NAP submissions by country, as of September 2025



Sources: UNFCCC NAP Tracking Tool; UNFCCC NDC Registry





DECENTRALISATION AND DIVERSIFICATION THROUGH RENEWABLES

Renewable energy is increasingly recognised as an adaptation measure, particularly in developing countries and small island states, for its potential to decentralise, diversify, and strengthen the resilience of energy systems.

DECENTRALISATION OF ENERGY SYSTEMS

Local and decentralised renewable energy allows communities to sustain reliable energy services and strengthen resilience to climate shocks.⁷ Among the 113 countries with NAPs and/or NDCs, 22 — including 20 developing countries — explicitly refer to distributed renewables or small-scale systems as an adaptation strategy. Countries plan to expand and strengthen several decentralised renewable energy solutions, including micro-hydroelectric plants (Moldova), micro- and mini-grids (the Philippines), distributed solar power (Brazil), and household biogas systems (Nepal).⁸

DIVERSIFICATION OF ENERGY SOURCES

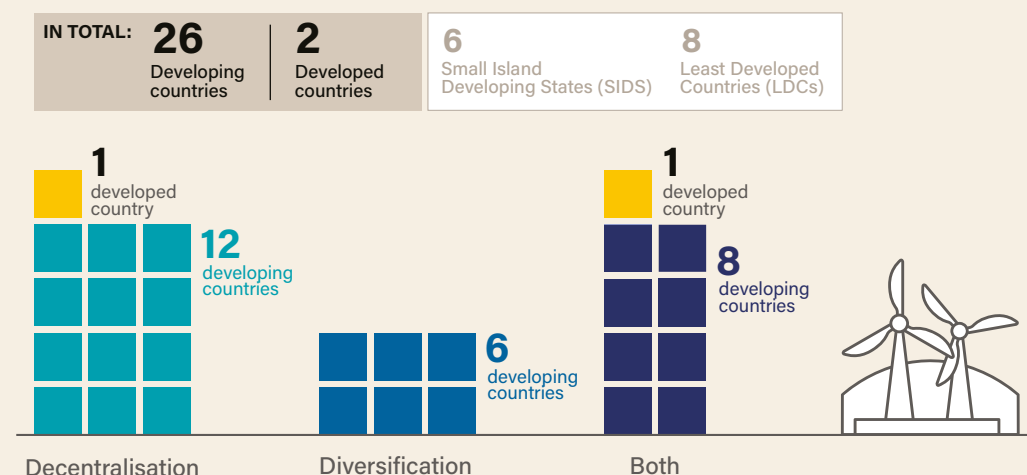
Diversifying renewable energy sources enhances climate adaptation by reducing reliance on climate-sensitive resources, strengthening system resilience, and ensuring reliable energy access. This diversification benefit is highlighted in 15 NAPs and NDCs. Ethiopia, Bhutan and Uruguay, for instance, specifically highlight diversification to reduce climate vulnerability associated with hydropower due to changing rainfall patterns.⁹



BUILDING RESILIENT RENEWABLE ENERGY INFRASTRUCTURE

Diversification and decentralisation of energy systems is crucial to ensure that renewable energy infrastructure is adaptable to climate change. Moreover, robust engineering, site-specific risk assessments, and quality infrastructure measures are essential to protect investments, maintain reliable energy access, and support goals beyond climate adaptation.¹⁰

— Countries referencing decentralisation or diversification through renewables in NAPs and NDCs, by country groupings



Sources: UNFCCC NAP Tracking Tool;
UNFCCC NDC Registry



RENEWABLES FOR SECTORAL ADAPTATION

Renewables are recognised in NAPs and NDCs for supporting adaptation in agriculture, water, and health: enhancing resilience to droughts, heatwaves, and sea-level rise, while creating income opportunities.

RENEWABLES FOR ADAPTATION IN THE WATER SECTOR

17 countries mention renewables as a key measure for climate adaptation in the water sector, all of them being developing countries, and 10 being least developed countries (LDCs). Most national climate strategies, such as Micronesia's, refer to solar power as one of the primary solutions for water sector adaptation, especially for irrigation, drinking water, and desalination.¹¹

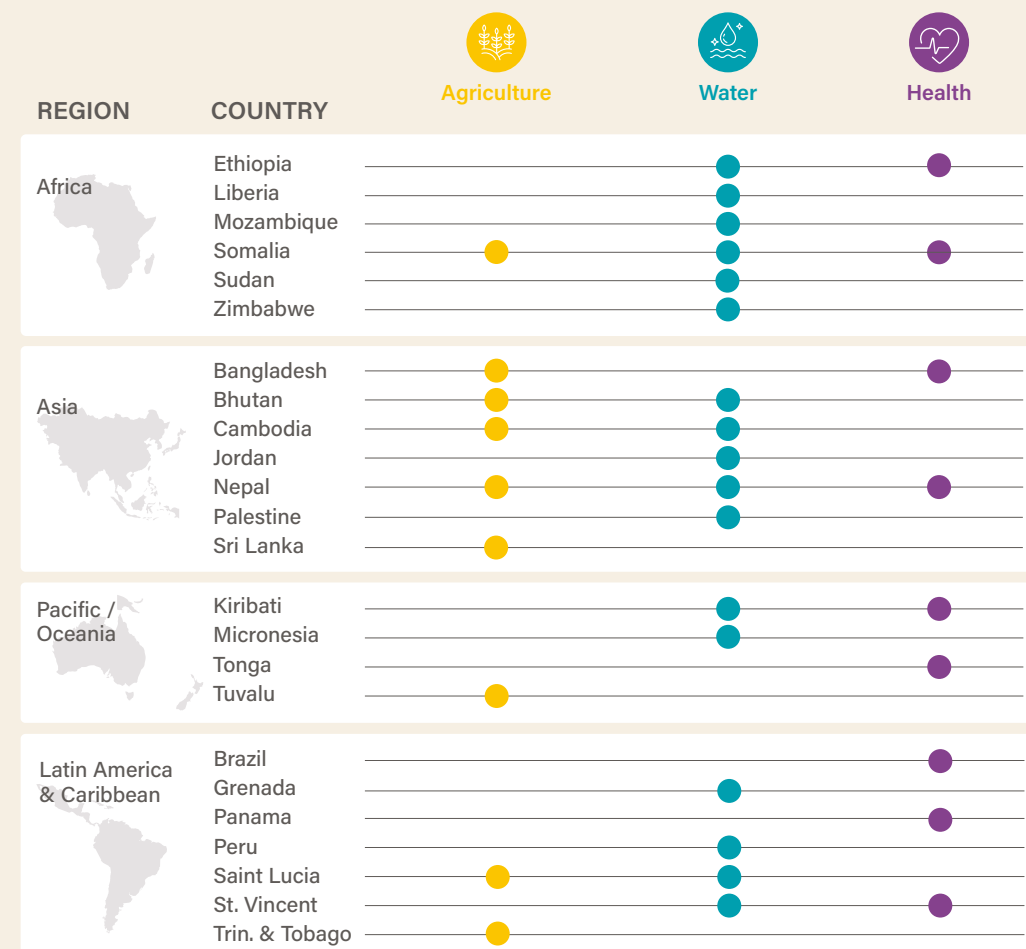
RENEWABLES FOR ADAPTATION IN THE HEALTH SECTOR

9 countries, including St. Vincent and the Grenadines, Kiribati and Jordan, recognise renewables for climate-resilient health services, e.g., through solar-powered sanitation and cold storage facilities, hospital energy supply, and disease surveillance systems.¹² All 9 countries are developing countries, with 5 of them being LDCs. For instance, St. Vincent and the Grenadines supports the installation of solar panels for powering cold storage facilities for vaccines, while Kiribati uses solar PV mini-grids to power healthcare facilities.

RENEWABLES FOR ADAPTATION IN THE AGRICULTURE SECTOR

9 countries — all developing and 5 LDCs — emphasise renewables to strengthen agricultural resilience, mainly through solar-powered irrigation combined with rainwater harvesting and ecosystem restoration.¹³ Measures often include early warning systems, real-time monitoring, and community engagement, creating co-benefits such as increased income, food security and reduced reliance on fossil fuels.

Countries referencing renewables for sectoral adaptation



Sources: UNFCCC NAP Tracking Tool; UNFCCC NDC Registry
Note: Some country names were shortened to serve readability in this figure.



SELECT POLICY EXTRACTS

Examples of renewable energy solutions for adaptation recognised in analysed NAPs and NDCs



Document

RE adaptation
mechanism

Extract

	NDC	Decentralisation	"Expand decentralised renewable energy systems to enhance resilience in outer islands."
	NDC	Diversification	"Energy generation from biomass [...] diversifies the energy matrix, strengthening the resilience of the national electricity system."
	NDC	Resilience in the Water Sector	"Using solar PV to power irrigation water pumps is an adaptation measure because of the erratic and little rainfall in some parts of the country."
	NAP	Resilience in the Health Sector	"Investments in climate-resilient health systems - such as solar-powered facilities, [...] are critical to reducing the health burden associated with climate change."
	NAP	Resilience in the Agriculture Sector	"Promote solar water pumps to improve access to drinking water and irrigation [...]"



BARRIERS TO MAINSTREAMING RENEWABLE ENERGY IN ADAPTATION STRATEGIES



Despite its central role in building resilience, renewable energy remains poorly integrated into the global adaptation agenda. Frameworks to assess resilience rarely include energy indicators, reducing visibility of progress. Policies on energy, adaptation, and development remain misaligned, while finance for renewables-based adaptation falls far short of needs. The current GGA Indicator Framework omits this dimension, risking that national renewable adaptation efforts go untracked and uncoun-
ted.



RENEWABLES GAP IN THE GGA INDICATOR FRAMEWORK

Renewable energy is critical to climate resilience. Adaptation strategies and policies must integrate renewables and track their deployment and use. The Global Goal on Adaptation (GGA) Indicator Framework measures adaptation progress through 7 thematic and 4 dimensional targets.

Between COP29 and COP30, experts streamlined 490 indicators down to 100. The final indicator set will be negotiated by governments.

Targets and GGA Indicator Count Changes

	Targets to be met under the GGA	No. of Indicators (May 2025)	No. of Indicators (Proposed for COP30)
Thematic 	9a. Water supply and sanitation	33	10
	9b. Food and agriculture	66	10
	9c. Health impacts and health services	62	10
	9d. Ecosystem and biodiversity	40	10
	9e. Infrastructure and human settlements	99	7
	9f. Poverty eradication and livelihoods	24	9
	9g. Cultural heritage and knowledge	63	8
Dimensional 	10a. Impact, vulnerability, risk assessment	18	10
	10b. Planning	26	10
	10c. Implementation	39	11
	10d. Monitoring, evaluation, and learning	20	5

While this consolidation improves consistency, creates a critical gap: it obscures renewable energy's role in adaptation, undermining evidence-based policymaking.¹⁴ Many NAPs and NDCs recognise renewables as essential for building resilience, yet this progress risks becoming invisible in global metrics. For example, Target 9e (Infrastructure and Human Settlements) was reduced from 99 indicators to just 7.¹⁵

- Sample infrastructure and human settlements indicators excluded from the proposed set of indicators for COP30 negotiations



Resilient energy access

9e35 – Population with reliable access to climate-resilient basic services (energy, water, ICT, health)



Finance

9e41 – Adaptation finance for resilient infrastructure and services



Energy supply

9e40 – Continuity of electricity supply during climate shocks



Sectoral approaches

9e58 – Essential infrastructure services with adaptation plans (energy, health, water, transport)

Earlier indicator sets understood energy as fundamental to resilience—delivering system-wide solutions across sectors. The current proposed set to be negotiated at COP30 omits this perspective. This risks having renewable energy adaptation progress documented in NAPs and NDCs, untracked and unaccounted for in global assessments.



POLICY GAPS AND MISALIGNMENT

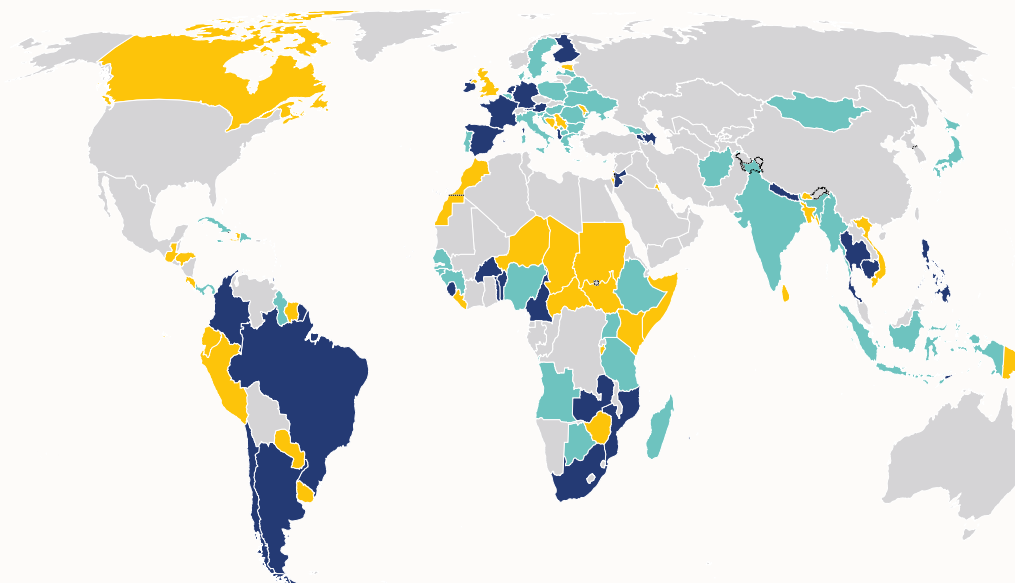
» Renewable energy's role in adaptation is still not systematically embedded in policy frameworks. Better alignment between NAPs, NDCs, and regional strategies would highlight how renewables can build resilient economies. National approaches remain uneven, with limited coherence and comparability across countries and persistent political and institutional barriers constraining implementation.¹⁶

By 2024, 76 countries had submitted NAPs and 89 had renewable energy targets, yet only 33—mostly developing countries—had both. This gap shows that renewable energy and adaptation policies remain poorly aligned, representing a barrier to comprehensively building adaptive capacity.

Effective adaptation requires aligning strategies and policies across global, national, subnational and sectoral levels. Integrated, context-specific policies, can prioritise renewable solutions, reduce overlaps, and strengthen cross-sector resilience.



— Countries with National Adaptation Plans and Renewable Energy Targets for Total Final Energy Use



● Renewable energy target ● NAP ● Both

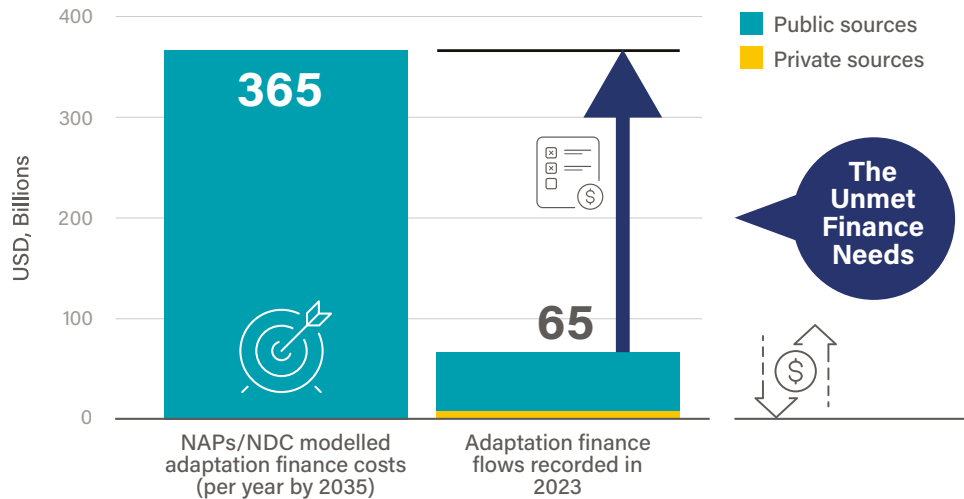
Sources: UNFCCC NAP Tracking Tool;
REN21 Policy Database



ADAPTATION FINANCE NEEDS

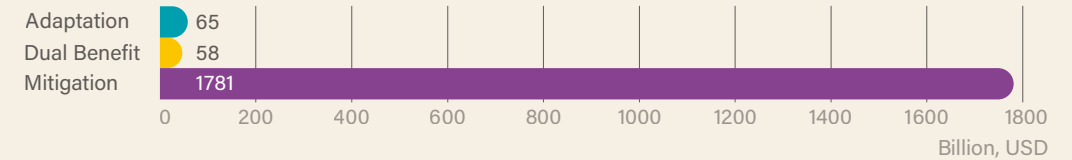
Renewable energy is vital for climate resilience, supporting essential services such as water, food, health, and communication. Yet funding for renewables-based adaptation, as a subset of adaptation finance, remains limited, lagging far behind identified needs, and is poorly tracked. Integrating renewables into adaptation finance is crucial to help countries build resilience while pursuing economic development in a changing climate.

Unmet finance needs for climate adaptation



Source: UNEP Adaptation Gap Report 2024, Climate Policy Initiative, 2025
The global adaptation finance gap is around USD 215 to 387 billion. This represents public international finance as analysed in the UNEP AGR. The global adaptation finance flows in 2023 includes both public international finance and private flows.

Climate finance flows by category in 2023



Source: Climate Policy Initiative, 2025

Currently, adaptation finance is less than USD 65 billion, accounting for 3.4% of climate finance. Developing countries require up to USD 365 billion to face climate adaptation between 2023 and 2035 - nearly four times the current flows and equivalent to 0.24% of global GDP. Meanwhile, failing to adapt could cost the world up to 18-23% of GDP by 2050. Within this landscape, renewables-based adaptation receives only a fraction of available funding. In 2023, about USD 520 million was recorded as adaptation-specific finance for energy systems—without clear evidence of how, or whether, these resources were directed toward renewable energy solutions.¹⁷

Meeting adaptation finance needs reveals economic opportunities and cost savings. For countries, spending on adaptation could lead to a 15 percentage-point increase in GDP by 2050. This reduces sovereign debt burden by reducing climate-related fiscal risks and improving credit ratings. Adaptation can also generate over 200 million jobs in developing countries by investing in resilient infrastructure and adaptation strategies.¹⁸ Renewable strategies in climate adaptation yield immediate cost savings following climate shocks. For example, Florida's smart grid helped restore power quickly after Hurricane Irma in 2017, saving the state government approximately USD 1.7 billion. As a resilient energy solution, renewables for adaptation build economic and social resilience, reduce systemic vulnerability, and anchor adaptation within sustainable development pathways.¹⁹



CALL TO ACTION



ADVANCE RECOGNITION OF RENEWABLES

Countries should advocate for renewable energy to be reflected in the final GGA indicator framework. Including renewables in the COP30 outcome on adaptation will ensure their role in resilience is tracked and measured globally.



INTEGRATE RENEWABLES INTO ADAPTATION STRATEGIES

Countries should embed renewable energy across national adaptation frameworks and reporting systems. This will establish renewables as a foundation for building resilient economies and societies.



ALIGN ADAPTATION AND ENERGY PLANNING

Integrating NAPs, NDCs, and renewable policies will create coherent, cross-sector strategies. Such alignment ensures adaptation measures strengthen energy security and build resilience.



SCALE FINANCE FOR CLIMATE ADAPTATION

Expanding funding for climate adaptation is an investment in resilient economic futures. This must include targeted finance for renewable energy solutions that sustain essential services during climate shocks.



1. Systemiq, 'Returns on Resilience: Investing in Adaptation to Drive Prosperity, Growth and Competitiveness', 16 October 2025, https://www.systemiq.earth/wp-content/uploads/2025/10/FINAL-REPORT>Returns-on-resilience_2025.pdf; World Bank 'Percentage of People at High Risk from Climate-Related Hazards', accessed 8 October 2025, https://scorecard.worldbank.org/en/data/indicator-detail/EN_CLM_VULN.
2. United Nations Framework Convention on Climate Change, 'Aligning National Adaptation Plans, Nationally Determined Contributions and Adaptation Communications', 2024, <https://unfccc.int/sites/default/files/resource/Policy-brief-NAPs-NDCs-AdComs.pdf>.
3. This does not include the United States. Given the United States' withdrawal from the Paris Agreement, both the United States' NAP and Third NDC were not considered for the analysis presented throughout this brief.
4. United Nations Development Programme Climate Promise, 'What Are National Adaptation Plans and Why Do They Matter?', 30 January 2024, <https://climatepromise.undp.org/news-and-stories/what-are-national-adaptation-plans-and-why-do-they-matter>.
5. To qualify as a new submission in the 2025 round, an NDC must define its contribution with a 2035 timeframe.
6. This brief only considers Third NDCs for analysis, given that they represent the most recent cycle of climate commitments and provide a consistent basis for comparing countries' updated targets and adaptation measures. In the following analysis, it will be referred to 'NDCs' for the sake of readability. Moreover, this brief focuses on NAPs, while other national adaptation and transparency frameworks under the UNFCCC, such as Biennial Transparency Reports (BTRs) and Adaptation Communications, were not analysed, leaving a research opportunity for future studies. The analysis of NAPs and Third NDCs presented throughout this brief, based on a mixed quantitative and qualitative approach, leaves room for more detailed qualitative assessment of UNFCCC adaptation frameworks in future research.
7. Prism Sustainability Directory, 'Decentralized Energy for Climate Resilience', 3 October 2025, <https://prism.sustainability-directory.com/scenario/decentralized-energy-for-climate-resilience/>.
8. Government of Nepal, 'National Adaptation Plan (NAP) 2021-2050', 2021, [NAP_Nepal_2021.pdf](#); Government of the Republic of Moldova, 'The National Climate Change Adaptation Programme Until 2030', 26 June 2024, [NAP_Moldova_2024.pdf](#); Republic of Fiji, 'National Adaptation Plan: A Pathway Towards Climate Resilience', 12 December 2018, https://unfccc.int/sites/default/files/resource/NAP_Fiji_2018.pdf; Climate Change Commission (CCC) and the Department of Environment and Natural Resources (DENR), 'National Adaptation Plan of the Philippines 2023-2050', 30 May 2024, https://unfccc.int/sites/default/files/resource/NAP_Philippines_2024.pdf; Brazil's Ministry of Environment, 'National Adaptation Plan to Climate Change', 12 May 2016, [NAP_Brazil_2016_EN.pdf](#); Government of the Republic of Moldova, 'Nationally Determined Contribution 3.0', 6 May 2025, https://unfccc.int/sites/default/files/2025-05/MD_NDC_3.pdf; Department of Environment, Ministry of Health, Wellness, Social Transformation, and the Environment, Government of Antigua & Barbuda (GoAB), 'National Adaptation Plan: Enhancing Adap-

- tive Capacity, Strengthening Resilience, and Reducing Vulnerability to Climate Change in Antigua & Barbuda', 24 June 2025, https://unfccc.int/sites/default/files/resource/NAP_Antigua_and_Barbuda_2025.pdf
9. The Federal Democratic Republic of Ethiopia, 'Ethiopia's Nationally Determined Contribution 3.0 (2025-2035)', 26 September 2025, <https://unfccc.int/sites/default/files/2025-09/Ethiopia%20NDC%203.0%20Final.pdf>; Department of Environment and Climate Change, Royal Government of Bhutan, 'First National Adaptation Plan 2023', 22 September 2023, <https://unfccc.int/sites/default/files/resource/NAP-Bhutan-2023.pdf>; Ministerio de Industria, Energía y Minería, 'Plan Nacional de Adaptación a la Variabilidad y al Cambio Climático Sector Energía', 2 August 2024, <https://unfccc.int/sites/default/files/resource/NAP-Uruguay-Energy-2024.pdf>.
10. International Renewable Energy Agency, 'Quality Infrastructure for Renewables Facing Extreme Weather', 2025, https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2025/May/IRENA_INN_Quality_infrastructure_extreme_weather_2025.pdf.
11. Royal Government of Cambodia, 'Cambodia Climate Change Strategic Plan 2014-2023', 7 July 2021, https://unfccc.int/sites/default/files/resource/NAP_Cambodia_2021.pdf; Kingdom of Cambodia, 'Cambodia's Third Nationally Determined Contribution (NDC 3.0)', 8 August 2025, https://unfccc.int/sites/default/files/2025-08/Cambodia-NDC%203.0_0.pdf; Government of Grenada, 'National Climate Change Adaptation Plan (NAP) for Grenada, Carriacou and Petite Martinique', 6 November 2019, [submitted-NAPs](#); Republic of Liberia, 'Liberia's 2035 Nationally Determined Contribution NDC 3.0', 24 September 2025, https://unfccc.int/sites/default/files/2025-09/Liberias_2035_NDC_3.0_Final.pdf; The Federated States of Micronesia, 'Nationally Determined Contribution 3.0', 24 September 2025, <https://unfccc.int/sites/default/files/2025-09/FSM%20NDC%203.0.pdf>.
12. The Hashemite Kingdom of Jordan, 'The National Climate Change Adaptation Plan of Jordan', 10 March 2021, https://www.moenv.gov.jo/ebv4.0/root_storage/ar/eb_list_page/final_draft_nap-2021.pdf; Government of Kiribati, 'Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management (KJIP)', 23 September 2021, <https://unfccc.int/sites/default/files/resource/Kiribati-NAP.pdf>; Government of St. Vincent and the Grenadines, 'National Adaptation Plan for St. Vincent and the Grenadines', 2019, <https://unfccc.int/sites/default/files/resource/NAP-Saint-Vincent-and-the-Grenadines-2019.pdf>.
13. Federal Government of Somalia, 'Somalia's Third Generation Nationally Determined Contribution (NDC 3.0)', 08 September 2025, https://unfccc.int/sites/default/files/2025-06/Somalia%20NDC%203.0_Submitted_to_UNFCCC_Final.pdf; Government of Tuvalu, 'Updated Nationally Determined Contribution (NDC)', November 2022, <https://unfccc.int/sites/default/files/NDC/2023-02/Tuvalu%20Updated%20NDC%20for%20UNFCCC%20Submission.pdf>; Kingdom of Cambodia, Cambodia's Third Nationally Determined Contribution (NDC 3.0), 08 August 2025, https://unfccc.int/sites/default/files/2025-08/Cambodia-NDC%203.0_0.pdf.

14. United Nations Framework Convention on Climate Change, 'Final list of potential indicators, UAE-Belém work programme on indicators', September 2025, <https://unfccc.int/documents/649629>
15. United Nations Framework Convention on Climate Change, 'Infrastructure and Human Settlements Expert Group', May 2025, https://unfccc.int/sites/default/files/resource/9%28e%29_Infrastructure_and_human_settlements.pdf.
16. Osamu Mizuno and Naoyuki Okano, 'Reconsidering National Adaptation Plans (NAPs) as a Policy Framework under the UNFCCC', Climate Policy 24(9), 2024, <https://doi.org/10.1080/14693062.2024.2378194>.
17. S&P Global, 'Investment in Climate Adaptation Benefits Growth', 9 January 2024, <https://www.spglobal.com/en/research-insights/special-reports/look-forward/investment-in-climate-adaptation-needs-have-high-returns-on-growth>; S&P Global, 'Lost GDP: Potential Impacts Of Physical Climate Risks', 27 November 2023, <https://www.spglobal.com/ratings/en/regulatory/delegate/getPDF?articleId=3094362&type=COMMENTS&defaultFormat=PDF>; Systemiq, 'Returns on Resilience: Investing in Adaptation to Drive Prosperity, Growth and Competitiveness', 16 October 2025, https://www.systemiq.earth/wp-content/uploads/2025/10/FINAL-REPORT>Returns-on-resilience_2025.pdf; United Nations Environment Programme. (2025). Adaptation Gap Report 2025: Running on Empty. Nairobi: UNEP.; Climate Policy Initiative, (2025), Global Landscape of Climate Finance 2025
18. World Resources Institute, 'Release: WRI Study Finds Climate Adaptation Investments Yield Massive Returns — Over \$10 for Every \$1 Spent', 6 March 2025, <https://www.wri.org/news/release-wri-study-finds-climate-adaptation-investments-yield-massive-returns>; Systemiq, 'Returns on Resilience: Investing in Adaptation to Drive Prosperity, Growth and Competitiveness', 16 October 2025, https://www.systemiq.earth/wp-content/uploads/2025/10/FINAL-REPORT>Returns-on-resilience_2025.pdf.
19. IEA, 'Climate Resilience for Energy Security', <https://www.iea.org/reports/climate-resilience-for-energy-security>; World Resources Institute, 'Release: WRI Study Finds Climate Adaptation Investments Yield Massive Returns — Over \$10 for Every \$1 Spent', 6 March 2025, <https://www.wri.org/news/release-wri-study-finds-climate-adaptation-investments-yield-massive-returns>; Systemiq, 'Returns on Resilience: Investing in Adaptation to Drive Prosperity, Growth and Competitiveness', 16 October 2025, https://www.systemiq.earth/wp-content/uploads/2025/10/FINAL-REPORT>Returns-on-resilience_2025.pdf;



REN21 is the global multi-stakeholder network of governments, industry, NGOs, science and academia that enables the necessary changes to build the renewable-based economy for prosperous lives and societies.

Our vision is a world where renewable energy is the foundation for strong, equitable and resilient economies. Renewables are the undeniable choice for people, nature and prosperity.

Founded in 2004, we've built a powerful and diverse network of 121 institutions and a community of more than 4,000 players, from the energy ecosystem and other key sectors. Our inclusive governance structure and collaborative culture enable us to build on the insights and intelligence of our global community to drive the solutions needed for economic prosperity and societal well-being.

REN21 SECRETARIAT

secretariat@ren21.net
www.ren21.net

