

# RENEWABLE ENERGY TRACKER 2023

An Equitable Assessment of Countries' Progress  
Towards 100% Renewable Energy Systems



PLATFORM OF ACTION  
FOR RENEWABLE ENERGY



**CAN**

CLIMATE ACTION NETWORK

## CREDITS

This report was written and prepared by Julie Ducasse, with the guidance of Dr. Stephan Singer and the support of Janet Milongo (coordination) and Dara Snead (communication). It is published by the [Platform of Action for Renewable Energy \(PoA\)](#), within [Climate Action Network International](#) Secretariat.

**PoA** was established in 2021 with the aim of promoting clean renewables, primarily solar, wind and geothermal, and supporting CSOs in developing a strong narrative that places renewable energy at the centre of the required energy system transformation, along with a just and equitable phase out of fossil fuels towards 100% renewable energies. PoA supports civil societies global action through proactive advocacy, public analysis and strategic communications, data sharing and data analysis on renewable energy sources.

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**Climate Action Network (CAN)** is a global network of more than 1,900 civil society organisations in over 130 countries driving collective and sustainable action to fight the climate crisis and to achieve social justice. CAN convenes and coordinates civil society at the UN climate talks and other international fora.

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## FOREWORD



This Renewable Energy Tracker is a positive and timely assessment of the state of the sector and its potential. Renewables are at the heart of our global efforts for an equitable energy transition. They are the primary solution on the supply side to scale global efforts to reduce greenhouse gases, especially in this decisive decade. It is with great optimism that we acknowledge renewables as the most cost-effective and viable pathway to achieving net-zero emissions by 2050. Their ability to generate electricity 'at scale' with markedly lower greenhouse gas emissions compared to traditional sources clears the way to break our long-standing fossil fuel dependencies.

As we witness a reshaping of the global landscape of power generation, it is heartening to see renewables emerging as the fastest-growing technology in this domain. Their stellar growth is a testament to the collective effort and commitment of societies and governments worldwide. But our journey is far from complete. As members of global civil society, it is imperative that we continue to advocate for scaled-up action at pivotal forums such as COP28.

At COP28, global leaders must bring not only their presence but also a deep-rooted political commitment to achieve both short- and long-term climate goals. Only with their cooperation and mutual agreement can we drive streamlined policies and regulations, enhance grid readiness, and unlock financial resources at a scale that propels the warp-speed expansion of renewable energy to meet the scientific and equity imperatives.

COP28 is a pivotal moment. It's a chance to boost and consolidate national commitments for transforming respective energy sectors through renewable energy. This transformation is more than mere change; it's about creating a sustainable, equitable, and orderly transition to a net-zero future.

A future where clean energy transition is not an alternative but a certainty, paving the way for a world that is more just for all. A future that must be manifested without delay.

**Shruti SHUKLA**  
Natural Resources Defense Council

A handwritten signature in blue ink that reads "Shruti Shukla".

# CONTENTS

<b>Summary</b>	<b>6</b>
The Renewable Energy Tracker	6
Key findings	7
Recommendations	11
<b>Introduction</b>	<b>13</b>
A just, equitable and rapid transition to 100% RE is urgently needed	13
The RET: towards a fair and equitable assessment of countries	14
<b>Methodology</b>	<b>19</b>
Country grouping	19
Ratings	20
<b>Countries' assessments</b>	<b>25</b>
<b>Focus   Which countries are leading or lagging?</b>	<b>27</b>
Overall assessment	27
Deployment	31
Ambition	35
Sustainable development	40
<b>Focus   Are countries up on track towards 100% RE systems?</b>	<b>43</b>
<b>Focus   Are countries making progress?</b>	<b>46</b>
<b>Conclusion</b>	<b>48</b>
<b>Appendix</b>	<b>50</b>
A. Wind and solar as key renewable sources	50
B. Notes on Methodology	51
C. Methodology for the Progress assessment	52
D. Indicators: sources, definition and scope	54
E. Detailed rankings	59

## SUMMARY

### The Renewable Energy Tracker

**The Renewable Energy Tracker (RET) is a multidimensional analysis driven by principles of equity, fairness and transparency** that assesses the performance of 60 countries representing 85% of total population and accounting for about 90% of total greenhouse gas emissions, energy use and GDP.

- It uses equity-driven indicators to acknowledge differences between countries in terms of priorities, financial abilities, population size and common but differentiated responsibilities whereby wealthier countries have to move faster than others.
- It puts emphasis on rewarding countries that are performing consistently well or better than others across the *majority* of indicators or categories assessed.

Through a 3-pronged analysis, it provides a snapshot of where countries stand and whether they are heading in the right direction: it **identifies leaders and slow-starters; assesses whether countries are on track towards 100% RE systems; evaluates whether countries are progressing.**

**Scaling up renewable energy is crucial, but it's just one piece of the puzzle.**

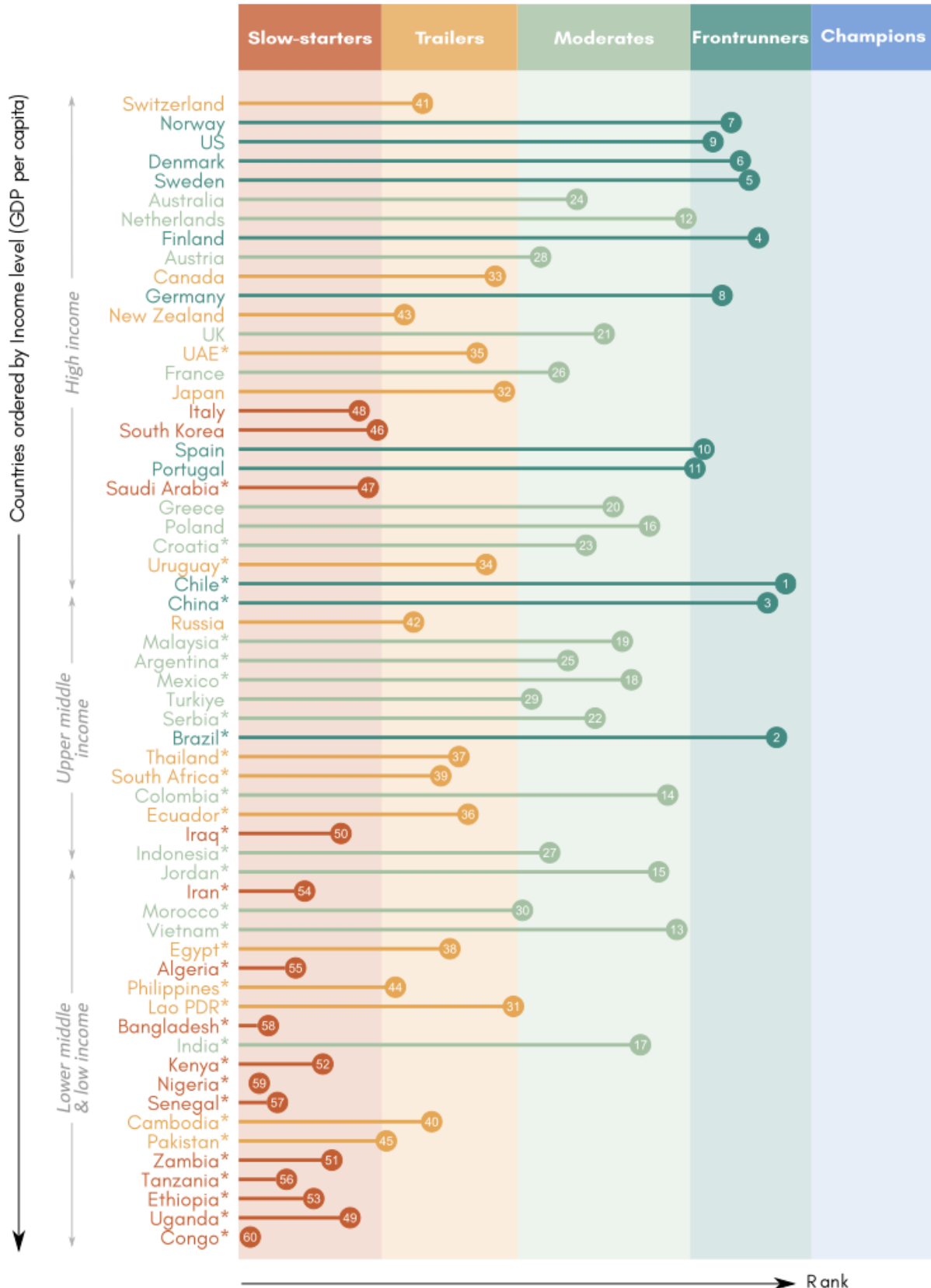
When it comes to energy, we must simultaneously commit to a just and equitable phase out of fossil fuels, double annual energy efficiency improvements and reduce overall energy consumption by 2050, notably in wealthier countries.

Radical and transformative changes are needed everywhere to achieve environmental and climate justice. Countries performing relatively well in terms of renewables may still rely heavily on or invest in fossil fuels, fail to provide sufficient funding to developing countries, engage in activities harmful to people or nature or pursue dangerous distractions such as carbon capture and storage.

This report offers a deep dive on renewables but results must be put into perspective with countries' progress in other areas: **a country with high ratings in the Renewable Energy Tracker is not necessarily a "climate leader".**

## Key findings

**Figure 1. Countries' rank and rating according to their income level.** Emerging and Developing Economies (EMDEs) are marked with the symbol \*.



## Country comparison: which countries are leading?

The RET assesses the relative performance of countries using 20 indicators and 7 categories measuring the level of deployment, investment, ambition, co-benefits, etc. related to renewable energy to rate them as *Champions*, *Frontrunners*, *Moderates*, *Trailers* or *Slow-starters*, as shown in Figure 1.

- ◆ **None of the countries are performing consistently better than others**, leaving the *Champions* group empty (top performers are hindered by their high reliance on solid bioenergy). One-third of countries fall into the *Moderates* group, further highlighting an overall lack of consistency as countries are performing comparatively better in some categories but poorly in others.
- ◆ **Three Emerging and Developing Economies (EMDEs) occupy the top 3 places: Chile (1st), Brazil (2nd), and China (3rd)**. The equity-based analysis reveals that a number of other emerging economies are doing better than advanced economies: Vietnam (13th), Colombia (14th), Jordan (15th), India (17th), Mexico (18th) and Malaysia (19th) all rank among the top 20.
- ◆ **On the contrary, a number of advanced economies are lagging behind and not living up to their capabilities and responsibilities**. In particular, five high-income countries that are members of the G20 are in the *Trailers* and *Slow-starters* groups and also account for almost 9% of global GHG emissions in 2021: Japan, Canada, South Korea, Saudi Arabia and Italy. Switzerland, Russia and New Zealand, all advanced economies, also rank among the *trailers*.
- ◆ **Despite some EMDEs performing better than others, in the *Trailers* and *Slow-starters* groups, 23 countries out of 30 groups are EMDEs**, which further demonstrates the challenges faced by these nations in deploying renewables at scale. This is especially the case for countries from sub-Saharan Africa: while the lack of investment in this region has been largely documented as a key challenge, the RET adds another line of evidence that even when considering equity-based indicators, those countries are left behind.



## Are countries up to speed to reach 100% renewable energy systems?

Being a *frontrunner* doesn't equate to achieving enough: among the 9 *Frontrunners*, none of the countries are assessed as being “on track” to achieve 100% renewable energy systems. In other words, **even top-ranked countries must intensify their efforts in deploying sustainable renewable energy systems.**

The tracker evaluates countries' progress towards achieving 100% renewables in the power sector and economy-wide. In line with climate urgency, a rapidly dwindling carbon budget and equity principles, the RET requires that a 100% renewable power sector is deployed by 2030 latest for advanced economies and by 2040 latest for others, and that the entire economy is fuelled by 100% renewable energy by 2040 latest for advanced economies and by 2050 latest for EMDEs (see Box 2).

Based on these criteria, the RET shows that:

- ◆ **The pace of change observed over the last four years available is insufficient and will have to be significantly accelerated** for countries to deploy 100% renewable energy systems by the specified years, notably through enhanced ambition, better regulations and significantly increased investments.
- ◆ **Efforts are needed in the power sector, and even more outside of the power sector, in all end-use sectors.** While in the power sector 13 countries are assessed as being *on track* or *almost on track*, only two countries are assessed as such when it comes to deploying renewables economy-wide<sup>1</sup>.
- ◆ **Several countries are heading in the wrong direction** and must reverse their trajectories: this is the case for five countries in the power sector (Cambodia, Uruguay, Croatia, Iran, Italy) and two countries economy-wide (Congo, Vietnam).
- ◆ **None of the nations of the G20 are up to speed to reach 100% renewables** either in the power sector or economy-wide. In general, and for the countries included in the tracker, advanced economies are not performing better than EMDEs: in the power sector for example, the same share of advanced economies or EMDEs are assessed as *on track* or *almost on track*.

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1. Including Uganda that has one of the largest energy access deficits.

## Trend assessment: Are countries progressing or backsliding?

Despite a general lack of ambition, our Renewable Energy Tracker indicates that:

- ◆ **Just over half of countries (33) are mostly progressing** across a selection of indicators<sup>2</sup>, while 14 are mostly stagnating and 9 are mostly backsliding<sup>3</sup>.
- ◆ **Progress is unequal between advanced economies and EMDEs:** 83% of advanced economies are mostly progressing, compared to only 38% of EMDEs. The differences are the largest when it comes to increasing the share of renewables in final energy consumption but also deploying new renewable capacities for the power sector (on a per capita basis).



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2. Considering the last two years available or the last two periods of time available if the indicator covers multiple years. See Appendix C.

3. Others have mixed results and are categorised as “inconclusive”.

## Recommendations

- Governments should commit to the UN Secretary-General's call for greater ambition, urging developed nations to achieve net-zero emissions by 2040 and other countries by 2050. Given the "history of unmet expectations"<sup>4</sup> of carbon capture and storage and the many issues inherent to nuclear energy, these goals should be attained through 100% renewables only. Members of the G20 in particular should redouble efforts as they are far off track from reaching these goals.
- Governments should commit to more than tripling renewable electricity capacity by 2030 compared to 2022 levels, and to adding at least 1.5 TW of renewable capacity worldwide annually by 2030 and beyond, primarily through wind and solar. This should be pursued in parallel to a just and equitable phase out of fossil fuels, ending of subsidies to fossil fuels and doubling the rate of annual energy efficiency improvements by 2030 and beyond.
- The last G20 Leaders' Declaration<sup>5</sup> is a first step in that direction, but will need to be considerably worked upon at COP28 and beyond. An independently, transparently and scientifically monitored process is needed that reviews the translation of these global targets into fair and equitable national targets, through a multi-stakeholder approach including the participation of civil society, policymakers, private actors, local communities, etc.
- International and (sub-)national commitments and regulations as well as Nationally Determined Contributions should be strengthened to particularly include targets for the power sector for 2030 and 2035, as well as economy-wide and sectoral targets to bolster electrification across all sectors for higher penetration of renewables economy-wide. Regulatory issues and supply-chain bottlenecks must also be addressed to ensure that the infrastructure for renewables (e.g. distribution and transmission grids, storage) is deployed at scale and on time.

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4. IEA (2023). [Net Zero Roadmap](#).

5. [G20 New Delhi Leaders' Declaration](#)

→ In many low-income countries, both the absence of sufficient financial support and the significantly higher and unjust costs of capital that they face contribute to delay the energy transition and must be tackled head-on, through significantly enhanced grant and non-debt creating finance from richer OECD/developed countries to developing countries, as well as international collaboration. This will help to define and implement a clean energy pathway away from fossil fuels and is paramount to ensure that the Sustainable Development Goal 7, which aims for universal access to electricity and clean cooking fuels and technologies, will be achieved by 2030.

→ Public grants-based money or/and concessional loans are not enough. To master the large clean energy transition, the private financial sector also needs to change. Beside other policies supporting Paris-aligned pathways, international regulations covering the international spread of national banks as well as strict adherence to company-wide rules nationally and internationally are conditional to trigger the billions needed for e.g. microgrids, rooftop solar or large scale offshore wind power.

→ Through national plans, policies, standards, certifications and due diligence procedures, governments and corporations should commit to a rapid, just and equitable transition to renewables that minimises impacts on nature, upholds and protects human and labour rights, ensures participation of local communities, strengthen the land rights of communities and indigenous peoples, ensuring their Free, Prior and Informed Consent, and contributes to sustainable development through e.g. access to quality jobs and decent livelihoods, including for women<sup>6</sup> and rural populations<sup>7</sup>.

→ Governments and international organisations should ensure the public availability of up-to-date and transparent data regarding renewables, including, but not limited to: better information on public investments in fossil fuels compared to renewables; employment statistics; ownership details; benefits for and inclusion of local communities; investments in and deployment of grids and storage; environmental impacts.

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6. See e.g. WWEA (2022). [Empowering women in the energy transformation.](#)

7. See e.g. SELCO & IRENA (2022). [Fostering livelihoods with decentralised renewable energy.](#)

## INTRODUCTION

### A just, equitable and rapid transition to 100% renewable energy is urgently needed

**The science is clear: to keep global warming below 1.5 degrees, we must urgently scale up renewable energy** and notably wind and solar energies, which were once again identified as the most cost-effective supply-side solutions with the greatest potential for mitigation in the latest reports from the IPCC<sup>8</sup> and IEA<sup>9</sup> published in 2023. Beyond mitigation, deploying renewable energy is also of utmost importance to achieve universal energy access by 2030, eradicate energy poverty in developing countries, improve air quality, ensure energy security, resilience and price stability, and generate jobs and local economic benefits.

The transition needs to be pursued in a just, equitable and sustainable way<sup>10</sup>, leaving “no worker, community or country behind”<sup>11</sup>. It must be pursued alongside a full, fast, fair and funded phase out of all fossil fuels<sup>12</sup> and significant improvements in energy efficiency and conservation, to achieve 100% renewable energy systems by 2050 at the latest.

**Over the past years, remarkable progress has been made in renewables**, with plummeting costs, record high shares of renewables in electricity generation (global electricity generation by wind and solar grew from 3% to 12% between 2012 and 2022<sup>13</sup>), and an increased number of governments adopting renewable energy or electricity targets. However, the electricity sector still provides less than one quarter of all final energy and **the share of fossil fuels in total final energy consumption remains at around 80%**, similar to one decade ago<sup>14</sup>.

8. IPCC (2023). [Synthesis report](#).

9. IEA (2023). [Net Zero Roadmap](#).

10. CAN (2023). [The transition to 100% RE must be just, equitable and rapid](#).

11. [Civil Society Equity Review \(2022\)](#)

12. CAN (2023). *The world needs a fair, fast, full, and funded fossil fuel phase-out*

13. EMBER Data Explorer: <https://ember-climate.org/data/data-tools/data-explorer/>

14. REN21 (2023). [Global Status Report Renewables](#) (Global Overview)

In addition, **investments and deployment in renewables remain unequally distributed across the world**: many developing countries are facing disproportionate and unjust high costs of capital, supply-chain risks and challenges are rising, and even more worryingly, 1 individual out of 11 still lacked access to electricity in 2021, i.e. 675 million people worldwide<sup>15</sup>.

**Efforts to significantly and urgently scale up renewables must be enhanced and maintained at a high level** to fully replace fossil fuels and provide universal access to electricity and clean cooking. The annual renewable capacity additions expected in 2023 (around 440 GW<sup>16</sup>) are promising, but there is still a long way to go before reaching at least 1.5 TW per year by 2030 and beyond with wind and solar mainly<sup>17</sup>, in order to stay within the 1.5 C temperature limits of the Paris agreement. For comparison, 1.5 TW is equal to the combined renewable power capacities installed in all OECD countries in 2022, or ten times the capacity installed in Germany, which currently holds the highest renewable power capacity in Europe.

## The Renewable Energy Tracker: towards a fair and equitable assessment of countries

In such a context, with positive signals and yet an overall lack of ambition and implementation, it is important to hold governments accountable and monitor their achievement and progress, while acknowledging differences across countries, e.g. in terms of priorities, financial abilities and common but differentiated responsibilities.

**The Renewable Energy Tracker (RET) is a multidimensional assessment of 60 countries<sup>18</sup>** that provides a snapshot of where they stand and where they are heading and that is **driven by principles of equity, fairness and transparency**.

15. [Tracking SDG7 - The Energy Progress report \(2023\)](#)

16. IEA (2023). [Renewable Energy Market Update](#)

17. CAN (2023). [Global targets for clean renewables and energy efficiency must stand alongside fossil fuel phase out](#). Climate Analytics (2023) - [2030 targets aligned to 1.5°C: evidence from the latest global pathways](#).

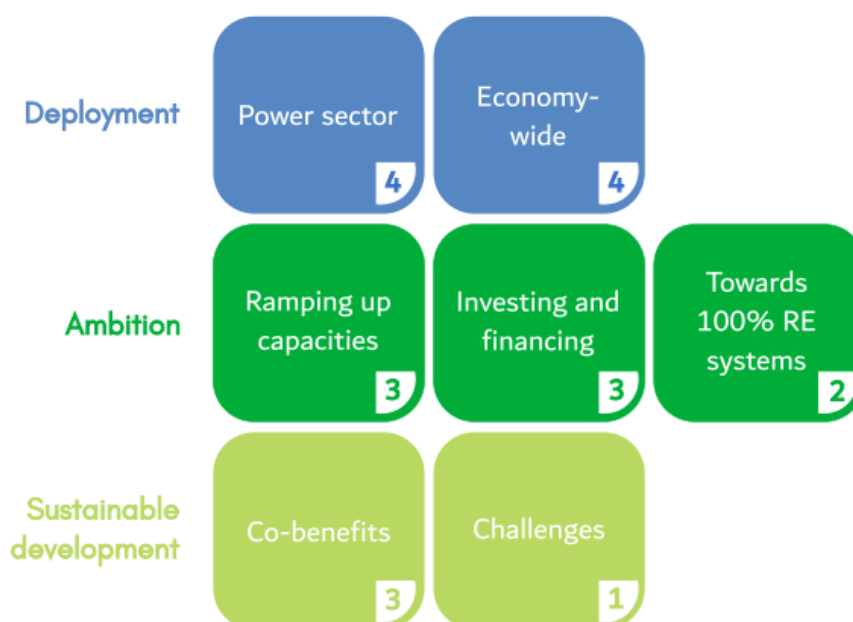
18. The countries were chosen to ensure a comprehensive coverage in terms of geographics, economics (26 countries with “high” income, 14 with “upper-middle” income and 20 with “low” or “lower-middle” income) and politics (all G20 and BRICS nations are included, but not the European Union as a whole). Some countries were included on an ad-hoc basis after screening for relatively good performance across several indicators or based on experts’ suggestions.

## Multidimensional

The RET offers a 3-pronged analysis to identify leaders and slow-starters (country comparison), assess whether countries are on track towards 100% RE systems, and evaluate whether countries are progressing (progress assessment).

The RET includes indicators that assess the countries' level of **deployment** of renewables, but also countries' **ambition** (e.g. forecasted capacities and investments) and **sustainable development** (looking at co-benefits such as electricity access and jobs in renewables, as well as challenges), as shown in Figure 2.

**Figure 2. Areas and categories covered by the tracker** for the country comparison assessment and number of indicators included in each category.



The RET looks at renewables in both the **power sector** and **economy-wide**. While the power sector can be seen as an early and comparably easy target for renewables expansion in many countries (but not all), large scale electrification and increasing renewables consumption outside of the 'classical' power sector will require considerable efforts.

### **Box 1 | Defining Renewable Energy**

Throughout the report, the term “renewable energy” refers to the following renewable resources: wind energy, solar energy, hydropower, geothermal energy, ocean energy (tidal and waves) and bioenergy. While some of these technologies can be associated with specific challenges, notably hydropower and bioenergy, they are categorised as renewables by international organisations such as the International Energy Agency (IEA), the International Panel of Climate Change (IPCC) or the International Renewable Energy Agency (IRENA). This does not mean that all renewables have no impacts on the environment and/or people, or that they are not responsible for greenhouse gas emissions (e.g. when burning solid forest biomass). CAN favours wind and solar as key renewable technologies in the power sector (see Appendix A).

The data used in this report to assess countries’ performance in renewable energy consumption economy-wide excludes traditional uses of biomass for cooking and heating, which is estimated by the IEA and the UNSD based on “the residential consumption of primary solid biofuels and charcoal in non-OECD countries”<sup>19</sup> (see Appendix D for details on indicators).

## **Equity, Fairness & Transparency**

- **Countries have different starting points.** While some may already have a significant amount of renewable energy, others are only recently catching up. The RET acknowledges this by including indicators that look at past and recent trends as well as prospective capacities.
- **Countries have different priorities.** Many developing countries must still provide access to electricity and clean cooking; on the other hand, wealthier countries have an historical responsibility to provide financial support to developing countries. The RET uses different indicators for Advanced economies (AEs) and Emerging and developing economies (EMDEs), when relevant.

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19. [Tracking SDG7 - The Energy Progress report \(2023\)](#)



- **Wealthier countries need to move faster and earlier towards fully renewable energy systems.** The RET uses different target years for Advanced economies and EMDEs for a switch towards 100% renewable electricity generation and energy in final consumption (see Box 2).
- **Countries have different economic and population sizes.** The RET uses “per capita” and “per unit of GDP” indicators to allow for a fair comparison of countries given their respective profiles.
- **Countries have different transparency and reporting standards.** The RET favours more recent data: we use the latest values available and not the latest year for which all countries have data.
- **Data reliability.** We acknowledge that some indicators are more robust than others due to methodology or coverage. Indicators that are deemed less robust or accurate are given a lower weight.
- **Transparency.** The RET is based on quantitative indicators, all publicly available, and on a transparent methodology. While we strive to make the comparison and assessment of the countries as fair as possible, and be clear about methodological limitations, there is always room for improvement and feedback and suggestions are welcome. In particular, and due to data limitations, the RET doesn’t cover some aspects of the transition to renewables that are yet crucial for this transition to be just, e.g. the question of ownership, impacts on communities, progress on grid and storage, etc. This is anticipated to be an annual report and we are committed to adjust it in the coming years based on data availability, recent developments, etc.



## Box 2 | Equitable benchmarks for 100% RE systems

For the transition to be just and equitable, and in line with the principles of Common But Differentiated Responsibilities and Respective Capabilities<sup>20</sup>, countries that have contributed the most to greenhouse gas emissions and that have the financial and technological capabilities to do so must transition faster and earlier out of all fossil fuels and into 100% renewable energy systems<sup>21</sup>.

The degree to which these principles are being incorporated into energy scenarios vary between organisations. Our analysis is based on the call by the UN Secretary-General for developed nations to achieve net-zero emissions as close as possible as 2040 and other countries by 2050.

These differentiated target years for the entire economy should also entail differentiated years for the power sector, which should move to 100% renewables earlier. This is because the technologies to decarbonize the power sector are already available and affordable, but also because the transition from 100% renewable power systems to 100% renewable energy systems economy-wide will require significant efforts and time, notably to increase electrification rates in end-use sectors and to deploy solutions at scale in sectors where electrification is challenging.

However, carbon budgets are shrinking<sup>22</sup> and time is running out. While developing countries must decarbonize their energy systems as early as possible and in light of their much lower respective capabilities, they cannot afford to go slower. On the other hand, developed countries have the capabilities to go faster and also have the historical responsibilities to do so. Based on these considerations, throughout the report, we use the following target years:

- **Advanced economies as a group must achieve 100% renewables in the power sector by 2030, which will allow them to achieve 100% renewable energy throughout the economy by 2040.**
- **EMDEs as a group must achieve 100% renewables in the power sector by 2040, which will allow them to achieve 100% renewable energy throughout the economy by 2050<sup>23</sup>.**

20. <https://leap.unep.org/en/knowledge/glossary/common-differentiated-responsibilities>

21. <https://www.equityreview.org/>

22. Lamboll et al. (2023). [Assessing the size and uncertainty of remaining carbon budgets](#).

23. For comparison, a study by the [Climate Action Tracker](#) based on a selection of pathways assessed by the IPCC AR6 showed that “the world should aim to achieve clean electricity by 2040” and that the global share of renewables in electricity generation should reach 81%-89% by 2030. While the study incorporated some equity principles by e.g. accelerating the phase out of coal and gas in developed countries, the results are based on a selection of pathways from the IPCC AR6, most of them “do not make explicit assumptions about global equity, environmental justice or intra-regional income distribution” (IPCC AR6).

## METHODOLOGY

### Country grouping

In order to capture countries' specific priorities and responsibilities as well as to assess the results from an equity perspective, we distinguish between two groups of countries, mostly following IEA's classification:

- **Advanced economies (AEs)**, which include countries that are member of the OECD, minus Chile, Colombia and Mexico, but adding Russia (as an Annex II country in the UNFCCC);
- **Emerging and developing economies (EMDEs)**, which include countries that aren't members of the OECD as well as Chile, Colombia and Mexico.

**Table 1. Countries covered by the tracker.** Members of the G20 are marked with \*.

Region	Countries
East Asia and Pacific	<b>AEs:</b> Australia*, Japan*, New Zealand, South Korea* <b>EMDEs:</b> Cambodia, China*, Indonesia*, Laos, Malaysia, Philippines, Thailand, Vietnam
South Asia	<b>EMDEs:</b> Bangladesh, India*, Pakistan
North America	<b>AEs:</b> Canada*, USA*
Latin America and Caribbean	<b>EMDEs:</b> Argentina*, Brazil*, Chile, Colombia, Ecuador, Mexico*, Uruguay
Middle East and North Africa	<b>EMDEs:</b> Algeria, Egypt, Iran, Iraq, Jordan, Morocco, UAE, Saudi Arabia*
Sub-Saharan Africa	<b>EMDEs:</b> Congo (Dem. Rep.), Ethiopia, Kenya, Nigeria, Senegal, South Africa*, Tanzania, Uganda, Zambia
Europe and Central Asia	<b>AEs:</b> Austria, Denmark, Italy*, Finland, France*, Germany*, Greece, Netherlands, Norway, Poland, Portugal, Russia*, Spain, Sweden, Switzerland, Türkiye*, UK* <b>EMDEs:</b> Croatia, Serbia

Income groups: High - Upper middle - Lower middle - Low

## Ratings

### Country comparison: Which countries are leading or lagging?

This part of the analysis builds upon 20 indicators organised in seven categories and three areas: deployment, ambition and sustainable development<sup>24</sup>. In addition to usual indicators (share, consumption and capacity of renewable energy or electricity), indicators also cover investment, access to energy and clean cooking, among others.

The RET primarily focuses on the power sector, due to the increasing significance of electrification, but also looks at renewable energy in final energy consumption. The indicators used offer a partial view of countries' efforts towards renewables, as due to data limitations many aspects couldn't be covered, in particular when it comes to the "quality" of the renewable energy systems being deployed in terms of governance, human and environmental rights, benefits to local communities, etc.

**Table 2. List of indicators.** Some indicators are taken into account for Advanced economies only (in blue), or for EMDEs only (in orange). TFEC stands for Total Final Energy Consumption.

	Category	Indicator	Weight	
			Advanced	EMDEs
Deployment	Economy-wide	Increase in the share of renewable energy in TFEC since 2015	25%	
		Final renewable energy consumption per unit of GDP per capita	25%	
		Final renewable energy consumption per capita	25%	
		Share of renewable energy in TFEC	25%	
	Power	Increase in the share of renewable electricity generation since 2015	25%	
		Renewable electricity generation per unit of GDP per capita	20%	
		Renewable electricity generation per capita	20%	
Ambition	Ramping up RE	Share of wind and solar in electricity generation	35%	
		Average new renewable energy capacity per capita over the last three years	60%	
		Planned additions of renewable energy capacity per capita by 2030	20%	
	100% RE	Planned additions of wind and solar capacity per capita by 2030	20%	
		Economy-wide: Is the country on track to reach 100% by 2040 (AE)/2050 (EMDE)?	50%	
	Finance	Power: Is the country on track to reach 100% RE by 2030 (AE)/2040 (EMDE)?	50%	
		Investments in renewables per unit of GDP per capita	40%	50%
Investments in renewables per capita		40%	50%	
Sustainable development	Challenges	Annual change in climate-related development finance (2017-2021)	20%	0%
		Share of solid biomass in total primary energy supply (-)	100%	100%
	Co-benefits	Number of jobs in renewable industry as a share of total workforce	100%	30%
		Share of population with access to electricity	0%	35%
		Share of population with access to clean cooking	0%	35%

24. See Appendix D for details about the indicators (sources, data availability, etc.).

## Weights

- In the **Power** and **Economy-wide** categories, the indicators measuring the increase in the share of renewables since 2015 are given a similar weight as other indicators. This is to acknowledge latecomers that have only recently increased their efforts to deploy renewables, even if their achievements may fall short compared to countries with already high shares or levels of consumption/generation of renewable energy.
- In the **Power** category, the share of wind and solar in electricity generation is given a higher weight due to the predominance of these two technologies in most Paris-aligned energy pathways. This is primarily because they are the cheapest solutions with the highest mitigation potential, but also because other renewable sources like hydropower and bioenergy entail geographic and sustainability challenges (Appendix A).
- In the **Ramping Up RE** category, the two indicators on “prospective capacities” are given lower weights because the available data only covers project capacities above a certain threshold<sup>25</sup>, therefore putting at a disadvantage countries that will rely more heavily on smaller and decentralised energy systems.
- In the **Finance** category, the indicator for climate-related development aid is given a lower weight because it encompasses a wide range of activities including mitigation, energy efficiency, energy infrastructure and adaptation. However, it still gives an indication of whether countries are significantly scaling up their financial support to developing countries.

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25. See Appendix D. Prospective capacities are taken from Global Energy Monitor, which estimates that the thresholds enable to capture 40% of the total operating capacity worldwide for Solar power; around 80% for geothermal power; close to 90% for Wind power and just above 80% for hydropower.

## Assessment and ranking

Countries are classified in five groups based on their relative performance across categories: *Champions*, *Frontrunners*, *Moderates*, *Trailers* or *Slow-starters*. To accommodate for data limitations and/or for countries that already have a high level of renewables and consequently may underperform in the categories **Ramping up RE** and **Finance**, countries are given some leeway and can be labelled as *Champions* or *Frontrunners* even if they do not perform well in all categories.

Within each category, countries are ranked based on the weighted sum of their rank for each indicator included in that category (the lower the sum, the better). By taking into account the rank rather than the actual differences between countries' values, we aim to achieve consistency across indicators<sup>26</sup>.

**Table 3. Assessment table: is the country leading?**

	Champion	Frontrunner	Moderate	Trailer	Slow-starter
Criteria 1	In top 20% in at least 5 categories	In top 40% in at least 5 categories	In top 60% in at least 5 categories	In top 80% in at least 5 categories	Others
Criteria 2	0 category in bottom 40%	Max 1 category in bottom 20%	Max 1 category in bottom 20%		

Within each group (*Champion*, *Frontrunner*, etc.), countries are then ranked according to their overall performance. Countries in the top 20% in all categories get the highest possible score while countries in the bottom 20% in all categories get the lowest possible score<sup>27</sup>.

## Are countries up to speed towards 100% renewable energy systems?

This analysis looks into more detail into the 100% RE category by giving a specific rating to countries for the two indicators considered. Unlike the previous section (Country comparison), countries are not rated based on their relative performance vis-à-vis other countries, but based on their absolute performance against predefined benchmarks (see Box 2).

26. Even if a country is performing better by many orders of magnitude on one indicator, it doesn't receive an extra advantage that can be used to compensate for a lower performance on another indicator.

27. If countries are on par, the one with the fewest categories within the bottom 20% is ranked first, followed by the one with the fewest categories in the bottom 40%, etc.

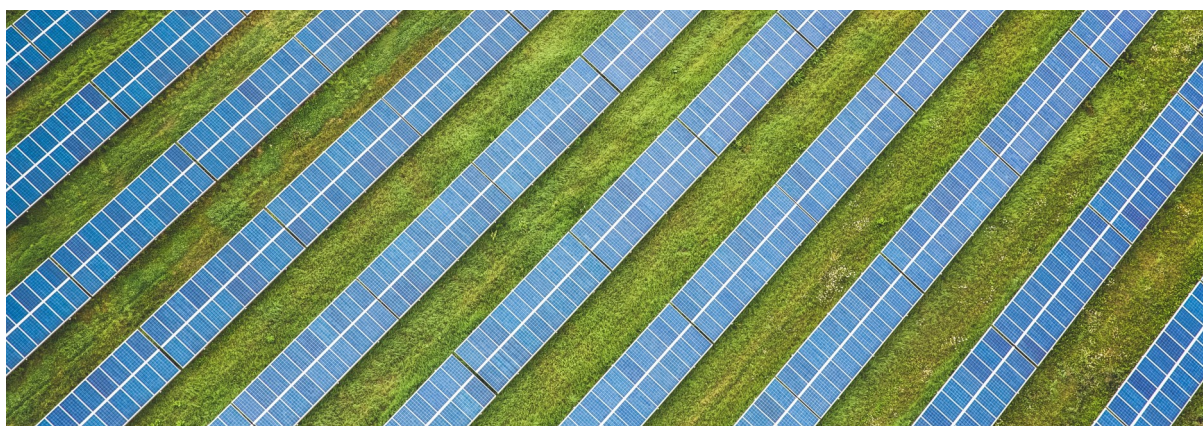
Advanced economies are expected to achieve 100% renewables by 2030 in the power sector and economy-wide by 2040; EMDEs are expected to transition to 100% renewables by 2040 in the power sector and economy-wide by 2050.

To assess whether countries are “up to speed”, we measure whether the rate of change observed over the last 4 years available, *if maintained*, would be sufficient to reach 100% by the stated years. To do so, we compare the rate of change in the share of renewables in electricity/final energy consumption *observed* to that *required* to reach 100% by the years stated above<sup>28</sup>. **Countries are considered on track only if their rate of change is good enough in both the power sector and economy-wide<sup>29</sup>.**

**Table 4. Assessment table: is the country up to speed to reach 100% RE systems?**

Assessment	Yes	Almost	U-turn needed	No
<b>Criteria</b>	$R_{\text{power}} > 0.9$ and $R_{\text{energy}} > 0.9$	$R_{\text{power}} > 0.6$ and $R_{\text{energy}} > 0.6$	$\text{Coeff}_{\text{power}} < -0.5$ pp or $\text{Coeff}_{\text{energy}} < -0.5$ pp	Others

$R_{\text{power}}$  and  $R_{\text{energy}}$  are the ratio between the observed and required rates of change (“Coeff”).



28. The rate of change is calculated using the method of least squares to fit a regression line.

29. We note that the rate of change in the share of renewables is more likely to follow an S-curve than a linear curve, with slow improvements at first, followed by rapid improvements as technology penetrates the market and then stalled improvements when reaching saturation. However the proposed measure can be applied to all countries regardless of where they currently stand.

30. pp: percentage points

## Progress assessment: are countries progressing or backsliding?

A subset of indicators presented in Table 2 is used to assess whether countries are rather progressing, stagnating or even backsliding. Some indicators are excluded either because they are useful to compare countries in an equitable way but not necessarily when used to track a country's absolute performance over time ("per GDP" indicators), or because data is not available for two consecutive years or time periods.

For each country, we count the number of indicators that have increased, stagnated or decreased between the last two time periods for which data is available, using predefined thresholds (cf. Appendix C for details on the list of indicators included and time periods considered).

**Table 5. Assessment table: is the country making progress?**

	Progressing	Stagnating	Backsliding	Inconclusive
Criteria	Most indicators have increased	Most indicators haven't changed significantly	Most indicators have decreased	Others





## COUNTRIES' ASSESSMENTS

The countries' ratings are shown in Table 6 and are discussed in more detail in the following sections. The ranking refers to the country comparison only (Which countries are leading?). The terms used to rate the countries (*Frontrunner*, *Slow-starter*, etc.) only reflect the fact that countries are performing relatively better or worse than others: they do not indicate whether countries are doing enough, and should be interpreted in line with countries' differentiated responsibilities and respective capabilities including commitments (and their effective implementation) to phase out all fossil fuels in a just and equitable way.

This relative ranking and assessment is complemented by a specific rating looking at whether countries are up to speed to reach 100% RE systems: countries are considered up to speed only if they perform well enough in both the power sector and economy wide (see Table 4).

It should be noted that these assessments rely on the latest available verified data and therefore do not reflect most recent development. Indicators for the power sector use data from 2022 (or 2021 for some countries); data from 2021 is used from most other indicators except for data related to renewable energy in final consumption, where data from 2020 is used (see Appendix D for details).

**Table 6. Countries' ratings.** The ranking refers to the country comparison only (Which countries are leading?). EMDEs are marked with a \*.

Rank	Country		Mostly leading or lagging?	Income level group	Up to speed to reach 100% RE?
<i>No countries in the Champions group</i>					
1	Chile*	a	Frontrunner	High income	No
2	Brazil*	a	Frontrunner	Upper middle income	No
3	China*	b	Frontrunner	Upper middle income	No
4	Finland		Frontrunner	High income	No
5	Sweden		Frontrunner	High income	Almost
6	Denmark	a	Frontrunner	High income	No
7	Norway		Frontrunner	High income	No
8	Germany		Frontrunner	High income	No
9	US	c	Frontrunner	High income	No
10	Spain	c	Frontrunner	High income	No
11	Portugal		Frontrunner	High income	No

- Not in the *Champions* group because they rank in the bottom 40% performers in the Challenges category due to their reliance on solid biofuels.
- China is the only country that does not rank in the bottom 40% performers in any categories.
- The US and Spain are the only countries in the *Frontrunner* categories that rank in the bottom 20% performers in the 100% RE category. The US rank 59 out of 60 in that category.

Rank	Country		Mostly leading or lagging?	Income level group	Up to speed to reach 100% RE?
12	Netherlands		Moderate	High income	No
13	Vietnam*		Moderate	Lower middle income	U-turn needed <i>d</i>
14	Colombia*		Moderate	Upper middle income	No
15	Jordan*		Moderate	Upper middle income	No
16	Poland		Moderate	High income	No
17	India*		Moderate	Lower middle income	No
18	Mexico*		Moderate	Upper middle income	No
19	Malaysia*		Moderate	Upper middle income	No
20	Greece		Moderate	High income	No
21	UK		Moderate	High income	No
22	Serbia*		Moderate	Upper middle income	No
23	Croatia*		Moderate	High income	U-turn needed
24	Australia		Moderate	High income	No
25	Argentina*		Moderate	Upper middle income	No
26	France		Moderate	High income	No
27	Indonesia*		Moderate	Lower middle income	No
28	Austria		Moderate	High income	No
29	Türkiye		Moderate	Upper middle income	No
30	Morocco*		Moderate	Lower middle income	No
31	Laos*	e	Trailer	Lower middle income	No
32	Japan		Trailer	High income	No
33	Canada		Trailer	High income	No
34	Uruguay*		Trailer	High income	U-turn needed <i>g</i>
35	UAE*	f	Trailer	High income	No
36	Ecuador*		Trailer	Upper middle income	No
37	Thailand*		Trailer	Upper middle income	No
38	Egypt*		Trailer	Lower middle income	No
39	South Africa*		Trailer	Upper middle income	No
40	Cambodia*		Trailer	Lower middle income	U-turn needed
41	Switzerland		Trailer	High income	No
42	Russia		Trailer	Upper middle income	No
43	New Zealand		Trailer	High income	No
44	Philippines*		Trailer	Lower middle income	No
45	Pakistan*		Trailer	Lower middle income	No
46	South Korea		Slow-starter	High income	No
47	Saudi Arabia*	e	Slow-starter	High income	No
48	Italy		Slow-starter	High income	U-turn needed
49	Uganda*		Slow-starter	Low income	Yes <i>h</i>
50	Iraq*	e	Slow-starter	Upper middle income	No
51	Zambia*		Slow-starter	Low income	No
52	Kenya*		Slow-starter	Lower middle income	No
53	Ethiopia*		Slow-starter	Low income	No
54	Iran*		Slow-starter	Lower middle income	U-turn needed
55	Algeria*		Slow-starter	Lower middle income	No
56	Tanzania*		Slow-starter	Lower middle income	No
57	Senegal*		Slow-starter	Lower middle income	No
58	Bangladesh*		Slow-starter	Lower middle income	No
59	Nigeria*		Slow-starter	Lower middle income	No
60	Congo*		Slow-starter	Low income	U-turn needed

d. Although Vietnam saw large improvements in the share of renewables in the power sector (6 pp per year between 2019 and 2022), the share of renewables in final energy consumption has also significantly decreased between 2017 (21%) and 2020 (16%). See <https://www.iea.org/countries/viet-nam>.

e. No data for one indicator in the Co-benefits category (employment)

f. UAE is the only country in the *Trailer* group that ranks among the bottom 20% performers in both the Power and Economy-wide categories, which could arguably be considered the most important ones.

g. A "U-turn" is needed because the share of renewables in electricity has decreased by around 1.5 pp per year between 2019 and 2022 but Uruguay's share of renewables in the power sector remains very high (85%)

h. Uganda has indeed increased its share of renewables, mainly through hydro in the power sector, but it remains among the countries with the largest access deficit rates, with 25 million people still lacking access to electricity.

## FOCUS: WHICH COUNTRIES ARE LEADING?

### Overall assessment

The assessment of the countries focuses on relative differences between countries rather than absolute performance. **It rewards consistency, i.e. countries must perform better than others in the majority of categories to be assigned a good rating.**

**Table 7. Overall assessment.** Emerging and Developing Economies are highlighted in orange. Advanced economies are highlighted in blue.

Overall assessment							
Champions	Frontrunners	Moderate		Trailers		Slow-starters	
	1 Chile	12 Netherlands	22 Serbia	31 Lao PDR	39 South Africa	46 South Korea	54 Iran
	2 Brazil	13 Vietnam	23 Croatia	32 Japan	40 Cambodia	47 Saudi Arabia	55 Algeria
	3 China	14 Colombia	24 Australia	33 Canada	41 Switzerland	48 Italy	56 Tanzania
	4 Finland	15 Jordan	25 Argentina	34 Uruguay	42 Russia	49 Uganda	57 Senegal
	5 Sweden	16 Poland	26 France	35 UAE	43 New Zealand	50 Iraq	58 Bangladesh
	6 Denmark	17 India	27 Indonesia	36 Ecuador	44 Philippines	51 Zambia	59 Nigeria
	7 Norway	18 Mexico	28 Austria	37 Thailand	45 Pakistan	52 Kenya	60 Congo
	8 Germany	19 Malaysia	29 Turkiye	38 Egypt		53 Ethiopia	
	9 US	20 Greece	30 Morocco				
	10 Spain	21 UK					
	11 Portugal						

The analysis shows that **no country fulfils the criteria to be categorised as *Champion*** and no country is in the top 20% in at least six categories out of seven.

**Chile, Brazil and China, all EMDEs, are the top three countries, followed by four Nordic countries: Finland, Sweden, Denmark and Norway.** Chile, Brazil and Denmark are the only countries to be among the top 20% performers in five categories out of seven, but they are all penalised by their reliance on solid biofuels, which places them in the bottom 40% in the *Challenges* category.

The *Frontrunners* group mostly includes Advanced economies and the *Trailers and Slow-starters* group mostly includes EMDEs. Yet, the equity-based comparison reveals that the divide is not systematic:

- Among the *Frontrunners*, **three EMDEs are punching above their heights**: Chile, Brazil, China.
- Among the *Trailers and Slow-starters*, **seven Advanced economies are punching below their heights**: Japan, Canada, Switzerland, Russia and New Zealand (*Trailers*) as well as South Korea and Italy (*Slow-starters*).

**Several EMDEs rank among the *Moderates* and in the top 20**: Vietnam, Colombia, Jordan, India, Mexico and Malaysia.

**Nearly one third of countries fall into the *Moderates* group, highlighting an overall lack of consistency** as countries are performing well in some categories but poorly in others. While the *Power* and *Economy-wide* categories are mostly important as they reflect where countries actually and currently stand in terms of deployment, other categories reflect the level of countries' ambition as well as sustainability aspects and must also be considered.

**At the bottom of the ranking (*Trailers and Slow-starter*), 23 countries out of 30 are EMDEs**, highlighting the challenges faced by such economies to deploy renewables at scale but also to provide access to electricity and clean cooking.

**South Korea, Saudi Arabia and Italy are the only high-income countries among the *Slow-starters***. Japan and Canada, two other high-income countries members of the G20, are among the *Trailers*. This is particularly concerning as in 2021 these five countries accounted for nearly 9% of total GHG emissions in 2021<sup>31</sup>.

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31. <https://ourworldindata.org/co2-emissions>

With the exception of Italy and South Korea, **the Slow-starters can be split between two groups of similar countries:**

- **oil and gas OPEC producer countries** from the Middle East and Africa (Saudi Arabia, Iraq, Iran, Algeria, Nigeria), which rank notably low in terms of renewable energy investments<sup>32</sup>.
- **sub-Saharan African countries** (Uganda, Zambia, Kenya, Ethiopia, Tanzania, Senegal and Congo). With the exception of Kenya, all these countries are among the bottom 20% performers when it comes to co-benefits and challenges due to their reliance on biomass for traditional uses and lack of access to electricity and clean cooking technologies. The lack of investments flowing to Africa from developed countries has been reportedly identified as a key barrier to the roll out of renewables in that region<sup>33 34</sup>.

## Selected findings

- ◆ **Vietnam** (13th) and **India** (17th) are the highest ranked lower-middle countries included in the RET. Vietnam is among the top performers in terms of investments and performs relatively better than others when it comes to ramping up renewable energy. India ranks among the top 20% performers in terms of renewable deployment economy-wide and in terms of investment on a per-GDP basis.
- ◆ **Indonesia** (27th) and **Morocco** (30th) are the only two other lower-middle income countries in the Moderate group, ahead of many high income and upper-middle income countries.



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32. With the exception of Saudi Arabia who ranks among the top 60% in the Finance category, all other countries rank among the bottom 20%.

33. IEA (2023). [World Energy Investment](#).

34. Power Shift Africa (2023). [Just Transition. A climate, energy and development vision for Africa](#).

- ◆ Although it still relies heavily on coal, **Poland** is mainly rewarded for having increased its share of renewables economy-wide since 2015 (+4%, ranking 12th for this specific indicator) and in the power sector (+7%) as well as for its relatively high added capacities over the last 3 years on a per capita basis. Investments have been steadily increasing since 2017, also contributing to Poland's overall rating as *Moderate*<sup>35</sup>.

### **Box 3 | Beyond the Renewable Energy Tracker: A comparison with global trackers**

The **Climate Change Performance Index**<sup>36</sup> assesses climate protection performance of several countries. Similar to our ranking, Sweden, Denmark and Chile appeared in the top 3 of the CCPI last year and in the top 6 of the RET. However, Brazil and the US rank among the *Frontrunners* in the RET but lower in the CCPI (respectively 38th and 52nd). The CCPI looks at climate action in general, not only renewables: the CCPI report notes that these two countries are among the biggest producers of oil, gas, and coal worldwide and also rate as low or very low when it comes to GHG emissions. Saudi Arabia and Iran rank at the very bottom of the CCPI, and so do they in the RET: the CCPI highlights their (very) low rating in both GHG Emissions, energy consumption and climate policy.

The **RISE** index<sup>37</sup> assesses country's policies and regulations in the energy sector. Despite being ranked amongst the top in the "renewable energy" category, the UK and Mexico only rank among *Moderate* countries in our tracker, highlighting a gap between policy and implementation. In the RET, **the UK fails** to perform among the best due to its relatively low share of renewable energy consumption economy-wide, relatively high share of solid biofuels, but also because its rate of change is not sufficient to reach 100% RE. As for **Mexico**, it has added little capacities over the last years and has limited capacity in the pipeline as well. According to the Climate Action Tracker, recent changes in policies have resulted in "prioritising the government's own ageing, fossil fuel-fired power plants"<sup>38</sup> and reduced incentives for renewable energy investment.

35. <https://www.global-climatescope.org/markets/pl/>

36. <https://ccpi.org/>

37. <https://rise.esmap.org/>

38. <https://climateactiontracker.org/countries/mexico/>

## Deployment

The share of electricity in global final energy consumption must rise to probably up to three-quarters by 2050<sup>39</sup> compared to only 20% today. While the power sector is often seen as a low hanging fruit among mitigation solutions thanks to the plummeting costs of wind and solar technologies, achieving this level of change nevertheless necessitates intensified and continuous efforts to deploy renewable electricity at scale. In sectors and applications where electrification is not the most suitable choice, there is also an urgent need to expand other forms of renewable energy such as renewable-based hydrogen derived from renewable electricity.

The *Deployment* area looks at renewables in both the power sector and economy-wide, by looking at the current shares of renewable electricity energy and the current levels of consumption/generation of renewable energy/electricity on a “per capita” and “per GDP” basis. **Consequently, countries with high amounts of renewables may not appear at the top of the ranking if they are not also performing better than others relative to their economy or population sizes.** The assessment also rewards latecomers by including a measure of the increase in the share of renewables since 2015. In the *Power* category, the emphasis is put on wind and solar technologies due to their significance in Paris-aligned scenarios.

**Table 8. Top and bottom countries in *Deployment* categories.** Countries highlighted in green are in the top 10 in both categories; those highlighted in red are in the bottom 10 in all categories. Numbers indicate the rank of each country within each category (final energy consumption vs power sector).

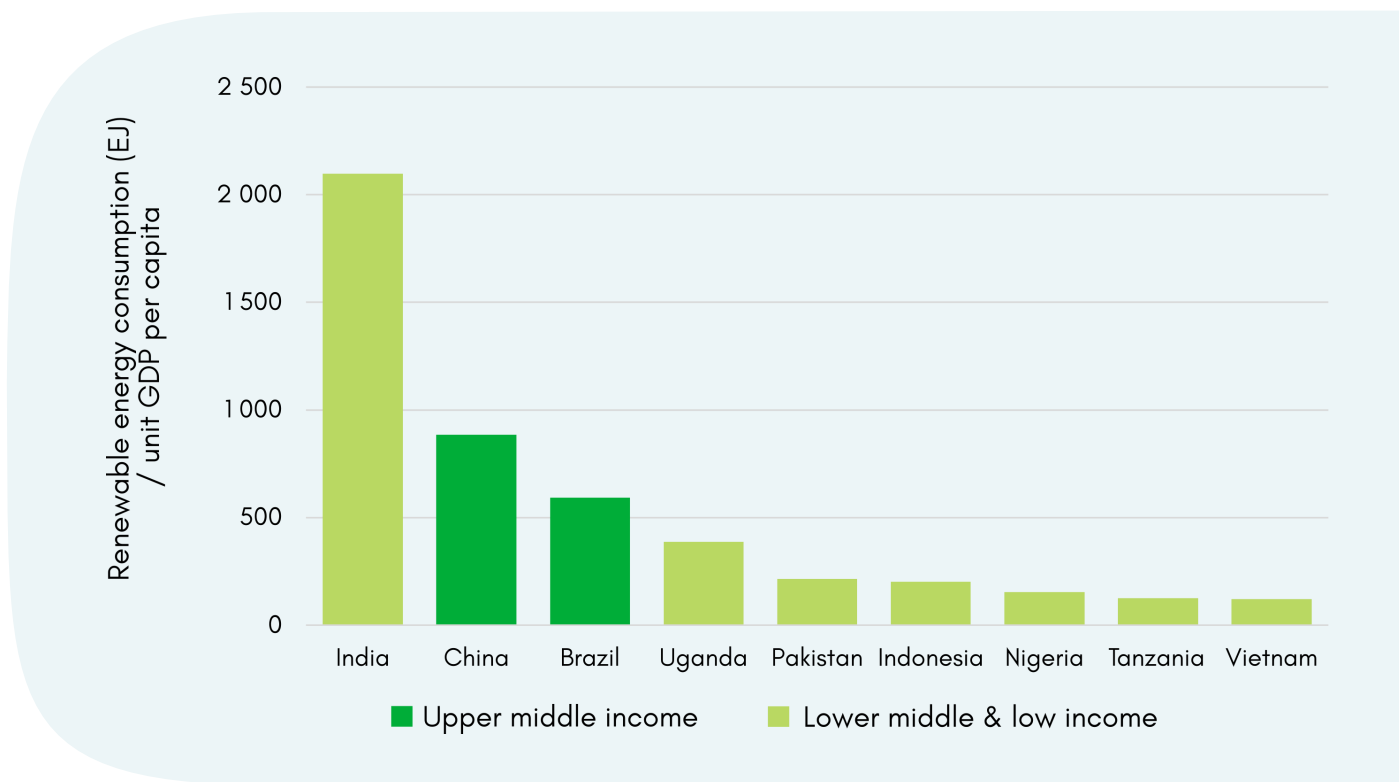
Renewables in final energy consumption				Renewables in the power sector			
Top 10		Bottom 10		Top 10		Bottom 10	
1	Brazil	51	Ethiopia	1	Germany	51	Pakistan
2	Uganda	52	Egypt	2	Brazil	51	Nigeria
3	Sweden	53	South Korea	3	Denmark	52	UAE
4	Finland	54	Iran	4	UK	53	Philippines
5	Norway	55	Kenya	6	Chile	54	Congo
6	Denmark	56	UAE	6	Australia	55	Tanzania
7	Canada	57	Iraq	7	Spain	56	Iraq
8	Germany	58	Bangladesh	8	Netherlands	57	Iran
9	Serbia	59	Saudi Arabia	9	Portugal	58	Algeria
11	Portugal	60	Algeria	10	Greece	59	Bangladesh
						60	Saudi Arabia

39. 53% in the IEA’s revised NZE Scenario, 70% according to [Climate Analytics](#) based on a selection of Paris-compatible global pathways used in the IPCC AR6 report.

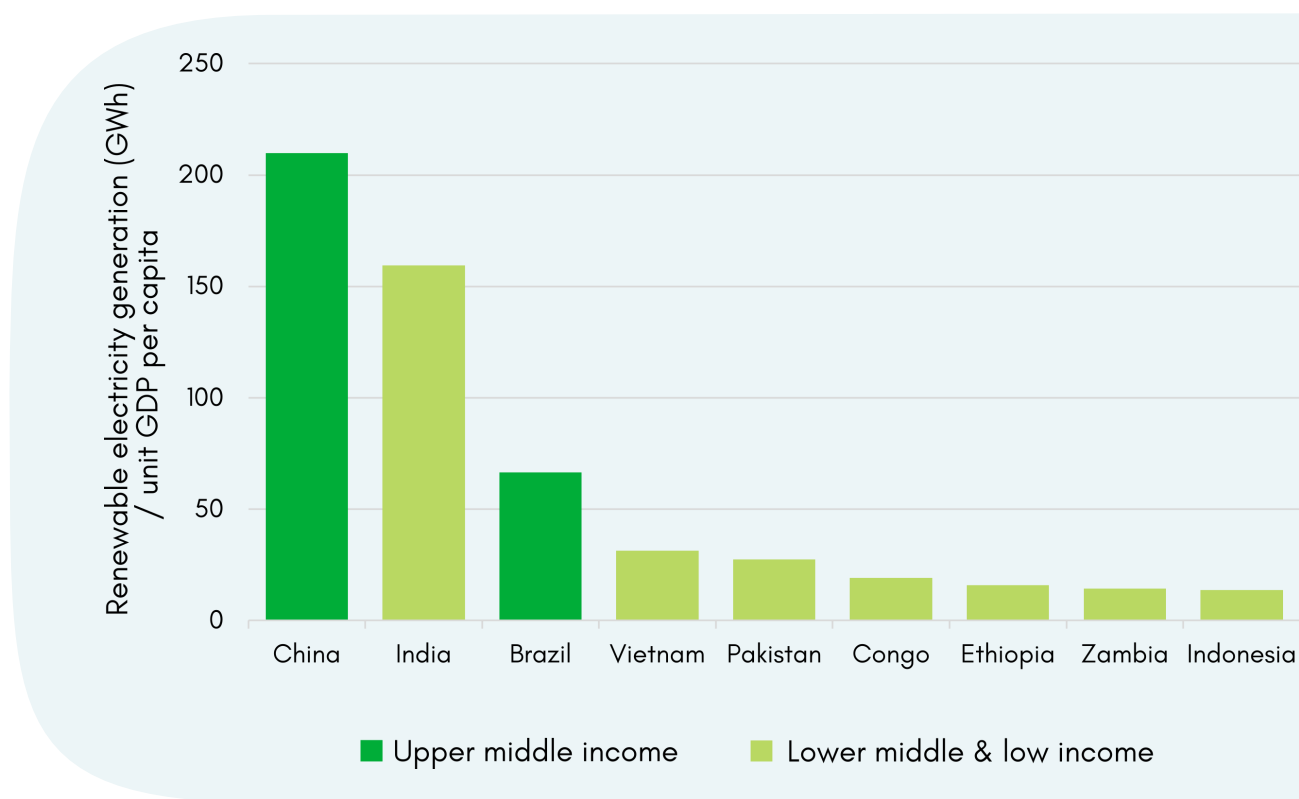
Among the top 10 in both the power sector and economy-wide, only Brazil, Denmark, Germany and Portugal stand out. **This underscores the imperative for all countries within the Renewable Energy Transition (RET) to substantially enhance their efforts across various energy types and end-use sectors.** It is noteworthy that both Brazil and Denmark heavily lean on solid biofuels. Additionally, Brazil's strong reliance on hydropower introduces environmental, social, and operational complexities and climate-related risks, particularly evident during droughts.

Figures 3 and 4 show that in both the power sector and economy-wide, **when adjusting for economy size, i.e. on a per GDP basis, India, China and Brazil are leading**, highlighting their higher efforts to deploy renewables compared to richer countries. All top 10 performing countries for these specific indicators are Emerging and Developing Economies, with only China and Brazil being “upper middle income” countries.

**Figure 3. Renewable energy consumption (economy-wide) relative to the size of the economy.**





**Figure 4. Renewable electricity consumption relative to the size of the economy.**

## Selected highlights

- ◆ **Five OPEC countries** rank among the bottom 10 in both the power sector and economy-wide: Algeria, Iran, UAE, Iraq and Saudi Arabia<sup>40</sup>. All these countries have strong fiscal dependencies on oil and gas export revenues<sup>41</sup> and rank among the *Slow-starters* in both categories due to their very low shares of renewables but also their poor performance in terms of renewables per capita or per unit of GDP. In these countries where the transition to renewable energy will affect revenues and employment, strong policies incentivizing a roll out of renewables alongside an equitable phase out of fossil fuels are urgently needed, in line with Just Transition principles. Egypt and Russia have a similar profile.

40. UAE and Saudi Arabia are the only high-income countries that are among the bottom 20% in both the power sector and economy-wide.

41. <https://carbontracker.org/reports/petrostates-energy-transition-report/>

- ◆ **Kenya** is the highest ranked sub-Saharan African country in the *Power* category. Kenya already has a high share of renewables in the power sector (close to 90% in 2022) and has pledged to have 100% of its electricity coming from renewable sources by 2030. Kenya's renewable electricity mainly comes from its geothermal and hydropower plants, but wind and solar are picking up. Economy-wide, Kenya has among the lowest shares of modern renewables in final energy consumption (4%) – an indicator that has barely increased since 2015 (3.7%).
- ◆ **Uganda** appears in the top 10 of the *Economy-wide* category but this should be nuanced and viewed in perspective with other categories. Uganda is the fifth country with the largest access deficits in 2021, with over 25 million of people without access<sup>42</sup>. For Uganda and other countries that yet have to significantly increase their energy consumption, leapfrogging to renewable energy instead of investing in fossil fuel infrastructure is paramount<sup>43</sup>.

#### **Box 4 | Beyond the Renewable Energy Tracker: Legal targets to promote renewables in end-use sectors**

**REN21's dedicated module on renewable energy demand**<sup>44</sup> assesses trends in four end-use sectors: transport, agriculture, industry and buildings. In 2020, modern renewable energy consumption in the transport sector represented only 4% of the sector's total energy demand, while in other sectors the share was higher but still insufficient (16% in buildings and agriculture, 17% in industry).

REN21's analysis highlights the need for governments to scale up ambition by adopting specific policies for these end-use sectors: while 174 countries have a renewable power or energy target in place, only 94 countries have so in at least one end-use sector, and only three countries have an energy target or policy in place in all four sectors (Spain, Portugal and Türkiye). **Portugal** and **Spain** have in fact increased their share of renewables in final energy demand by respectively 4% and 3% between 2015 and 2020, which put them at the 17th and 22th place for that specific indicator. **Türkiye** performs better when looking at renewables in final energy consumption on a per GDP basis, ranking 14th.

42. ESMAP (2023). *Tracking SDG7 Progress*.

43. <https://dont-gas-africa.org/>

44. [https://www.ren21.net/qsr-2023/modules/energy\\_demand/](https://www.ren21.net/qsr-2023/modules/energy_demand/)

## Ambition

In order to stay within the limits of 1.5 degree of global warming, renewable capacity must triple by 2030 compared to 2022 levels. While the recent market updates have sent strong signals, with record highs in new capacity additions, the annual rate of deployment needs to be further accelerated to reach around 1.5 TW of new capacity additions annually by 2030 and beyond.

The *Ambition* area looks at various metrics that give an indication of the level of ambition of the countries. The *Ramping Up RE* category looks at both recent trends in newly capacity installed as well as estimates of prospective new capacities<sup>45</sup>. A second category (100% RE) is used to assess whether countries are on track to reach 100% renewable energy systems and is presented in detail in the next Focus section.

The *Finance* category includes data on investments in renewables, as those have to be significantly scaled up, on a “per capita” and “per GPD” basis. In addition, public investments from wealthier countries to developed countries will be crucial to ensure that these objectives are reached. The *Finance* category therefore also looks at climate-related development aid provided by Advanced economies, although this encompasses a wide range of activities including non-energy Mitigation and Adaptation (cf. Appendix D).

**Table 9.** Top and bottom countries in Ambition categories. Countries highlighted in green are in the top 5/10 in at least two categories; those highlighted in red are in the bottom 5/10 in at least two categories.

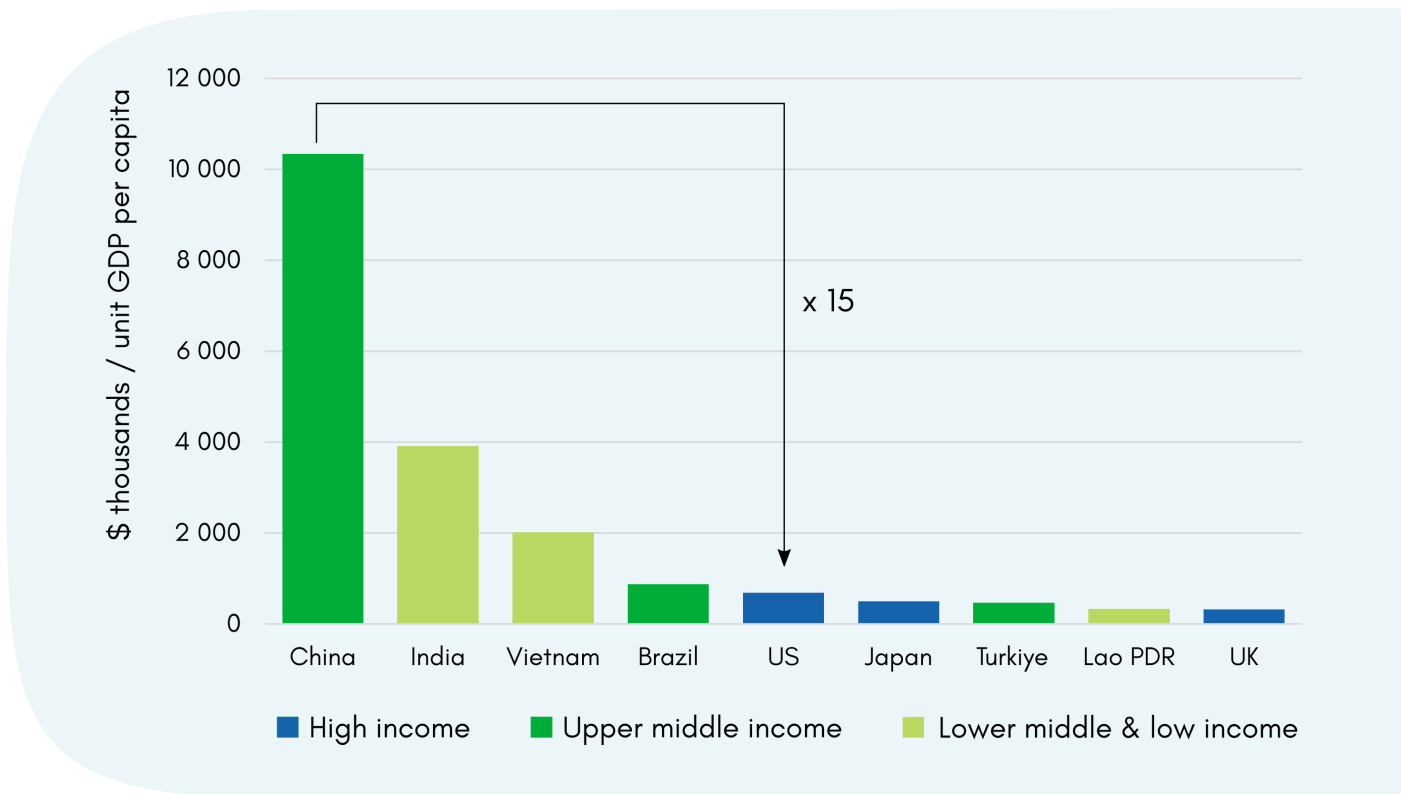
Ramping Up RE		Finance (Advanced)		Finance (EMDEs)	
Top 10	Bottom 10	Top 5	Bottom 5	Top 5	Bottom 5
1 Sweden	51 Algeria	1 Japan	19 Portugal	1 Chile	33 Iraq
2 Finland	52 Uganda	2 US	20 Austria	2 China	34 Iran
3 Australia	53 Iran	3 France	21 Italy	3 Laos	37 Uruguay
4 Greece	54 Thailand	4 Netherlands	22 Switzerland	4 Vietnam	37 Ecuador
6 Denmark	55 Bangladesh	5 South Korea	23 New Zealand	5 Brazil	37 Senegal
6 Netherlands	56 Tanzania				
7 Norway	58 Ecuador				
8 Chile	58 Ethiopia				
9 Spain	60 Nigeria				
11 China	60 Congo				

45. Including projects that are in the pre-construction or construction phase but excluding projects that have been announced only. The dataset mostly includes projects above a certain size and therefore disadvantage countries that will deploy smaller-scale renewable units (Appendix D).

## Investments

In terms of investments, on a per GDP basis, China is significantly ahead of other countries (Figure 5). It is followed by India and Vietnam, also well ahead of other high-income countries. Without adjusting for differences in financial capabilities, i.e. on a per capita basis only, Finland, Netherlands and Sweden are leading.

**Figure 5. Investments in renewables relative to the size of the economy.**



Regarding climate-related development finance, the calculation of a trendline over the last 5 years indicates that 17 countries out of the 23 advanced economies are increasing their financial support. Portugal, Türkiye, Poland, Russia and Spain have tended to decrease theirs, although from a relatively lower initial absolute amount. According to the OECD's data, the UK showed a significant reduction in its reported climate-related development aid in 2021, leading to a declining trendline over the assessed period.

## Selected highlights

- ◆ While **Japan**<sup>46</sup> ranks first in the Finance category based on equity-based metrics, Japan is continuously investing in fossil fuels and is one of the world's largest providers of public finance for fossil fuels. Japan is also investing in nuclear and other technologies such as co-firing with ammonia that will lock the country (and the countries it is investing in) in fossil-fuel based systems for many years.
- ◆ Looking at investments on a per GDP basis, **Argentina** ranks among the lowest EMDEs and signals for future investments are mixed: the country faces economic challenges, auctions for renewables were cancelled in previous years and the country is banking on nuclear power with the approval of the construction of a fourth nuclear power plant. At the same time, and according to data from IRENA, Argentina is one of the countries facing the highest costs of capital for wind and solar projects<sup>47</sup>. After the USA, the Latin American country is heavily embarking on exploring and potentially operationalising the second-largest emissions-intensive shale gas reserves in Vaca Muerta, in Patagonia<sup>48</sup>.
- ◆ **New Zealand** ranks at the very bottom of the *Finance* category, notably due to its low investments in renewables on a per GDP and per capita basis. In fact, New Zealand's renewable capacities have been stagnating, notably because of uncertainties regarding the closure of the Tiwai point aluminium smelter, which accounts for around 10% of the country's electricity demand<sup>49</sup>. In addition, the recently elected party plans to abandon the existing 100% renewable electricity target<sup>50</sup>. Despite having an already high share of renewables in electricity generation thanks to its hydropower capacities, the country needs to invest in new capacities to fully phase out fossil fuels as current capacities (less than 1 GW of wind capacity and almost no solar) are insufficient.

## Renewable capacities

**In terms of prospective capacities, Greece and Sweden are leading the charge on a per capita basis**, almost exclusively with wind and solar technologies (and even more with solar for Greece). Both countries are also in the top 10 when looking at the average new capacity installed per capita over the last three years.

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46. <https://fossilfreejapan.org/>

47. IRENA (2023) *The cost of financing for renewable power*.

48. *Fracking in Patagonia, The Guardian October 2023, 'Vaca Muerta was the future': Argentina goes all in on fracking*

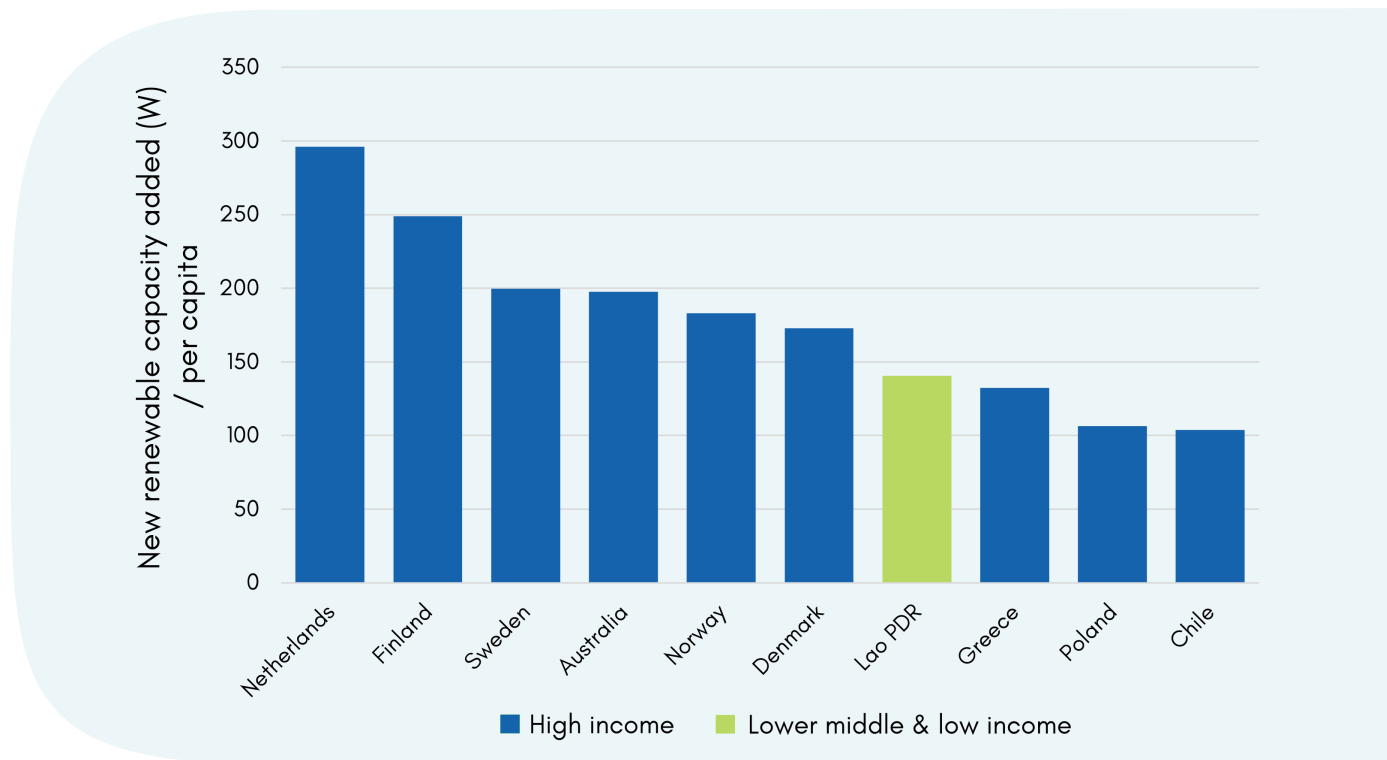
49. <https://www.odt.co.nz/business/smelter-key-renewable-energy-strategy>

50. <https://reneweconomy.com.au/new-nz-government-to-abandon-plans-for-zero-emissions-grid-by-2030/>

Outside of the four Nordic countries, the top 10 countries that added new capacities per capita include Netherlands, Australia, Greece, Poland, Laos and Chile:

- **Australia** and **Netherlands** respectively added close to 14 GW and 12 GW of solar capacities between 2019 and 2022, while also expanding their wind capacities, albeit at a lower pace.
- Solar capacities picked up in **Poland**, from less than 1 GW in 2018 to just over 11 GW in 2022, which lead to wind and solar accounting for 15% of electricity generation in 2022.
- **Laos** is the only country that increased its renewable capacities almost uniquely through hydropower but electricity generation from coal remained flat at around 10 TWh per year since 2017.
- Solar capacities picked up in **Chile** (+ 6 GW between 2019 and 2022), and estimated prospective capacities for wind and solar also send a positive signal, ranking Chile at the 8th place for this indicator. Chile has ambitious policies in place with a target of 70% renewable electricity by 2030 and a 100% renewable energy target in the transport sector.

**Figure 6. New renewable electricity-generating capacities added per capita over the last three years available.**



### **Box 5 | Beyond the Renewable Energy Tracker: Public investments from G20 countries in renewables.**

The Oil Change International (OCI) Public Finance for Energy database<sup>51</sup> compiles international public finance for energy from G20 export credit agencies, development finance institutions and multilateral development banks (MDBs).

Between 2019 and 2021, cumulative financial flows for renewable projects by G20 nations, excluding MDBs, represented only one third of financial flows for energy projects (including all projects that could be classified as renewables, fossil fuels or nuclear)<sup>52</sup>. Focusing on financial flows from advanced economies to EMDEs, the large majority (over 70%) of financial support for renewables is being provided as debt.

OCI's analyses highlight the need for governments to urgently switch public finance from fossil fuels projects into renewables and to enhance grant-based support for EMDEs rather than domestic support or support for other advanced economies. OCI's work also highlights the need for better transparency and reporting mechanisms by governments and DFIs, to avoid data gaps, hold governments accountable and ensure effective decision-making.



51. <https://energyfinance.org/#/>

52. On top of energy generation, this includes various sectors such as batteries, energy efficiency and hydrogen. Unlike in OCI's analyses, biofuels, biomass and large hydropower were all considered as renewables.

## Sustainable development

Although the deployment of renewables comes with many benefits e.g. in terms of energy security and resilience, health and air quality, lower dependence on imports of energy, community ownership<sup>53</sup>, avoided GHG emissions, those are not easily quantifiable and data is often lacking. Hence, in this first edition of the tracker, only the number of jobs in the renewable energy sector is considered for Advanced economies for the *Co-benefits* category. For EMDEs, two additional indicators are included: the share of the population with access to electricity and with access to clean cooking fuels and technologies.

With regards to the *Challenges* category, only the share of solid biofuels in primary energy supply is considered. This is also due to a lack of regularly monitored data at the country level on topics such as the respect of human, land and environmental rights, governance standards, participation of local communities, impacts of renewable projects on biodiversity and ecosystems, etc. Box 6 gives more insight on the issue of transition minerals for renewable energy technologies.

**Table 10. Top and bottom countries in Ambition categories.** Countries highlighted in green are in the top 5/10 in at least two categories. Numbers indicate the rank of each country within each category.

Co-benefits (Advanced)		Co-benefits (EMDEs)		Challenges	
Top 5	Bottom 5	Top 5	Bottom 5	Top 10	Bottom 10
1 Denmark	19 Italy	1 Croatia	30 Nigeria	1 Saudi Arabia	51 Cambodia
2 Sweden	20 Japan	2 Uruguay	31 Ethiopia	2 Algeria	52 Uruguay
3 Finland	21 New Zealand	3 Jordan	32 Uganda	3 UAE	53 Senegal
4 Germany	22 South Korea	4 Chile	33 Tanzania	4 Iraq	54 Kenya
5 Portugal	23 Russia	5 Colombia	34 Congo	5 Iran	55 Zambia
				6 Malaysia	56 Nigeria
				7 Russia	57 Tanzania
				8 South Korea	58 Ethiopia
				9 Jordan	59 Uganda
				10 Türkiye	60 Congo

53. See case studies and best practises in e.g. the [Community Energy Toolkit](#) (IRENA Coalition for Action, 2021)



**In terms of co-benefits in advanced economies, Denmark, Sweden and Finland are leading**, with Sweden benefiting from its employment in the biomass sector – a sector which has been under strong critics by civil societies and that can have negative impact on forests and carbon sinks<sup>54</sup>. In 2020, Germany and Denmark together accounted for over 55% of wind export<sup>55</sup>, making Germany the second country behind China in terms of wind employment.

For EMDEs, the presence of **countries from Sub-Saharan Africa (Nigeria, Ethiopia, Uganda, Senegal, Tanzania, Congo) among the underperformers in both the Co-benefits and Challenges categories underscore the difficulties that they face**: their heavy reliance on solid biofuels does not enable them to ensure access to electricity or clean cooking. For these countries, deploying modern renewables technologies like wind and solar technologies as well as highly efficient woodstoves and biogas is crucial to enhance access to clean cooking and energy for all.

Out of the 60 countries covered by the tracker, in 2021:

- 18 countries did not have a 100% access rate to electricity, with Congo, Tanzania, Zambia and Nigeria having an access rate lower than 50%.
- 35 countries did not have a 100% access rate to clean cooking, including 13 of them with a rate lower than 50%.

## Selected highlights

- ◆ **Jordan** is the only country that ranks among the top 10 in both the *Co-benefits* and *Challenges* categories. When looking at the number of jobs in renewables as a share of total workforce (instead of absolute numbers), Jordan ranks second, after Denmark. Jordan has increased its share of renewables in final energy consumption by almost 7% between 2015 and 2020 and barely relies on solid biofuels (around 1% of total primary energy supply), making it one of the leading countries in the Middle East and North Africa region.
- ◆ **Uruguay** is the only high-income country in the bottom 20% of the *Challenges* category, with a share of biofuels of about 40% of total primary energy supply. However, this is part of the national strategy for the production of biofuels, notably from wood waste products from the cellulose industry<sup>56</sup>.

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54. See e.g. FERN (2023), [Duped](#)

55. IRENA (2022). *Renewable energy and jobs*.

56. <https://www.trade.gov/country-commercial-guides/uruguay-renewable-energy-equipment>

### **Box 6 | Beyond the Renewable Energy Tracker: Tracking countries and companies' engagement for responsible mining of transition minerals.**

The increasing amount of minerals required for the energy transition poses several challenges in terms of environmental impacts, human rights, supply chains, etc., which are however hard to quantify and hence not included in the tracker.

The **IEA's Critical Minerals Policy Tracker**<sup>57</sup> assesses the existence of governments' policies that encourage "sustainable and responsible practices" with regards to five topics: environmental standards; transparency norms; due diligence obligations; inclusivity and gender policies; permitting regimes. Out of the 22 countries covered by the IEA, only one of them (the United States) is assessed as having at least one policy for each of these five topics, while Colombia, India and New Zealand are assessed as having no dedicated policy.

**The Business and Human Rights Resource Centre's Renewable Energy and Human Rights Benchmark**<sup>58</sup> assesses human rights policies and practises of 15 wind and solar power generation companies and investors. For its second year, companies' average score was 28% only, yet with an average increase of 6% compared to the previous edition. Both of these studies highlight the significant efforts that need to be made by governments and companies to ensure that the transition to renewables is just, fair and respectful of human, land and environmental rights.

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57. <https://www.iea.org/reports/critical-minerals-policy-tracker>

58. <https://www.business-humanrights.org/en/from-us/briefings/renewable-energy-human-rights-benchmark/>

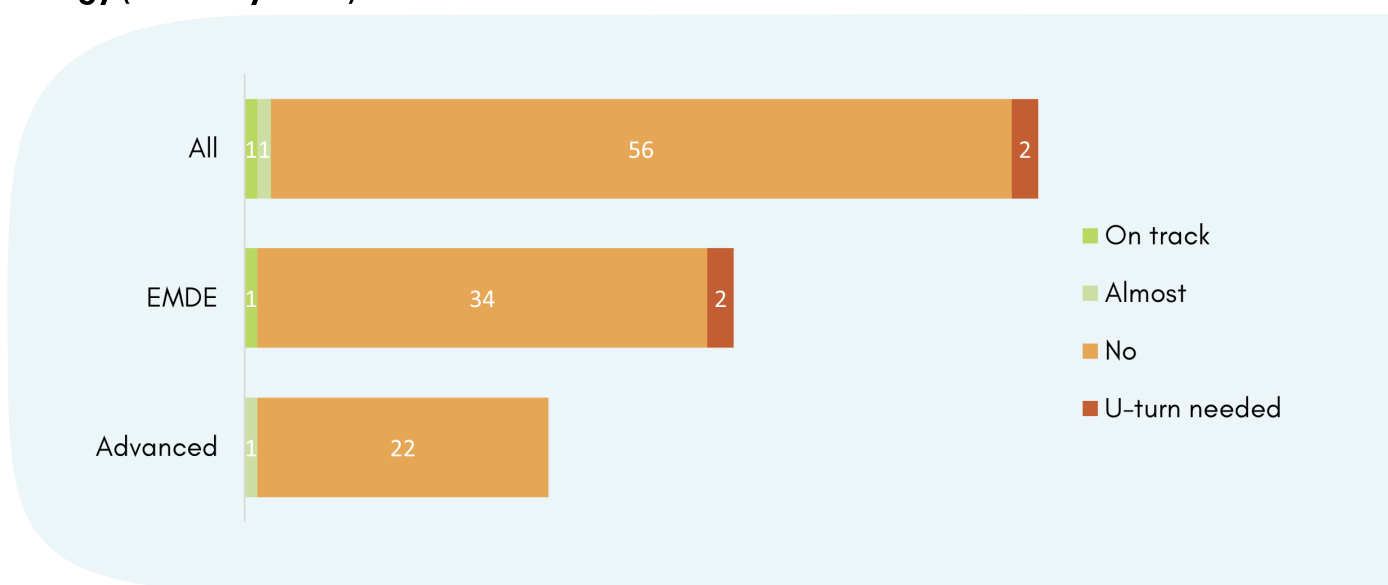
## FOCUS: ARE COUNTRIES ON TRACK TOWARDS 100% RE?

While there have been significant increases in the adoption of renewable electricity and energy sources in various regions, achieving the goal of 100% renewable energy presents significant challenges. This part of the RET looks at whether countries are up to speed to reach 100% renewable electricity by 2030 (for advanced economies) or 2040 (for EMDEs), as well as 100% economy-wide renewable energy by 2040 (for advanced economies) or 2050 (for EMDEs)<sup>59</sup>.

It compares the annual change in the share of renewables *observed* over the last four years available to the change *required* to reach 100% electricity/energy between the latest year available and the stated target years. The measure provides a sense of the required **pace** but does not fully reflect the scale of effort needed: as electrification is growing and so is energy consumption in many EMDEs, achieving a higher share of renewables requires progressively more effort. In other words, to increase the share of renewables by even one percentage point, a larger amount of renewable electricity/energy is required as time goes on.

Globally, **countries are not on track to reach 100% renewable energy systems and must considerably strengthen their efforts, especially outside of the power sector.**

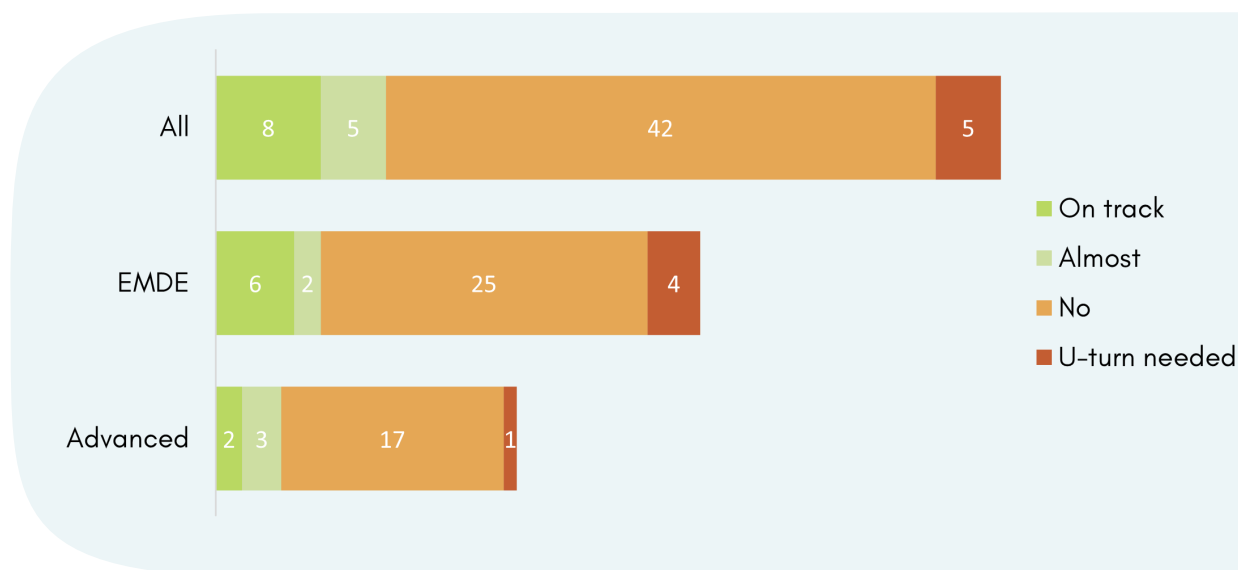
**Figure 7. Numbers of countries that are on track or not towards 100% renewable energy (economy-wide).**



59. See section *Methodology - Countries* for an explanation of the distinction between Advanced and Emerging and Developing Economies as well as Box 2 for an explanation of the benchmarks used.

While just over a fifth of all countries assessed are (almost) up to speed in the power sector, only 2 countries have increased their share of renewables in final energy consumption at a pace that, if maintained, would be sufficient or almost sufficient to reach 100% renewable energy systems by 2040 or 2050, as shown in Figures 7 and 8.

**Figure 8. Numbers of countries that are on track or not towards 100% renewable electricity.**



### In the power sector

- **8 countries are up to speed to reach 100% renewable electricity** by 2030 (advanced) or 2040 (EMDEs): Uganda, Norway, Zambia, Denmark, Kenya, Laos, Vietnam and Jordan. 5 countries are “almost there”: Sweden, Chile, New Zealand, Congo and Ecuador.
- **5 countries must reverse the latest trend** as their share of renewables in the power has declined over the last four years for which data is available: Cambodia, Uruguay, Croatia, Iran and Italy<sup>60</sup>.
- All other countries are heading in the right direction but must accelerate their efforts.

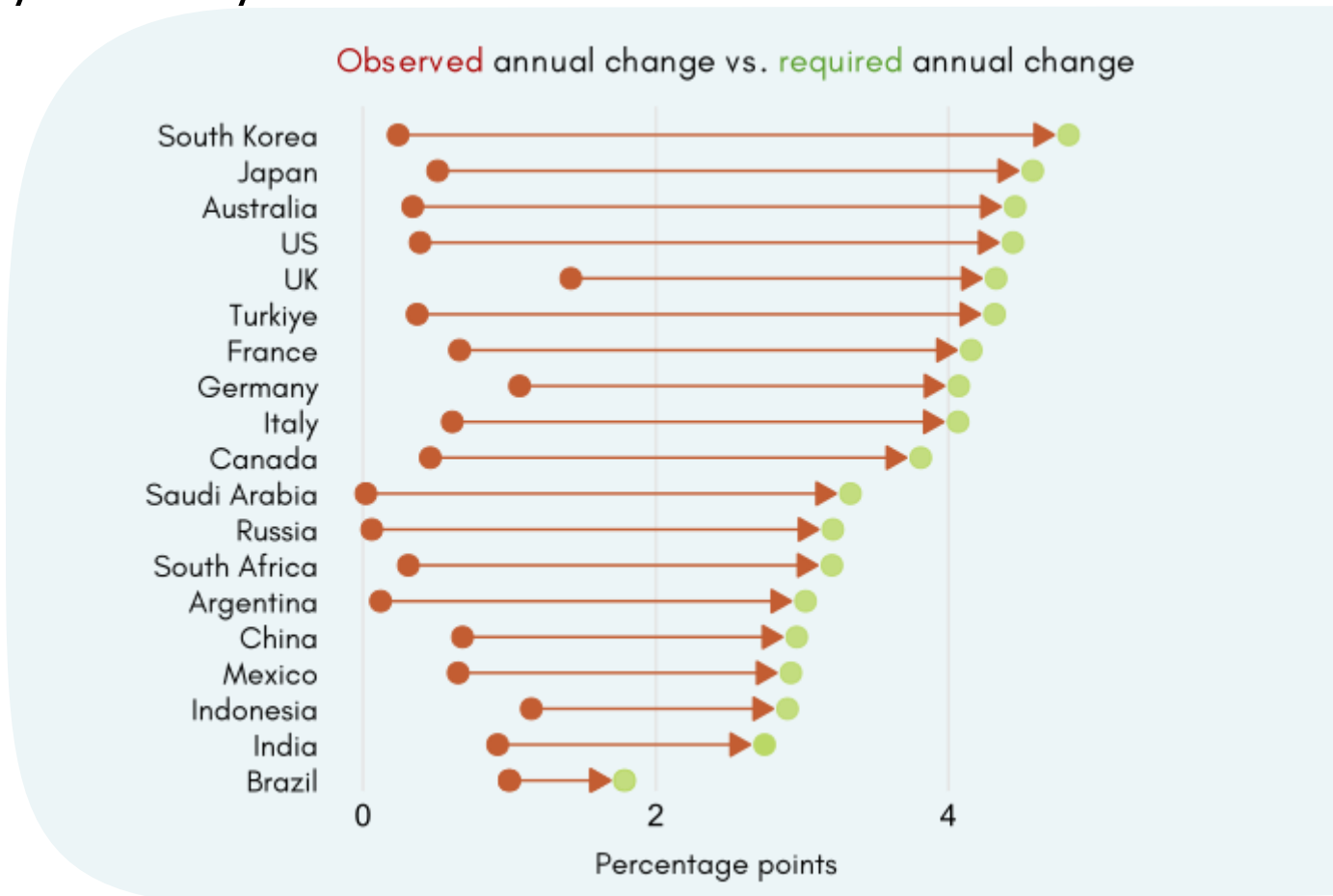
60. 3 other countries have seen their share of renewables declining over the last 3 years available, but at a very low rate (<0.5 percentage point per year): Pakistan, Philippines and Ethiopia.

### Economy-wide

- **2 countries only are (almost) up to speed to reach 100% renewable energy** by 2040 (advanced) or 2050 (EMDEs): Uganda and Sweden. However, Uganda does not yet have a 100% access rate to electricity and must considerably increase its energy generation to provide access to electricity to all. As for Sweden, they currently rely strongly on solid biofuels.
- **2 countries must reverse the latest trend** as their share of renewables in total final energy demand has declined over the last four years for which data is available: Vietnam and Congo<sup>61</sup>.

**None of the nations that are member of the G20** are up to speed to reach 100% renewables either in the power sector or economy-wide (see Figure 9)

**Figure 9. G20's assessment of progress towards 100% renewable energy systems economy-wide.**

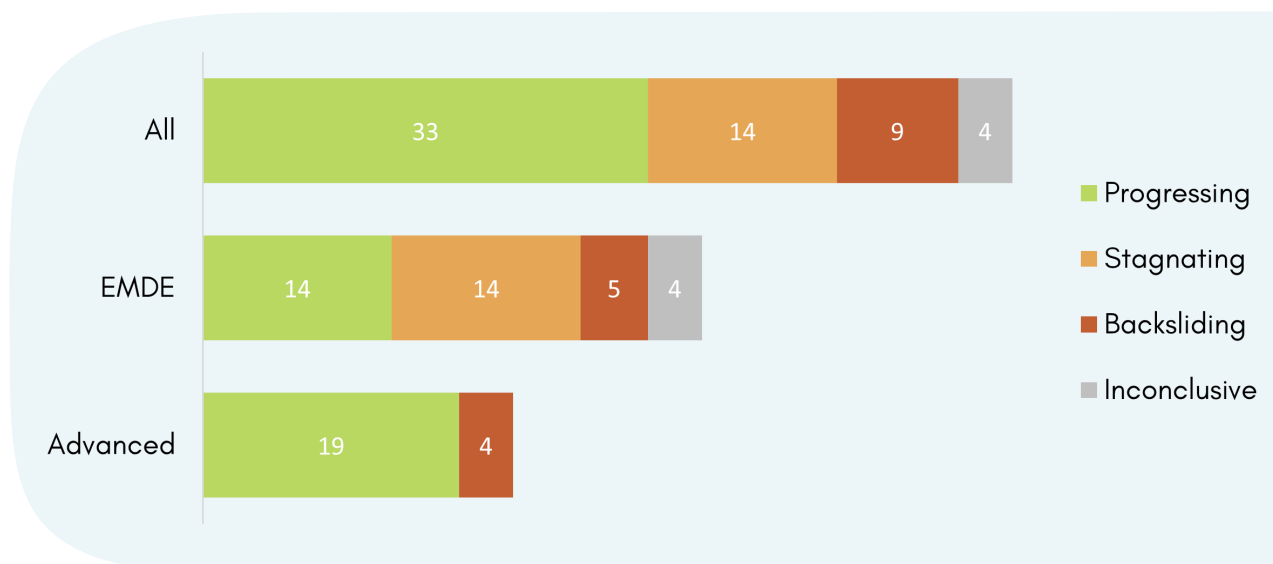


61. The share of renewables in final energy consumption declined in 6 other countries but at a very low rate (New Zealand, Zambia, Philippines, Tanzania, Nigeria and Bangladesh)

## FOCUS: ARE COUNTRIES PROGRESSING?

Looking at a subset of indicators only, we analyse whether countries are going in the right direction by comparing data over the last two years or periods of time available (see Appendix C for details). To acknowledge that year-on-year change may not reflect longer trends, countries are given some leeway and are considered as “progressing” if improvements are recorded across the *majority* of indicators instead of all indicators – therefore offering a snapshot of countries’ progress that errs on the optimistic rather than conservative side.

**Figure 10. Numbers of countries that are mostly progressing, stagnating or backsliding.**



**Just over half of the countries are mostly progressing across indicators**, while 14 are mostly stagnating and 9 are mostly backsliding.

However, **progress is unequal between advanced economies and EMDEs**: there are comparatively more advanced economies progressing (83%) than EMDEs (38%). The difference arises mainly because there are comparatively more EMDEs stagnating (38% vs 0%).

**The difference in progress between advanced economies and EMDEs is the largest when it comes to increasing the share of renewable in final energy consumption (economy-wide)**: over the last two years available, 83% of advanced economies have increased the share of renewable but 35% of EMDEs only.

The second largest difference is about the average capacity added over the last three years: about 75% of advanced economies have increased it over the last two periods of time available, compared to about 30% of EMDEs only.

Differences are also high for the share of wind and solar in electricity generation: while more than 80% of advanced economies have increased their share of wind and solar between the last two years available, less than 40% of EMDEs did so.

All countries that are mostly stagnating are EMDEs: Algeria, Congo, Bangladesh, Ecuador, Egypt, Iran, Iraq, Saudi Arabia, Ethiopia, Malaysia, Nigeria, Tanzania, UAE and Uganda.

The countries that are mostly backsliding include EMDEs (Mexico, Croatia, Zambia, Cambodia and Argentina) and Advanced economies (Norway, Spain, Switzerland, Russia). Norway's rating should however be nuanced by the fact its power sector runs on almost 100% renewable electricity (mainly hydro), which limits progress in terms of renewables share, per capita generation or investments.

## Selected highlights

- ◆ **Saudi Arabia** and the **UAE** are the only two high-income countries that are mostly stagnating.
- ◆ **Among advanced economies:** Denmark, Germany and UK are the two countries with the highest share of "progressing" indicators. Spain and Russia have the lowest share of "progressing" indicators and are among the countries with the highest share of "backsliding" indicators.
- ◆ **Among EMDEs:** India, China and Brazil have the highest share of "progressing" indicators, followed by Chile and Indonesia. Algeria and Congo have the lowest share of "progressing" indicators, and Algeria is the only country with no "progressing" indicators. Mexico, Cambodia, Croatia and Zambia have the highest share of "backsliding" indicators.

## CONCLUSION

The climate crisis is unfolding at unprecedented rates, fuelled by coal, oil and gas, the production and consumption of which is responsible for 75% of global GHG emissions. Yet, evidence is piling up that the world is far off track and needs to take the bull by the horns to speed up the transition out of fossil fuels in a just and equitable way<sup>62</sup>. Current Nationally Determined Contributions are far below what is needed, putting us on track to decrease GHG emissions by 9% in 2030 compared to 2010, whereas a reduction of 43% is deemed necessary<sup>63</sup>; governments are planning to produce twice as much fossil fuels in 2030 than what is needed to stay within the limits of the Paris Agreement<sup>64</sup>.

Fortunately, the technologies to reduce emissions, notably in the energy sector, are readily available and can be developed rapidly and at scale all across the world, through OECD countries providing adequate financial support to other countries.

**Wind and solar power must drastically increase and so must electrification of all end-use sectors.**

However, our analysis shows that **countries are way off track and must accelerate the transition to achieve 100% renewable energy systems** by their respective and equitable target years at the latest. While a number of emerging and developing countries are doing comparatively well relative to their capabilities, too **many advanced economies are not living up to their responsibilities and capabilities**.

Our analysis also shows an overall lack of consistency: progress must happen in the power sector and across all sectors, while striving to deliver positive benefits for people, including universal access to electricity and clean cooking fuels and technology, minimising negative impacts on environments and taking into account climate-related risks. Too many *frontrunners* are depending on solid biofuels or hydropower, putting their progress and nature at risk.

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62. Systems Change Lab (2023). [State of Climate Action](#).

63. UNFCCC (2023). [NDC Synthesis Report](#).

64. UNEP (2023). [Production Gap Report 2023](#).



## Recommendations

*See detailed recommendations in the Summary*

- Developed nations should commit to and achieve 100% renewable energy systems by 2040 and other countries by 2050 at the latest.
- Governments should commit to more than tripling renewable electricity capacity and doubling energy efficiency improvements by 2030 as well as phasing out fossil fuel in a just and equitable way.
- These global targets should be translated into fair and equitable national targets and monitored scientifically, through an inclusive and transparent multi-stakeholder approach.
- National targets, NDCs and regulations should be strengthened to ease and accelerate the roll out of renewables in the power sector and all end-use sectors by addressing regulatory issues, infrastructure and supply-chain bottlenecks.
- Governments should commit to significantly enhanced grant and non-debt creating finance from developed countries to developing countries and deliver these commitments urgently and consistently.
- Through national plans, policies, standards, certifications and due diligence procedures, governments and corporations should commit to a rapid, just and equitable and transition to renewables that that puts people and nature first.
- Governments and international organisations should ensure the availability of up-to-date and transparent data for all things renewables to allow for a accurate and equitable assessment of countries.

## APPENDIX

### A. Wind and solar as key renewable sources

In this report, renewables include wind, solar, hydro, geothermal, bioenergy and other renewables such as tidal and wave generation. This is in accordance with international classification such as that of the IEA, IRENA and the IPCC.

However, it must be noted that some renewable technologies can have a significant negative impact on the environment and on health, such as **bioenergy**. This is for example the case of biomass in the form of harvested wood for large scale electricity and heat production, but also charcoal and agricultural residues that are used for traditional purposes such as cooking and heating in rural areas in developing countries. The traditional use of biomass has a large impact on health and indoor cooking causes about 4 million premature deaths annually. Other issues related to bioenergy include competition over crops for biofuels production vs food production, the amount of water required for certain biofuels (e.g. corn-based ethanol), release of soot-like particles when burning wood, etc. This is why the share of solid biofuels in primary energy supply is used as a “challenge” in the *Sustainable Development* area, to reward countries that have a limited dependence on solid biofuels.

**Hydropower** is renewable energy but not always included in national renewable energy targets by some governments or only below a certain capacity threshold. Large hydropower can have negative impacts on the environment as hydropower reservoirs can be a source of GHG emissions when biomass-rich ecosystems are flooded. Resettlement of local population for creation of the water reservoir is often connected to significant human rights violations. Hydropower plants, large or small, also affect river flows, freshwater fish stocks and freshwater biodiversity<sup>65</sup>. A report by WWF notes that in Europe for example, “small hydropower plants come with a large ecological impact because they are numerous and disrupt river continuity, whilst contributing minimally to electricity production”<sup>66</sup>. However, there are also many hydropower plants globally that comply with sustainability requirements, free of GHG emissions, pollution or waste production. Also, the global energy transition towards the growing share of variable weather-dependent solar and wind power requires increasingly electricity storage for which “pumped hydro” will play a fundamental role. Yet, the diversity of hydropower projects, management practices and countries’ hydro profiles makes it difficult to rank

65. WWF (2022). [Insuring a nature-positive world](#).

66. WWF (2019). [Hydropower pressure on European rivers](#).

countries based on their share of electricity produced from small/large hydropower and it was therefore decided not to include it in the *Sustainable Development* area.

**CAN calls for significant scaling up of renewable energy through wind and solar technologies mainly<sup>67</sup>**, because of their high mitigation potential, low freshwater demand, cost-effectiveness compared to other mitigation options, no solid, gaseous waste and other pollution, while pushing for governments and industry to deploy wind and solar in a just and equitable way that minimises negative impacts on people and nature<sup>68</sup>.

## B. Notes on Methodology

### Selection of countries

The countries were chosen to ensure a comprehensive coverage in terms of geographics, economics (26 countries with “high” income, 14 with “upper-middle” income and 20 with “low” or “lower-middle” income) and politics (all G20 and BRICS nations are included, but not the European Union as a whole). Some countries were included on an ad-hoc basis after screening for relatively good performance across several indicators or based on experts’ suggestions through a survey.

### Scope

The RET does not include data related to specific sectors (heating and cooling, transport, industry and buildings), infrastructure (grids and storage), energy efficiency, or the phasing out of fossil fuels. Although improvements across all these areas must occur alongside the development of renewables, covering all of them at once could overly complicate country comparisons. Moreover, comprehensive data at the country level is not consistently available for all these aspects. Future editions of the RET might include additional areas or sectors depending on data availability.

### Choice of indicators

The indicators included in the assessment were selected in a participatory manner through exchanges and discussions within and outside CAN as well as through a survey with a range of experts. Only quantitative indicators from public sources and with authorization from the respective organisations were included, provided that they cover the large majority of countries included in the tracker.

67. CAN (2023). [\*Global targets for clean renewables and energy efficiency must stand alongside fossil fuel phase out.\*](#)

68. CAN (2023). [\*The transition to 100% RE must be just, equitable and rapid.\*](#)

## C. Methodology for the Progress assessment

Not all indicators used for the comparison of countries (Focus: which countries are leading?) are used for to assess countries' progress (Focus: are countries making progress?) as some indicators were designed to allow for a fair comparison of countries ("per unit of GDP") but are less relevant for tracking progress of a specific country over time. Some indicators were also excluded because data was not available for two consecutive years (number of jobs in the renewable industry; prospective renewable capacities until 2030).

To assess countries' progress, the difference between two different years (or time periods) is calculated either in absolute terms (mathematical difference) or in relative terms (percentage growth). In addition, thresholds are used for each indicator: the country is "progressing" if the difference is above the upper threshold; it is "backsliding" if the difference is below the lower threshold; it is "stagnating" if the difference is between the lower and upper threshold.

In addition, in order to deal with the case of countries with insignificant levels of renewable energy or electricity (i.e. very close to 0), an additional threshold was added, whereby countries can only be considered as progressing if they have a minimum amount of renewable energy/electricity.

The table below indicates which indicators are included for the assessment of countries' progress, the time periods considered, the method to calculate the difference (relative vs absolute) and the thresholds used.

**Table A.1. Methodology overview for the Trend assessment**

Category	Indicator	Period	Method	Thresholds <sup>70</sup>	
				Lower	Upper
Economy-wide	Renewable energy consumption per capita	2020 vs 2019	Rel	-2%	+2%
	Share of renewables in final energy consumption	2020 vs 2019	Abs	-0.5pp	+0.5pp
Power	Renewable electricity generation per capita	2022 vs 2021 when available. 2021 vs 2020 otherwise.	Rel	-2%	+2%
	Share of renewables in total electricity generation	2022 vs 2021 when available. 2021 vs 2020 otherwise.	Abs	-0.5pp	+0.5pp
	Share of wind and solar in total electricity generation	2022 vs 2021 when available. 2021 vs 2020 otherwise.	Abs	-0.5pp	+0.5pp
Ramping up RE	Average new renewable capacity per capita over last 3 years available	2019-2022 vs 2018-2021 when available. 2018-2021 vs 2017-2020 otherwise.	Rel	-2%	+2%
Scaling up Finance	Investment in renewable per capita	Avg 2020-2021 vs Avg 2019-2020.	Abs	-2%	+2%
	Growth in climate-related development finance	Cumulative 2018-2019 vs cumulative 2020-2021	Rel	-2%	+2%
Co benefits	Share of population with access to electricity	2021 vs 2020	Abs	-0.5pp	+0.5pp
	Share of population with access to clean cooking	2021 vs 2020	Abs	-0.5pp	+0.5pp
Challenges	Share of solid biofuels in TPES	2021 vs 2020 when available, 2020 vs 2019 otherwise	Abs	-0.5pp	+0.5pp

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70. pp: percentage points

## D. Indicators: sources, definition and scope

### Socio-demographics metrics

- **Population.** World Bank (indicator [SP.POP.TOTL](#)).
- **Gross Domestic Product (GDP):** World Bank (indicator [NY.GDP.PCAP.CD](#)). GDP per capita (current US\$) is used for all “per unit of GDP per capita” indicators.

### Data on renewables

#### Indicators:

- **renewable electricity generation (Wh per unit of GDP; Wh per capita);**
- **share of renewables in electricity generation (%);**
- **increase in share of renewables in electricity generation (percentage point)**
- **share of wind and solar in total electricity generation (%)**

<b>Source</b>	EMBER Dataset: <a href="https://ember-climate.org/data-catalogue/yearly-electricity-data/">https://ember-climate.org/data-catalogue/yearly-electricity-data/</a> Last retrieved on 2023-10-09.
<b>Year</b>	2022 data whenever available. 2021 data is used for Algeria, Cambodia, Congo (DRC), Ethiopia, Iraq, Jordan, Laos, Morocco, Senegal, Tanzania, Uganda, UAE, Zambia.
<b>Scope</b>	Renewables include wind, solar, hydro (excluding contribution from pumped hydro production where possible), bioenergy, and other renewables (geothermal, tidal and wave generation). See details on methodology and data here: <a href="https://ember-climate.org/app/uploads/2022/07/Ember-Electricity-Data-Methodology.pdf">https://ember-climate.org/app/uploads/2022/07/Ember-Electricity-Data-Methodology.pdf</a>

**Indicator: Average new renewable capacity added over the last three years (W)**

<b>Source</b>	EMBER Dataset: <a href="https://ember-climate.org/data-catalogue/yearly-electricity-data/">https://ember-climate.org/data-catalogue/yearly-electricity-data/</a> . Last retrieved on 2023-10-09.
<b>Year</b>	2019–2022 data whenever available. 2018–2021 data is used for Algeria, Cambodia, Congo (DRC), Ethiopia, Iraq, Jordan, Laos, Morocco, Senegal, Tanzania, Uganda, UAE, Zambia.
<b>Scope</b>	Renewables include wind, solar, hydro (excluding contribution from pumped hydro production where possible), bioenergy, and other renewables (geothermal, tidal and wave generation). See details on data here: <a href="https://ember-climate.org/app/uploads/2022/07/Ember-Electricity-Data-Methodology.pdf">https://ember-climate.org/app/uploads/2022/07/Ember-Electricity-Data-Methodology.pdf</a>

**Indicators:**

- **renewables in final energy consumption (J per unit of GDP; J per capita);**
- **share of renewables in final energy consumption (%)**
- **increase in share of renewables in final energy consumption (percentage point)**

<b>Source</b>	IEA, with authorization (License: CC BY 4.0) <i>IEA (2023) Tracking SDG7: The Energy Progress Report, 2023</i> , IEA, Paris <a href="https://www.iea.org/reports/tracking-sdg7-the-energy-progress-report-2023">https://www.iea.org/reports/tracking-sdg7-the-energy-progress-report-2023</a> <a href="https://trackingsdg7.esmap.org/downloads">https://trackingsdg7.esmap.org/downloads</a>
<b>Year</b>	2020 for all countries.
<b>Scope</b>	Renewable energy sources include renewable energy from hydropower, wind, solar photovoltaic, solar thermal, geothermal, tide/wave/ocean, renewable municipal waste, solid biofuels, liquid biofuels, and biogases.  Renewable energy excludes traditional use of biomass, which is estimated based on “the residential consumption of primary solid biofuels and charcoal in non-OECD countries”.

**Indicator: prospective capacity until 2030 (W per capita)**

<b>Source</b>	Global Energy Monitor (GEM), with authorization. Data comes from GEM's trackers on <a href="#">Solar Power</a> (last updated in May 2023), <a href="#">Wind Power</a> (last updated in May 2023), <a href="#">Hydropower</a> (last updated in May 2023), <a href="#">Geothermal power</a> (last updated in July 2023) and <a href="#">Bioenergy Power</a> (last updated in January 2023).  To derive the per capita metric, population in 2022 is used.
<b>Year</b>	Start year between 2023 and 2030 or unknown
<b>Scope</b>	GEM provides data for prospective capacities for wind, solar, hydro, geothermal and bioenergy. GEM's data focuses on power station units over a certain capacity threshold, although projects below the threshold are included for some countries: 30 MW for bioenergy plants and geothermal plants; 10 MW for wind projects (including for captive industry such as hydrogen production); 20 MW for solar projects except for MENA countries where the coverage is for all project phases larger than 10 MW; 75 MW for hydropower projects. GEM estimates that using these capacity thresholds, around 40% of the total operating capacity worldwide is captured for Solar power; around 80% for geothermal power; close to 90% for Wind power and just above 80% for hydropower.  The RET's indicators are the sum of all projects' capacities that are in the "pre-construction" or "construction" phase, and that are meant to be operational by 2030 latest, or at an unknown year. Projects flagged as "announced" only are not included.

**Indicators:**

- **Investments per capita (USD per capita)**
- **Investments per unit of GDP per capita (USD per capita)**

<b>Source</b>	Climatescope by BloombergNEF, with authorization. <a href="https://www.global-climatescope.org/">https://www.global-climatescope.org/</a> Last retrieved in September 2023.
<b>Year</b>	Average of 2020 and 2021 data.
<b>Scope</b>	Data covers all investments (asset finance) in renewables, from international and domestic sources as well as public and private sources. Data is not available for two countries: Iran and Congo (DRC). Data was substituted with public investments in renewables from <a href="#">IRENA's database</a> .



**Indicator: annual change in climate-related development finance**

<b>Source</b>	OECD, with authorization. Indicator: Climate-related development finance at the activity level (provider perspective). <a href="https://oe.cd/development-climate">https://oe.cd/development-climate</a> . Dataset last updated on 20/04/2023.
<b>Year</b>	2017–2021
<b>Scope</b>	<p>This indicator covers climate-related development finance from bilateral sources from members of the Development Assistance Committee (DAC) and non-DAC members.</p> <p>It includes financial bilateral activities targeting climate change objectives as well as the climate share of core contributions to international organizations, on a commitment basis (in opposition to disbursement basis). It includes Official Development Aid as well as Other Official Flows and officially supported export credits, but does not include mobilized private finance. See details on methodology here: <a href="https://www.oecd.org/dac/financing-sustainable-development/development-finance-data/METHODOLOGICAL_NOTE.pdf">https://www.oecd.org/dac/financing-sustainable-development/development-finance-data/METHODOLOGICAL_NOTE.pdf</a></p> <p>Activities relate to adaptation and/or mitigation across a large variety of sectors (education, health, transport, energy, agriculture). Development aid for the energy sector includes renewable and non-renewable sub-sectors as well as investments in grids and energy efficiency.</p>

**Indicator: Share of solid biofuels in total primary energy supply (%)**

<b>Source</b>	OECD Indicator: Renewable Energy ( <a href="https://data.oecd.org/energy/renewable-energy.htm">https://data.oecd.org/energy/renewable-energy.htm</a> )
<b>Year</b>	2021 whenever available. 2020 data is used for the following countries: Algeria, Bangladesh, Cambodia, China, Congo, Croatia, Ecuador, Egypt, Ethiopia, India, Indonesia, Iran, Iraq, Jordan, Kenya, Laos, Malaysia, Morocco, Nigeria, Pakistan, Philippines, Saudi Arabia, Senegal, Serbia, South Africa, Tanzania, Thailand, UAE, Uganda, Uruguay, Vietnam, Zambia.
<b>Scope</b>	Biofuels are defined as “fuels derived directly or indirectly from biomass (material obtained from living or recently living organisms). This includes wood, vegetal waste (including wood waste and crops used for energy production), ethanol, animal materials/wastes and sulphite lyes”

**Indicators:**

- **Share of population with access to electricity (%)**
- **Share of population with access to clean cooking fuels and technologies (%)**

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<b>Source</b>	World Bank Indicators: <a href="#">EG.ELC.ACCS.ZS</a> and <a href="#">EG.CFT.ACCS.ZS</a>
<b>Year</b>	2021
<b>Scope</b>	The first indicator is the same as SDG7.1. It measures whether or not a household has access to electricity but does not provide information on other aspects such as “the type of electricity supply (grid or off-grid), the capacity of electricity supply provided (in Watts), the duration of service (daily hours and evening hours), the reliability of service (in terms of number and length of unplanned service interruptions), the quality of service (in terms of voltage fluctuations), as well as affordability and legality of service”. The second indicator (access to clean cooking fuels and technologies) includes non-renewable fuels such as natural gas and liquefied petroleum gas (LPG) as well as electricity (renewable or not), biogas and solar.

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**Indicator: jobs in renewable energy sector as a share of total labor force (%)**


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<b>Source</b>	For renewable employment data: IRENA ( <a href="https://www.irena.org/Data/View-data-by-topic/Benefits/Renewable-Energy-Employment-by-Country">https://www.irena.org/Data/View-data-by-topic/Benefits/Renewable-Energy-Employment-by-Country</a> ) Last retrieved on September 2023 (country-level data for 2022 not yet available) For workforce: World Bank. Indicator: <a href="#">SL.TLF.TOTL.IN</a>
<b>Year</b>	2021
<b>Scope</b>	Data are estimates only, based on IRENA’s evolving methodology and various governmental, industrial and non-governmental sources. It does not systematically include direct and indirect jobs for all technologies and all countries. For example, in the latest Annual Review, “the data for hydropower include direct employment only, whereas data for other technologies include both direct and indirect employment wherever possible”. Data can be based on e.g. surveys or model calculations and methodology and accuracy can therefore differ between countries.  Data is not available for four countries (Laos, Iraq and Saudi Arabia) and not substituted.

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72. <https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-01.pdf>

73. <https://www.who.int/tools/clean-household-energy-solutions-toolkit/module-7-defining-clean>

74. [https://www.oecd-ilibrary.org/energy/renewable-energy/indicator/english\\_aac7c3f1-en](https://www.oecd-ilibrary.org/energy/renewable-energy/indicator/english_aac7c3f1-en)

## E. Detailed rankings

**Table B.1. Detailed rankings.**

Top 20% Bottom 20%

Country	Group	Economy-wide	Power	Ramping up RE	100% RE	Challenges	Finance Advanced	Co-benefits Advanced	Finance EMDE	Co-benefits EMDE
Australia	Advanced	Orange	Dark Green	Dark Green	Dark Red	Light Green	Light Yellow	Light Yellow		
Austria	Advanced	Light Green	Light Yellow	Light Green	Light Yellow	Orange	Dark Red	Light Green		
Canada	Advanced	Dark Green	Light Green	Light Yellow	Orange	Light Green	Orange	Orange		
Denmark	Advanced	Dark Green	Dark Green	Dark Green	Dark Green	Orange	Orange	Dark Green		
Finland	Advanced	Dark Green	Light Green	Dark Green	Light Green	Orange	Light Green	Dark Green		
France	Advanced	Light Green	Light Green	Light Yellow	Dark Red	Light Yellow	Dark Green	Orange		
Germany	Advanced	Dark Green	Dark Green	Light Green	Orange	Light Yellow	Light Green	Dark Green		
Greece	Advanced	Light Yellow	Dark Green	Dark Green	Orange	Light Green	Orange	Light Yellow		
Italy	Advanced	Light Green	Light Yellow	Light Green	Dark Red	Light Yellow	Dark Red	Dark Red		
Japan	Advanced	Light Yellow	Light Green	Light Green	Dark Red	Dark Green	Dark Green	Dark Red		
Netherlands	Advanced	Light Yellow	Dark Green	Dark Green	Light Yellow	Light Green	Dark Green	Light Yellow		
New Zealand	Advanced	Orange	Light Yellow	Light Yellow	Orange	Light Green	Dark Red	Dark Red		
Norway	Advanced	Dark Green	Light Yellow	Dark Green	Dark Green	Light Green	Orange	Light Green		
Poland	Advanced	Dark Green	Light Green	Light Green	Orange	Light Yellow	Light Yellow	Light Green		
Portugal	Advanced	Dark Green	Dark Green	Light Green	Light Green	Light Yellow	Dark Red	Light Green		
Russia	Advanced	Orange	Orange	Orange	Orange	Dark Green	Orange	Dark Red		
South Korea	Advanced	Dark Red	Orange	Dark Green	Dark Red	Dark Green	Light Green	Dark Red		
Spain	Advanced	Light Green	Dark Green	Dark Green	Dark Red	Light Green	Light Green	Light Yellow		
Sweden	Advanced	Dark Green	Light Green	Dark Green	Dark Green	Orange	Light Yellow	Dark Green		
Switzerland	Advanced	Light Yellow	Orange	Light Yellow	Orange	Light Yellow	Dark Red	Orange		
Turkiye	Advanced	Light Yellow	Light Green	Light Yellow	Dark Red	Dark Green	Light Yellow	Orange		
UK	Advanced	Light Yellow	Dark Green	Light Green	Orange	Light Yellow	Light Green	Orange		
US	Advanced	Light Green	Dark Green	Light Green	Dark Red	Dark Green	Dark Green	Light Green		



Country	Group	Economy-wide	Power	Ramping up RE	100% RE	Challenges	Finance Advanced	Co-benefits Advanced	Finance EMDE	Co-benefits EMDE
Algeria	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%			Bottom 20%	Bottom 20%
Argentina	EMDE	Bottom 20%	Top 20%	Bottom 20%	Bottom 20%	Top 20%			Bottom 20%	Top 20%
Bangladesh	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%			Bottom 20%	Bottom 20%
Brazil	EMDE	Top 20%	Top 20%	Top 20%	Top 20%	Bottom 20%			Top 20%	Top 20%
Cambodia	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%			Bottom 20%	Bottom 20%
Chile	EMDE	Top 20%	Top 20%	Top 20%	Top 20%	Bottom 20%			Top 20%	Top 20%
China	EMDE	Top 20%	Top 20%	Top 20%	Top 20%	Top 20%			Top 20%	Top 20%
Colombia	EMDE	Top 20%	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%			Top 20%	Top 20%
Congo, Dem. Re	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%			Bottom 20%	Bottom 20%
Croatia	EMDE	Bottom 20%	Bottom 20%	Top 20%	Top 20%	Bottom 20%			Bottom 20%	Top 20%
Ecuador	EMDE	Top 20%	Bottom 20%	Bottom 20%	Top 20%	Top 20%			Bottom 20%	Bottom 20%
Egypt	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%			Bottom 20%	Bottom 20%
Ethiopia	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%			Top 20%	Bottom 20%
India	EMDE	Top 20%	Top 20%	Bottom 20%	Top 20%	Bottom 20%			Top 20%	Bottom 20%
Indonesia	EMDE	Top 20%	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%			Bottom 20%	Bottom 20%
Iran	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%			Bottom 20%	Top 20%
Iraq	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%			Bottom 20%	
Jordan	EMDE	Bottom 20%	Top 20%	Bottom 20%	Top 20%	Top 20%			Bottom 20%	Top 20%
Kenya	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%			Bottom 20%	Bottom 20%
Lao PDR	EMDE	Bottom 20%	Bottom 20%	Top 20%	Top 20%	Bottom 20%			Top 20%	
Malaysia	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%			Top 20%	Top 20%
Mexico	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%	Top 20%			Top 20%	Bottom 20%
Morocco	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%			Bottom 20%	Top 20%
Nigeria	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%			Bottom 20%	Bottom 20%
Pakistan	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%			Bottom 20%	Bottom 20%
Philippines	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%			Top 20%	Bottom 20%
Saudi Arabia	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%			Bottom 20%	
Senegal	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%			Bottom 20%	Bottom 20%
Serbia	EMDE	Top 20%	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%			Top 20%	Bottom 20%
South Africa	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%			Bottom 20%	Bottom 20%
Tanzania	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%			Bottom 20%	Bottom 20%
Thailand	EMDE	Top 20%	Bottom 20%	Bottom 20%	Bottom 20%	Bottom 20%			Bottom 20%	Top 20%
UAE	EMDE	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%	Top 20%			Top 20%	Top 20%
Uganda	EMDE	Top 20%	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%			Bottom 20%	Bottom 20%
Uruguay	EMDE	Top 20%	Top 20%	Bottom 20%	Top 20%	Bottom 20%			Bottom 20%	Top 20%
Vietnam	EMDE	Bottom 20%	Top 20%	Top 20%	Bottom 20%	Bottom 20%			Top 20%	Bottom 20%
Zambia	EMDE	Bottom 20%	Bottom 20%	Bottom 20%	Top 20%	Bottom 20%			Bottom 20%	Bottom 20%



Platform of Action for Renewable Energy  
[www.climatenetwork.org/our-work/renewable-energy/](http://www.climatenetwork.org/our-work/renewable-energy/)

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PLATFORM OF ACTION  
FOR RENEWABLE ENERGY



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