



# The Energy Transition and the Global South

A More Attractive Energy Future for All

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# Summary

## The Energy Transition Narrative

- The energy transition is a technology revolution with enormous wealth-generating and redistributive potential, not a burdensome cost to share.
- This new reality fundamentally changes the logic of international climate politics: mitigating climate is no longer a zero-sum free-rider problem; it is a positive sum game of reinforcing action, competition, and co-operation.

## The Energy Transition in the Global South

- The Global South, particularly Africa, needs energy to develop. Crucially, people need to get energy as fast and cheaply as possible. It is simply a question of what technology does this best.
- Renewables, compared to fossil fuels, are more available, more quickly, at lower cost, and are most competitive in sunny regions.
- Cost. Renewables are cheaper than fossil fuels in the Global South. And getting cheaper every year.
- Speed. Renewables are far faster to deploy than fossil fuels. And solar is the fastest growing energy technology in history.
- Availability. Africa for example has 39% of the global solar and wind resource and 4% of fossil fuel reserves. India's and China's renewable resource is 33 and 22 times their respective energy demands.

- Between renewables and fossils: one has a future of spectacular growth, the other is already in decline. One is a technology, the other is a commodity. One is distributed throughout the world, the other is highly concentrated, favoring the few, not the many. There is no debate about which energy choice will have greater social and economic benefits.
- Embracing fossil fuels at the end of the fossil fuel era is like embracing canals or landline phones. It is too late.

## Finance and the Global South

- Private capital is available. The priority is to create the policies and investing environment for large flows of private capital to go to Africa and other low energy per capita countries in the Global South. And the international community can support this.
- It is also the time for development capital to catch up to the realities of which technologies serve development the best. Multilateral development banks (MDBs) need to retool and redirect capital to speed up the renewable era.
- The transition is complex. Everywhere is different, and we seek in this piece simply to summarise the opportunity. Recent reports from the [ETC, Finance for Climate Action](#), the [African Climate Foundation](#), or [BNEF](#) examine the issues in more detail.
- Sovereignty and costs remain key. There will be a wide variety of energy solutions which are country dependent.

1. The Energy Transition Narrative: An Overview

2. The Energy Transition and the Global South

3. Supporting Rapid Energy Growth in the Global South

# 1

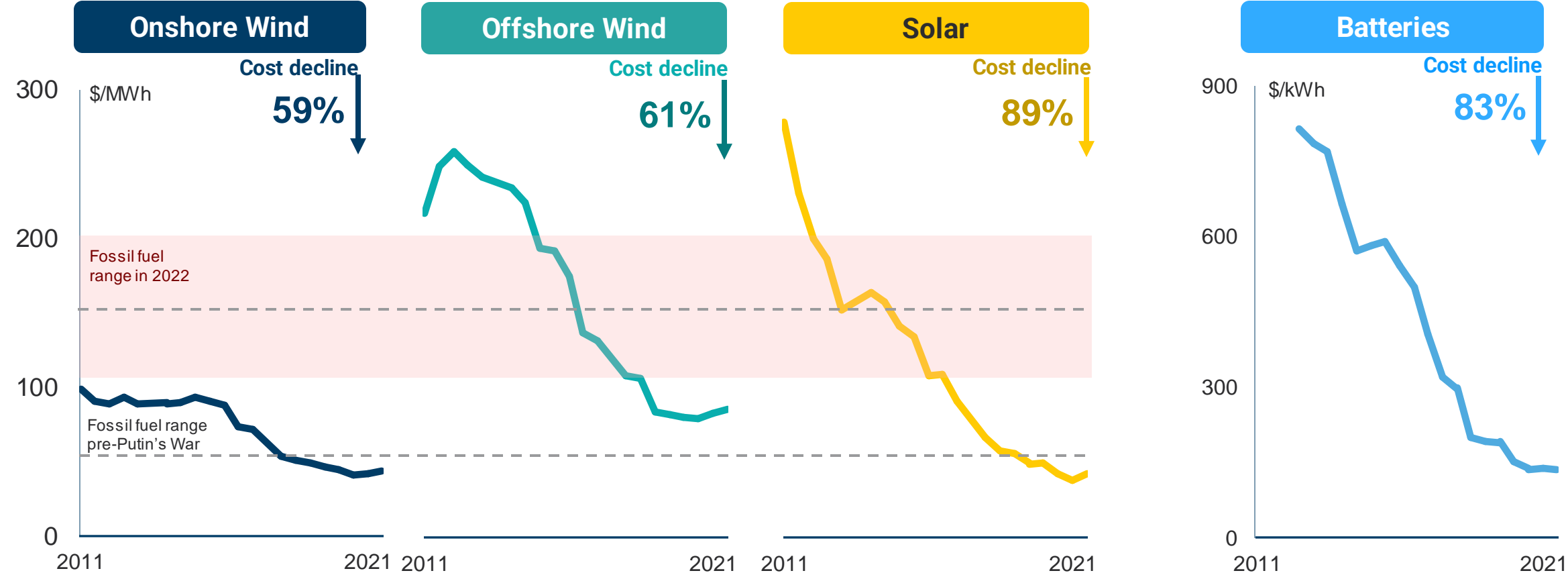
## The Energy Transition Narrative: An Overview

- Solar is the cheapest and fastest growing energy source in history
- Electricity is the dominant energy carrier
- Gain not pain changes the international climate politics



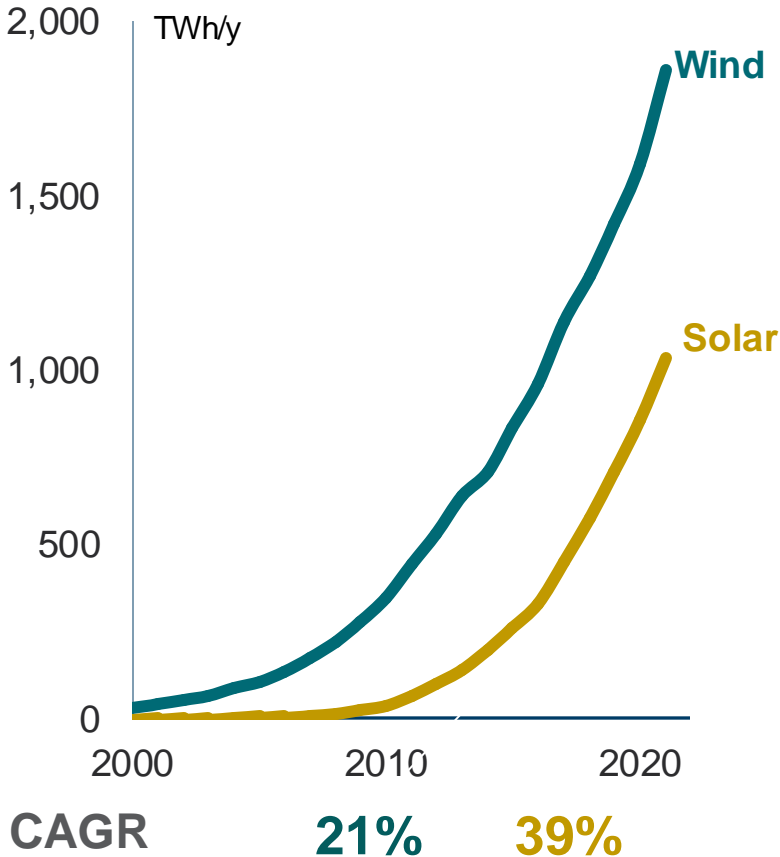
# We are in the middle of an energy technology cost revolution

The cost of new energy technologies has fallen by 60%–90% in 10 years

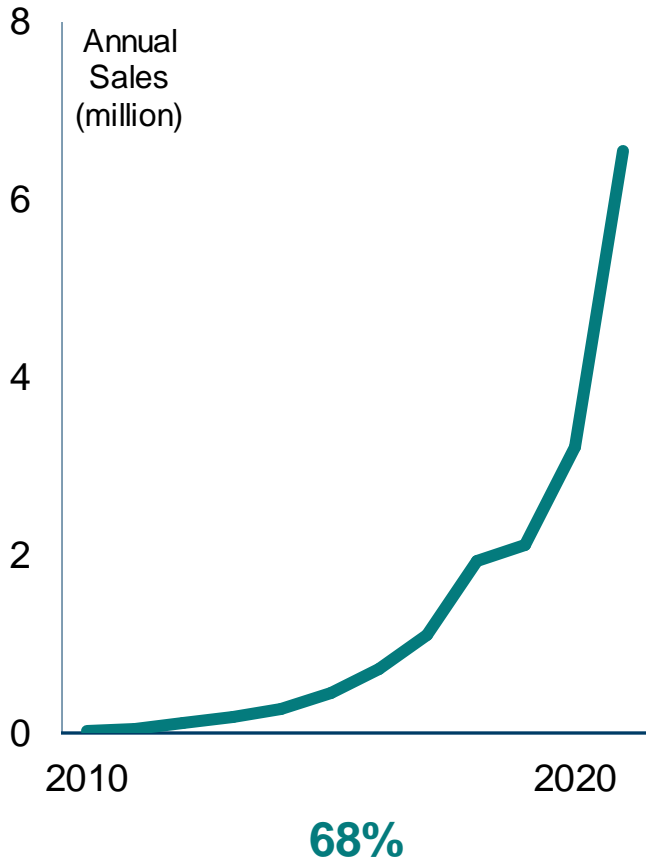


# Exponential energy change is all around us

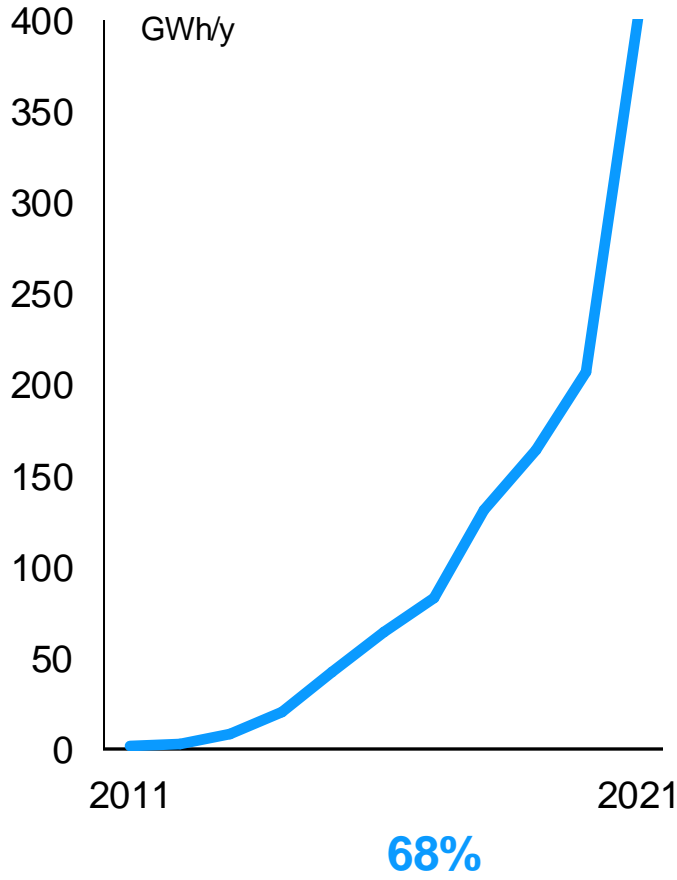
**Annual solar & wind generation**



**Annual EV sales**



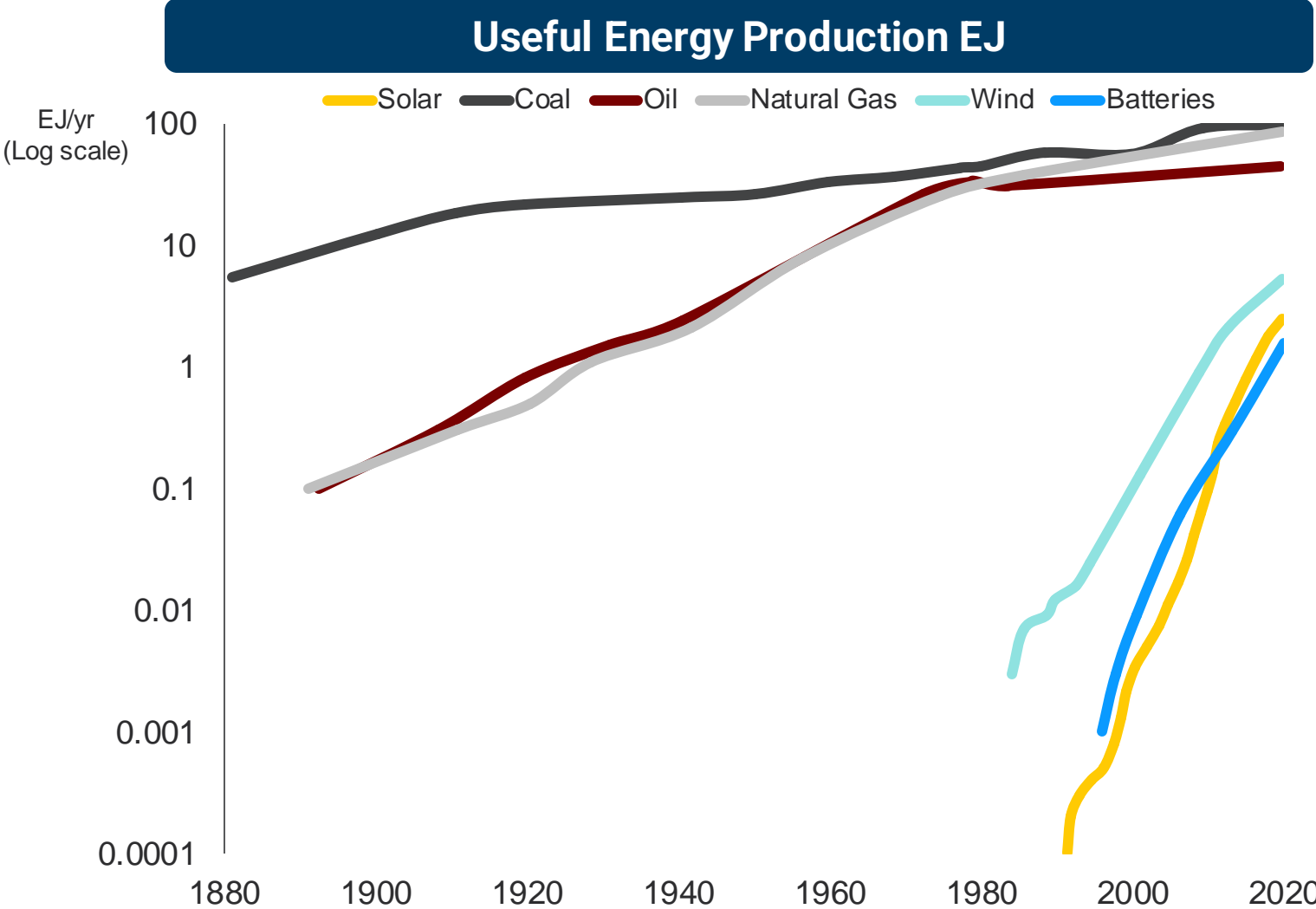
**Annual battery sales**



# Solar is the fastest growing energy source in history

Solar and other renewables are the energy technologies of the Exponential Age

- Fossil fuels grew at single digit growth rates during their rise in the past century.
- Renewable energy is growing far faster. Solar generation grew at a 38% CAGR in the last decade.
- Meanwhile fossil fuel demand has ground to a halt.

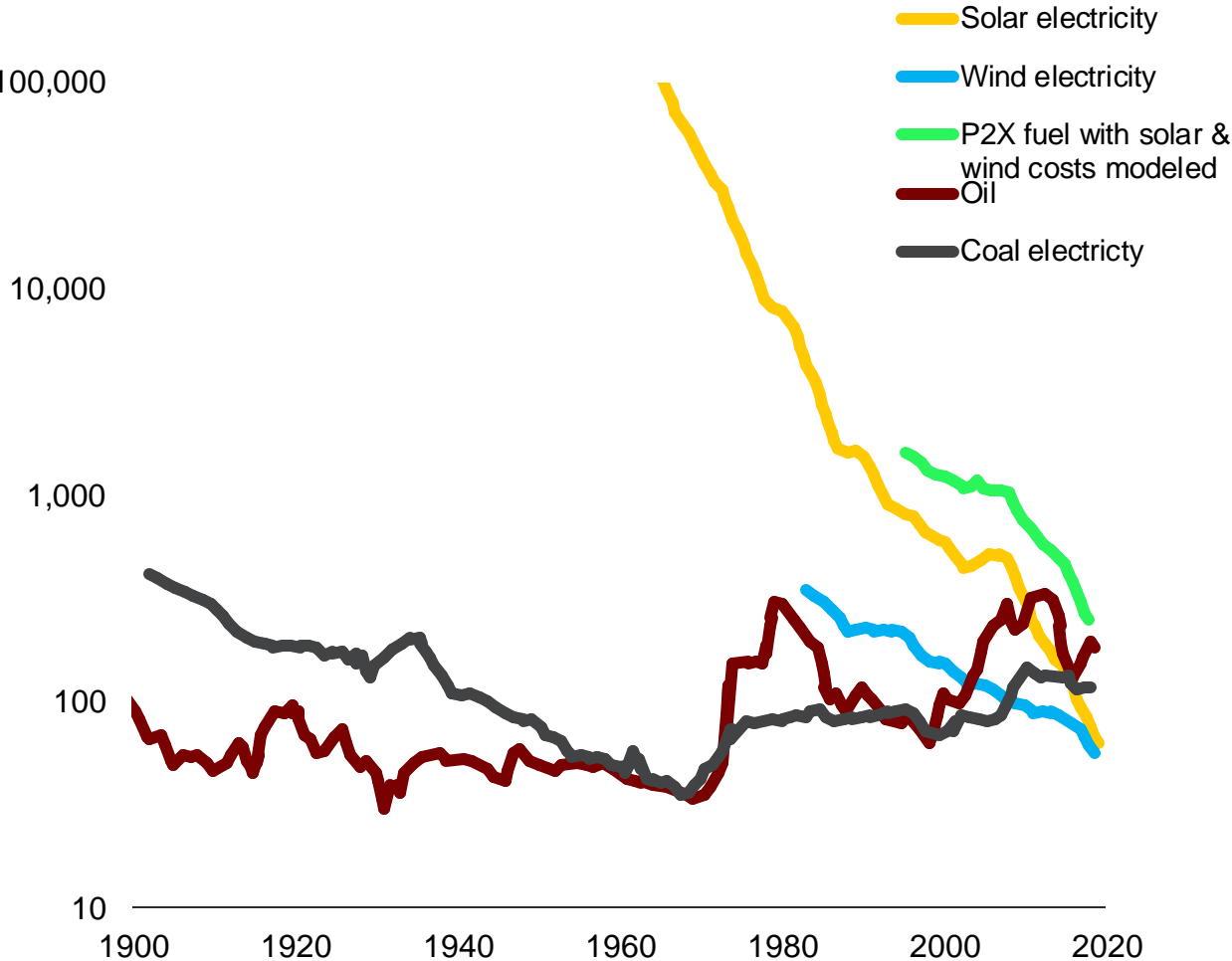


# And renewables have the fastest cost declines

- Fossil fuel prices have had no structural decline over the past century.
- Whereas renewables prices have fallen from the sky.
- Technologies ride learning curves; commodities do not.
- Renewables are subject to increasing returns to volume: the more you deploy, the cheaper they get.
- Fossil fuels are subject to diminishing or constant returns to extraction.

## The cost of energy

Useful energy cost  
\$[2020]/MWh  
(Log scale)

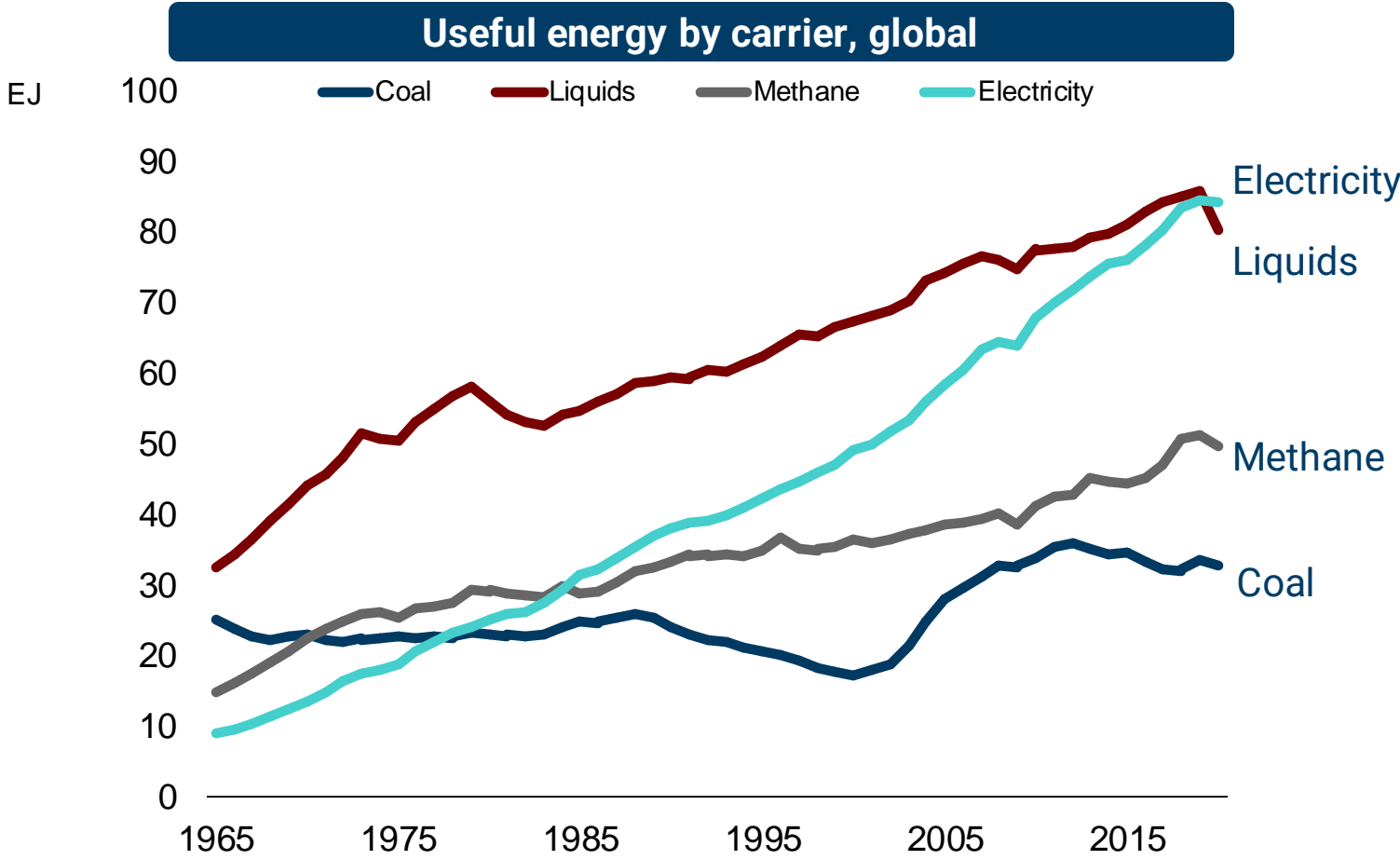




# Electricity is now the dominant energy carrier

Coal, methane, and oil as direct energy carriers have peaked; the future is electric

- According to Rystad Energy, electricity just became the largest energy carrier of useful energy, and it is rising fast.
- Coal demand has peaked and is reaching the end of its plateau.
- It looks increasingly like oil and gas demand as energy carriers is peaking.



# Renewables distribute power, fossils concentrate it

Renewables have fundamentally different characteristics and are inherently a more powerful and distributed development tool

## The Age of Carbon

**Commodity-based system**  
**No learning curve (or decreasing returns)**  
**Geographically concentrated**  
**Finite**  
**Continuous material flow required**  
**EROI falling**  
**Heavy**  
**Fiery molecules**  
**Low efficiency**  
**Pervasive negative externalities**  
**Trillions of dollars of rent for oligarchs**  
**Concentrates power**

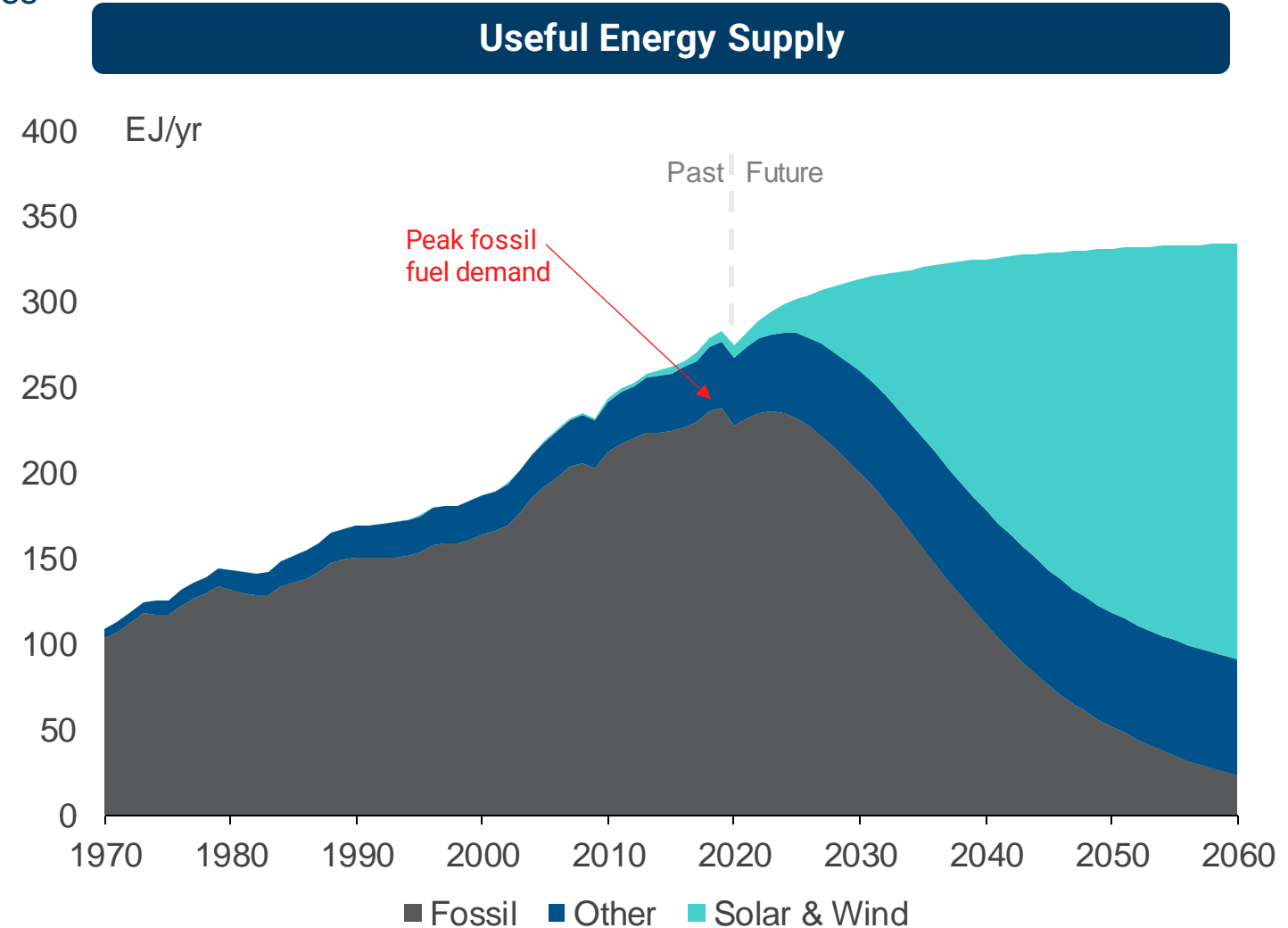
## The Age of Renewables

**Technology-based system**  
**Learning curve (increasing returns)**  
**Everywhere**  
**Abundant**  
**Zero marginal cost**  
**EROI rising**  
**Light**  
**Obedient electrons**  
**High efficiency**  
**Much lower impact on nature**  
**No superprofits**  
**Distributes power**

# So the energy future will be different from the past

As the growth of cheaper and superior new technologies drives energy system change

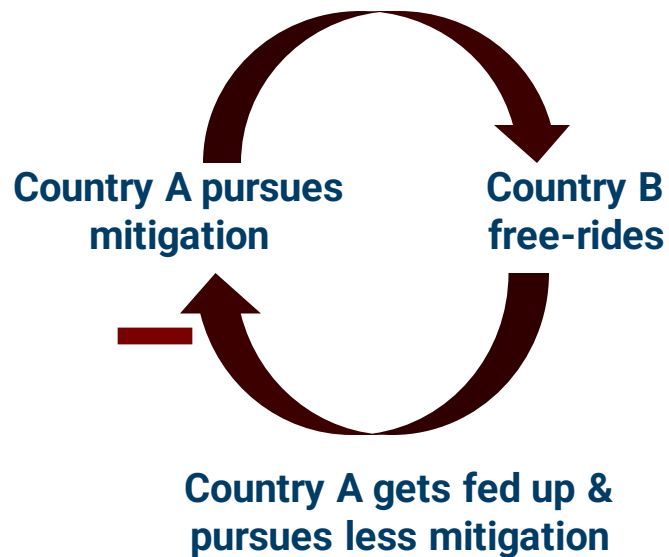
- In 2019, fossil fuels supplied 83% of primary energy demand according to BP.
- But in 2019 non-fossils already supplied 85% of the **growth** in primary energy demand because of their exponential growth.
- From 2019 to 2021 **all the growth** in primary energy supply (8 EJ) was met by **renewables**.
- **All the growth** in future supply of primary and useful energy will come from **renewables** in the Rystad central scenario.
- So **fossil fuel demand** has **peaked**. And now its only future is **plateau and then decline**. This analysis is detailed in [other RMI publications](#).



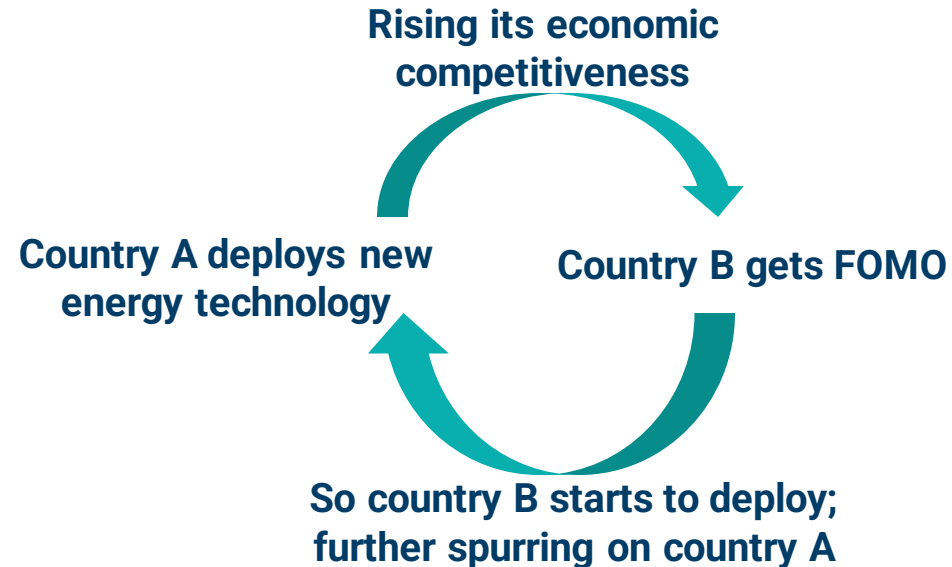
# Gain not pain changes international climate politics

- As the economics of clean energy change, so too do the international politics; when the facts change, so too do ideas and interests.
- The world has been freed from the gridlock of a zero-sum collective action problem.
- The Glasgow Breakthrough Agenda is evidence of this change.

The energy transition narrative of **pain** creates a **negative** feedback loop and a **free-rider** problem



The energy transition narrative of **gain** creates a **positive** feedback loop and a **positive sum** game



# 2

## The Energy Transition and the Global South

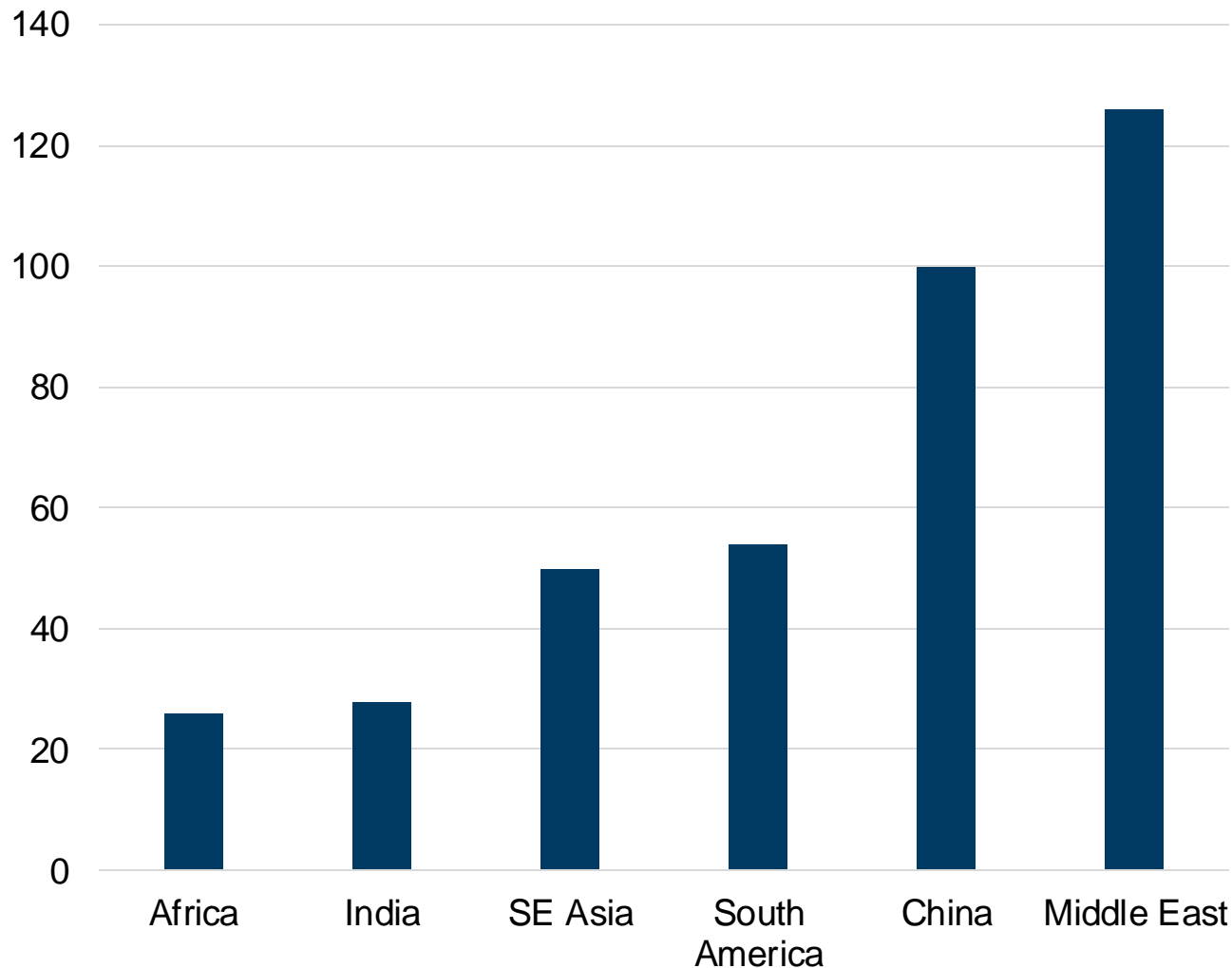
- The Global South is very diverse
- There are strong reasons to embrace renewables
- Change is already happening



# The Global South is very diverse

- It is unhelpful to put the Global South into one framing when looking at the energy transition, as regions have very different stories.
- China is half of the Global South's energy demand and is very different to the rest. It is pursuing new energy technologies faster than any other country.
- India has low energy demand but high growth and strong renewable targets in electricity and transport.
- SE Asia is split between fossil exporters and importers.
- South America has already seen peak fossil fuel demand and is a leader in new energy solutions.
- Africa has low energy demand per capita, but could be the world's renewable superpower.

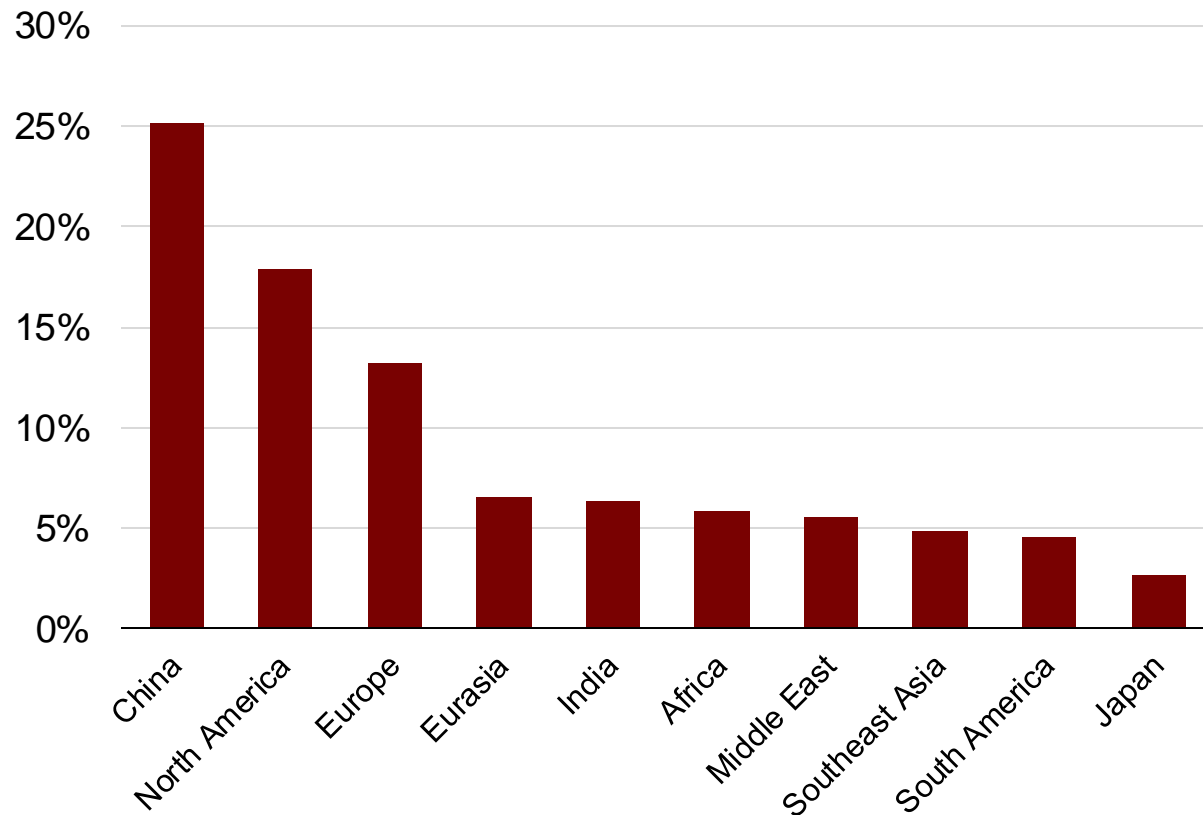
## Primary Energy demand per person pa 2019 GJ



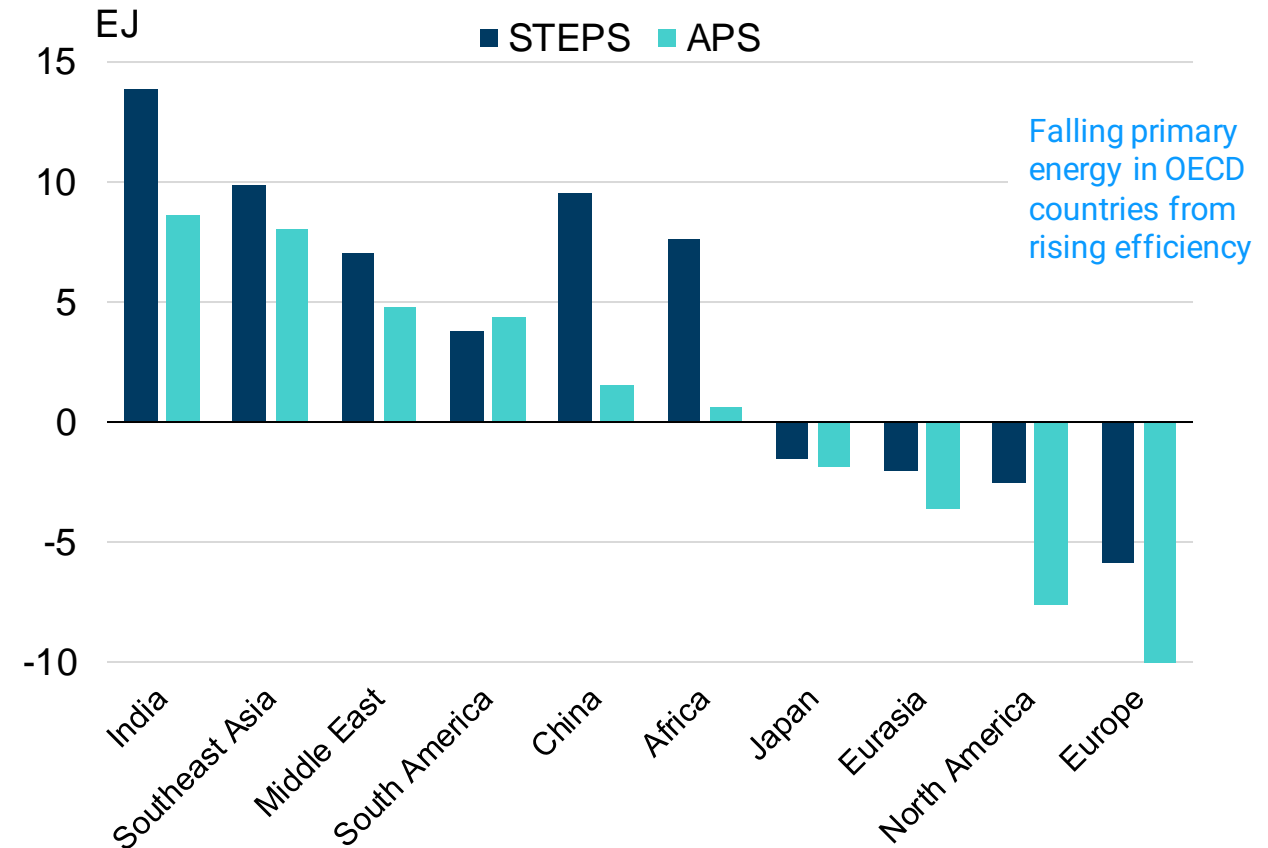
# China dominates demand but South Asia dominates growth

- China is a quarter of global energy demand
- The IEA's Announced Pledges Scenario sees India and SE Asia as the key areas of energy demand growth this decade

Share of primary energy demand in 2021 (%)



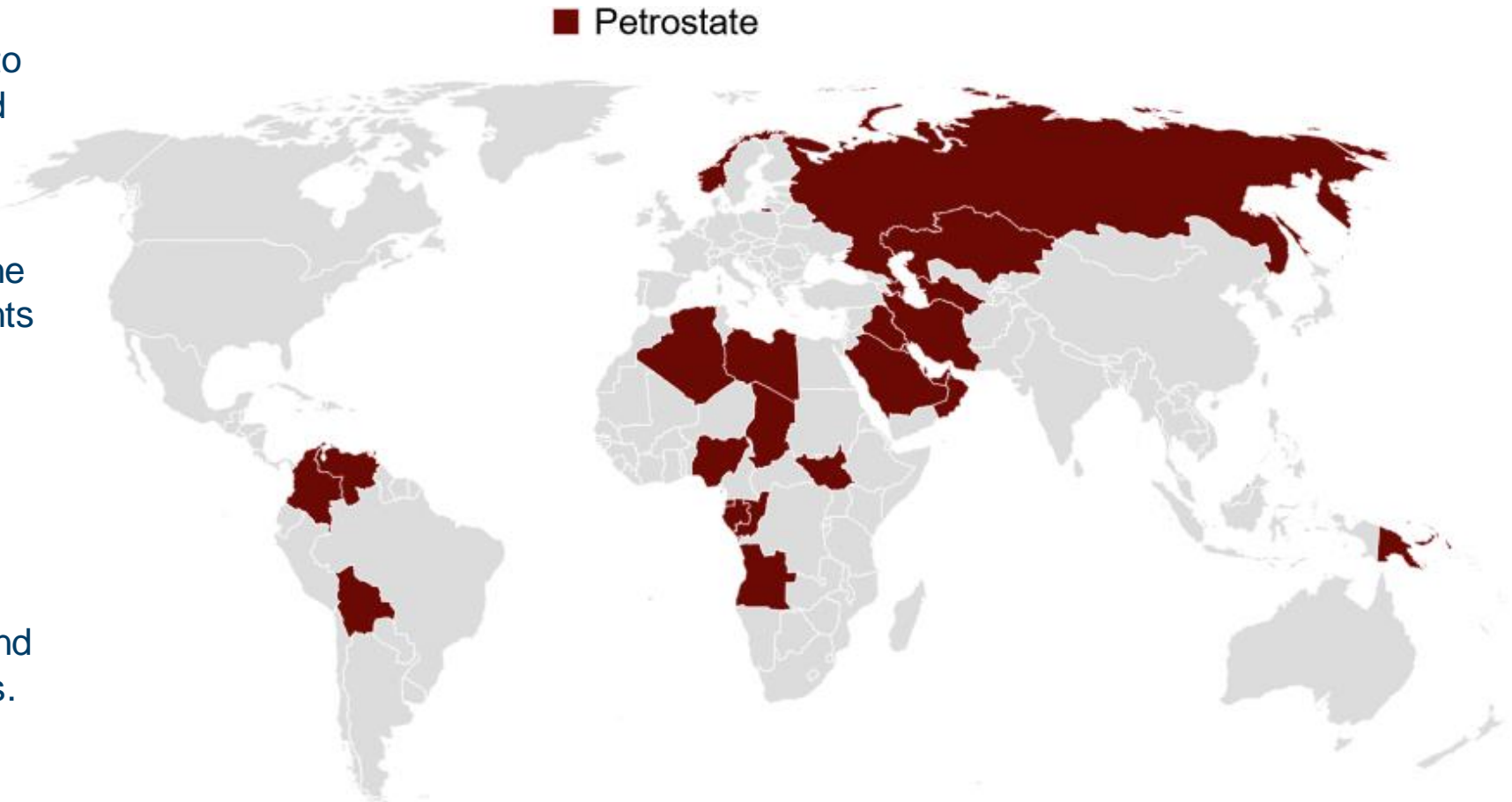
Primary energy demand growth 2021-30 EJ



# Petrostates vs. importers is a more useful distinction

- When it comes to motivation in the energy transition, it is more helpful to distinguish between petrostates and importers.
- Most petrostates want to maximize fossil fuel sales. They are after all the countries benefiting from annual rents of \$2tn at present.
- While importers have to pay for the fossil fuels. Their incentive is to use less imported fossil fuels and more local renewables.
- 10% of people live in petrostates, and a further 10% in fossil fuel exporters.
- 80% of people live in fossil fuel importers.

## Petrostates want to sell fossil fuels

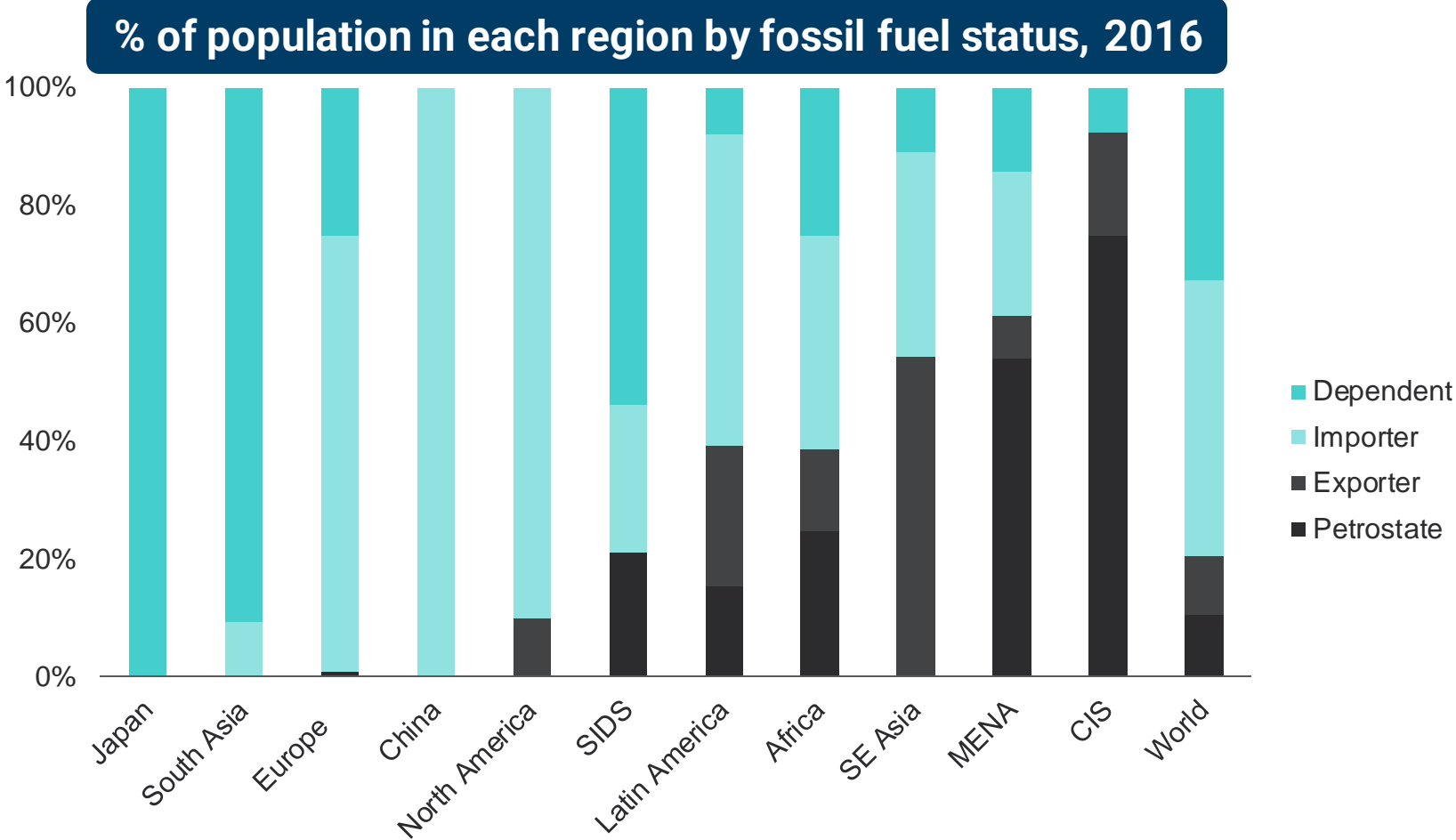




# Most people in the Global South import fossil fuels

There is a strong motivation to substitute money going to petrostates for local jobs and local energy

- Petrostates seek to lock the Global South into the fossil fuel system.
- But most people in the Global South live in net fossil fuel importers.
- The two most populous areas of China and South Asia are heavy fossil fuel importers.
- 80% of people in islands (SIDS) live in fossil fuel importers.
- 60% of people in Africa and Latin America live in fossil fuel importers.
- Even in SE Asia, around half the population lives in fossil fuel importers.

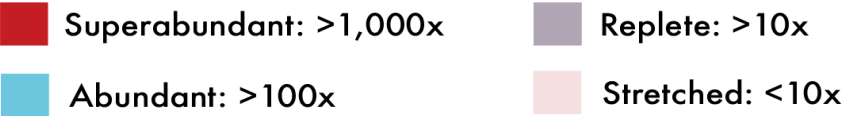


Source: World Bank for 2016

Dependent is +5% of GDP in fossil fuel imports; importer is 0%–5%. Petrostate is +10% GDP in fossil fuel exports; exporter is 0%–10%.

# The Global South is abundant with renewables

## Solar and wind energy potential as a multiple of energy demand



German renewable potential is 2.6 times energy demand. That calls for creative solutions.

China has 22 times as much potential.

South America has hundreds of times as much renewable potential as energy demand.

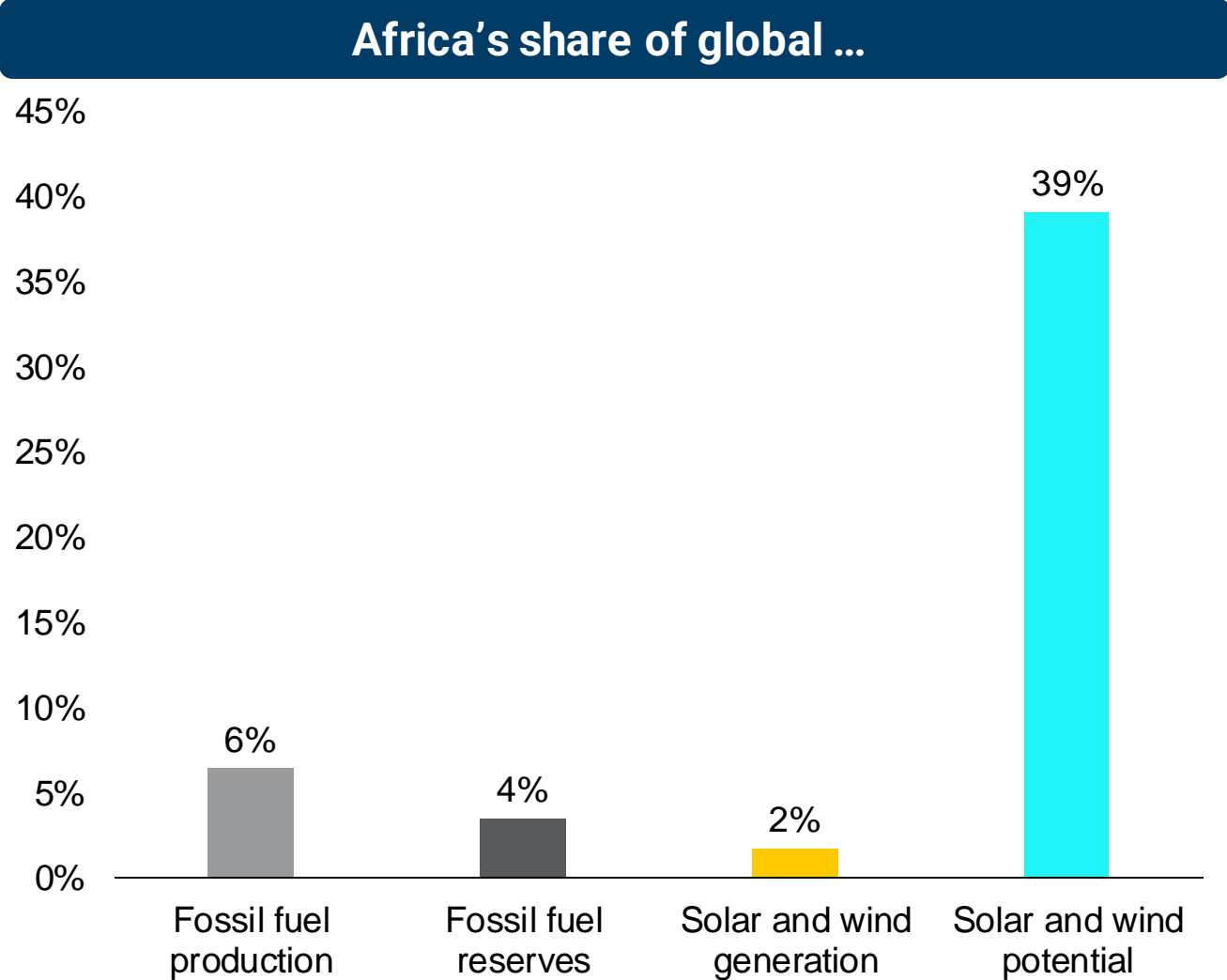
India has 33 times as much potential.

Australia has 392 times as much renewable potential as demand and can become a battery for Asia.

Most of sub-Saharan Africa has more than 1,000 times as much renewable potential as energy demand.

# Africa specifically has far more renewables than fossil fuels

- Africa produces only 6% of global fossil fuels from 4% of global reserves, but has access to 39% of global renewable potential.
- Fossil fuels have failed to deliver electricity to nearly 600 million people in Africa, but renewables are far better placed to do this.
- Embracing fossil fuels at the end of the fossil fuel era is thus like embracing canals or landline phones. It is too late.
- Africa has the opportunity to avoid fossil fuels dead ends and move directly to a superior renewable solution.
- Individual countries with very cheap fossil resources may of course diverge from the global shift for a while.

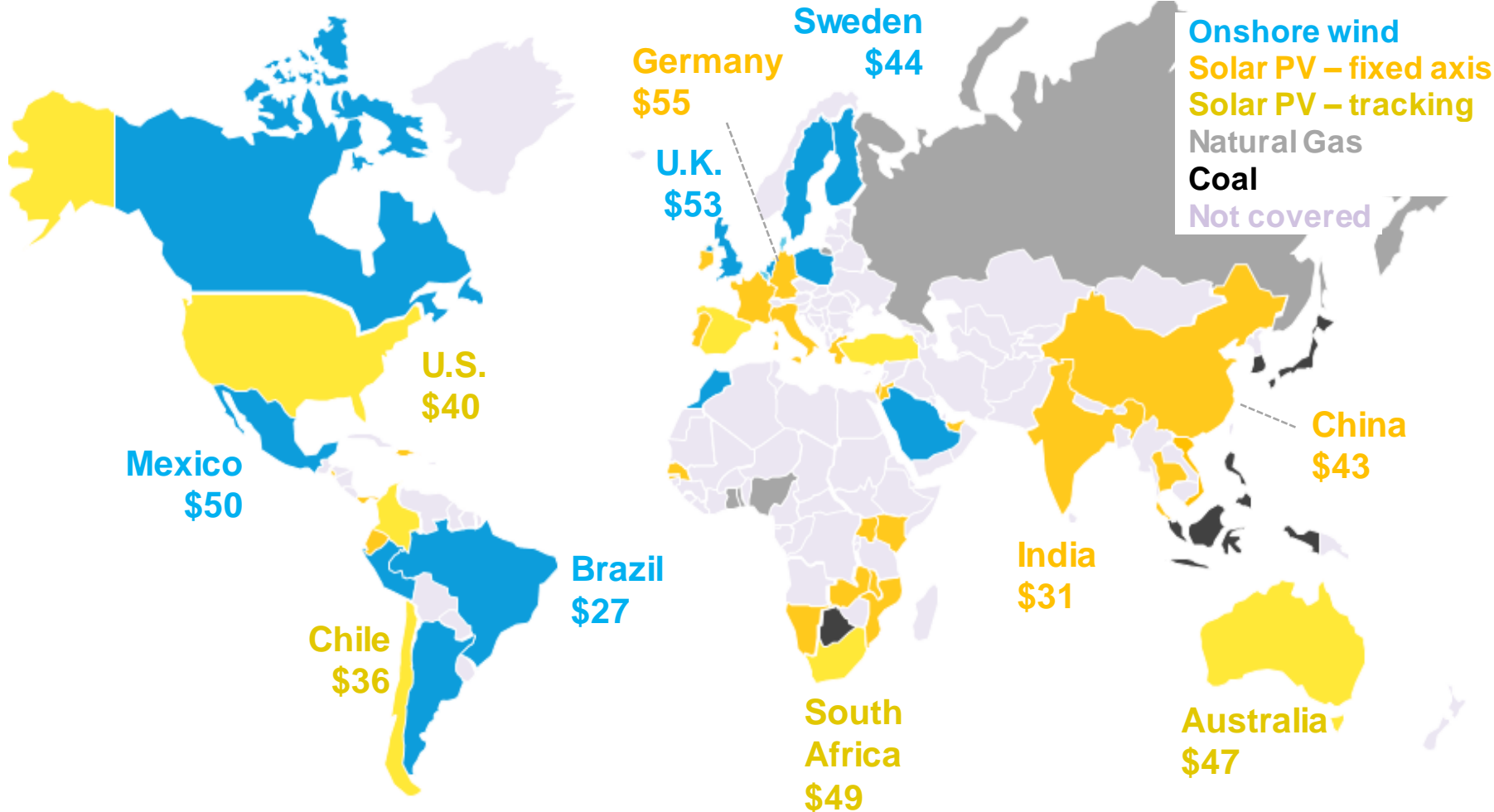


# Renewables are the cheapest provider of electricity

On average, renewable electricity is 50% cheaper than fossil fuels in the Global South

- Renewables are the cheapest source of new electricity generation in 90% of the world according to BNEF.
- In 2022, the short-run marginal cost of natural gas and coal power in a sample of large Global South countries is about double the total installation costs of solar\*.
- Meanwhile renewable costs continue to enjoy technology learning curves. Costs relative to fossil fuels in this period of inflation just keep improving.

## LCOE of new electricity in 2021

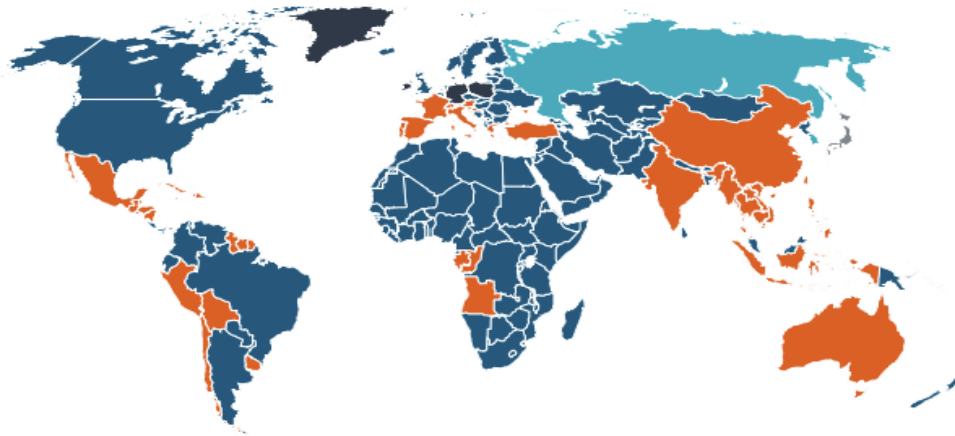


# And renewables are only getting cheaper

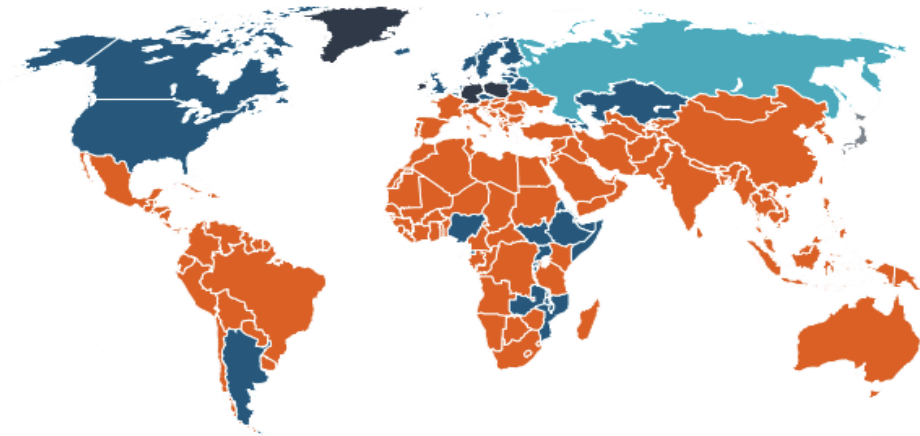
By the middle of this decade, solar is set to be the cheapest solution in nearly every geography

## Cheapest source of new electricity

Cheapest source in 2020

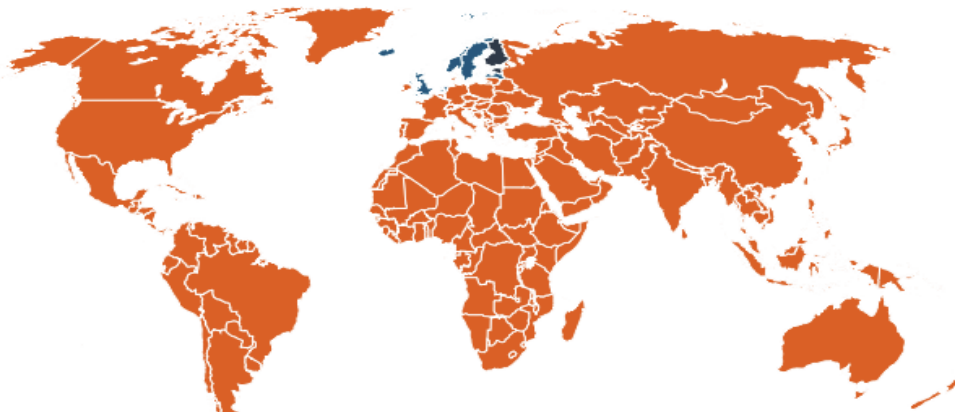


Cheapest source in 2023

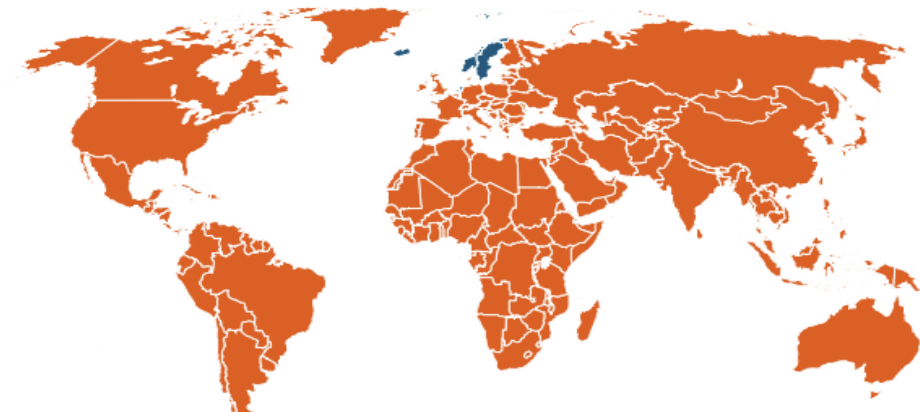


- Coal
- Nuclear
- Offshore
- Onshore
- Solar

Cheapest source in 2027



Cheapest source in 2030

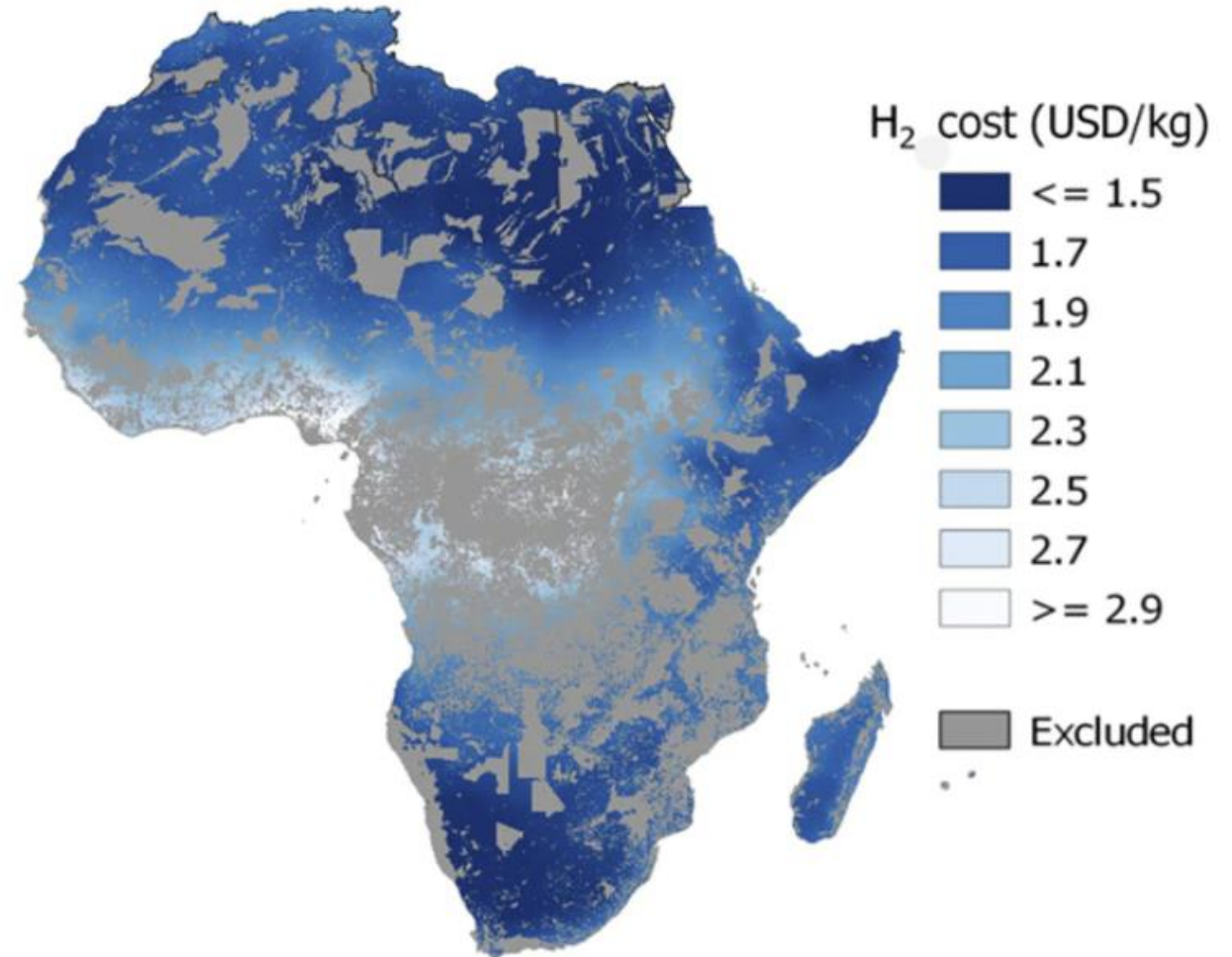


# Cheap renewables unlock new opportunities

The opportunities lie with the new not the old

- As manufacturing becomes increasingly automated, the manufacturing pull will move from cheap labor to cheap energy.
- Global South countries with cheap and abundant renewables can host the industrial hubs of tomorrow.
- Green hydrogen in North Africa is one example. According to the IEA, in 2030 Africa has the potential to produce 5,000 mt of hydrogen per year (far more than the world needs of course) at less than 2\$/kg. To paraphrase Adair Turner:
  - We are entering a world of falling demand for oil and gas, and Africa lies at the top end of that cost curve.
  - And we are entering a world that needs lots of renewables and green hydrogen, and Africa has the potential to be at the cheapest end of that cost curve

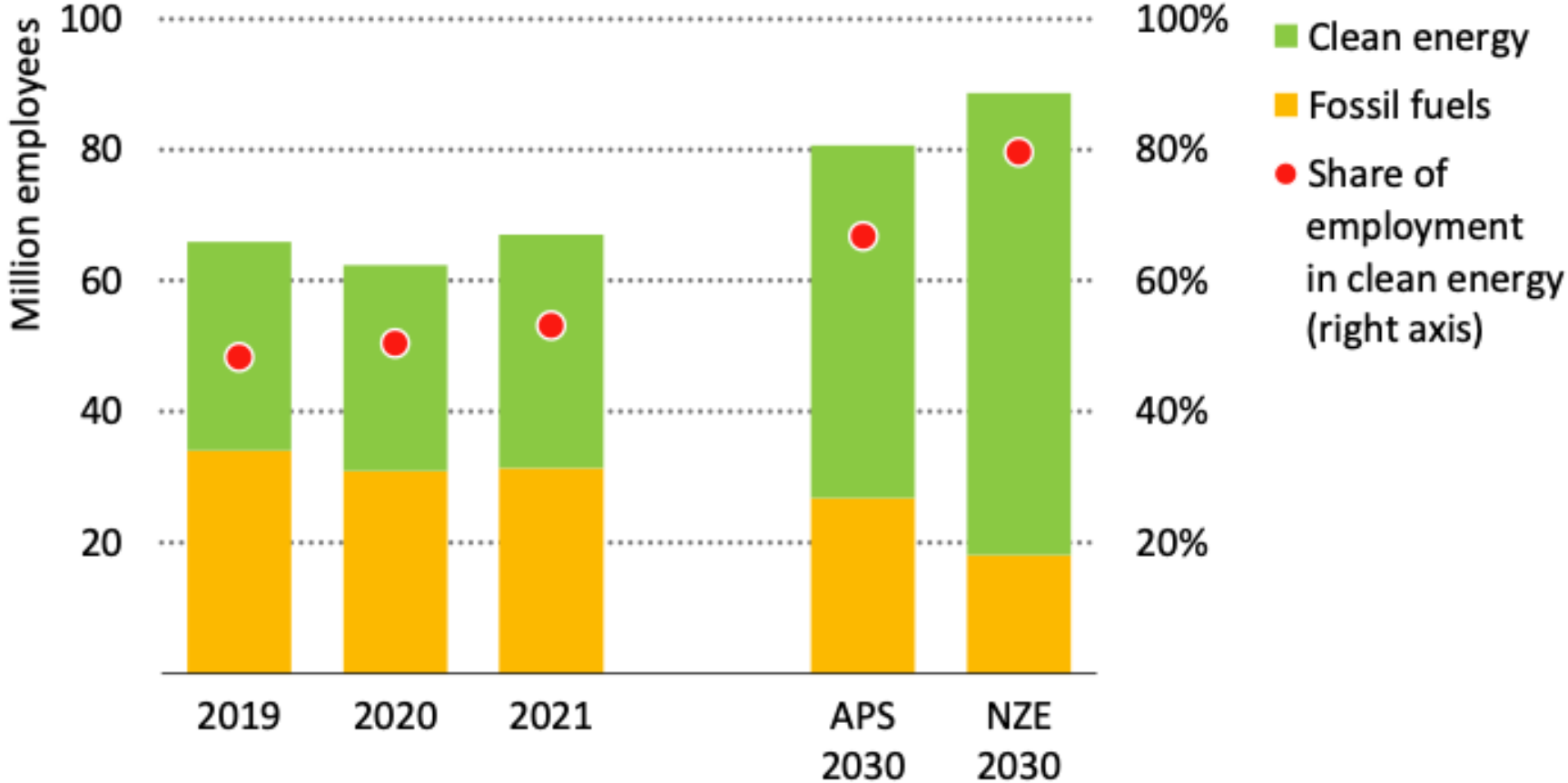
## Map of hydrogen cost production potential in Africa in 2030 within 200 km of a serviceable coast



# Renewables provide all the new jobs

- Clean energy already employs more people than fossil fuels.
- All the jobs of the future are in clean energy.
- The jobs opportunity is especially good for fossil fuel importers.
- Importers can swop fossil fuel imports for domestic clean energy jobs.

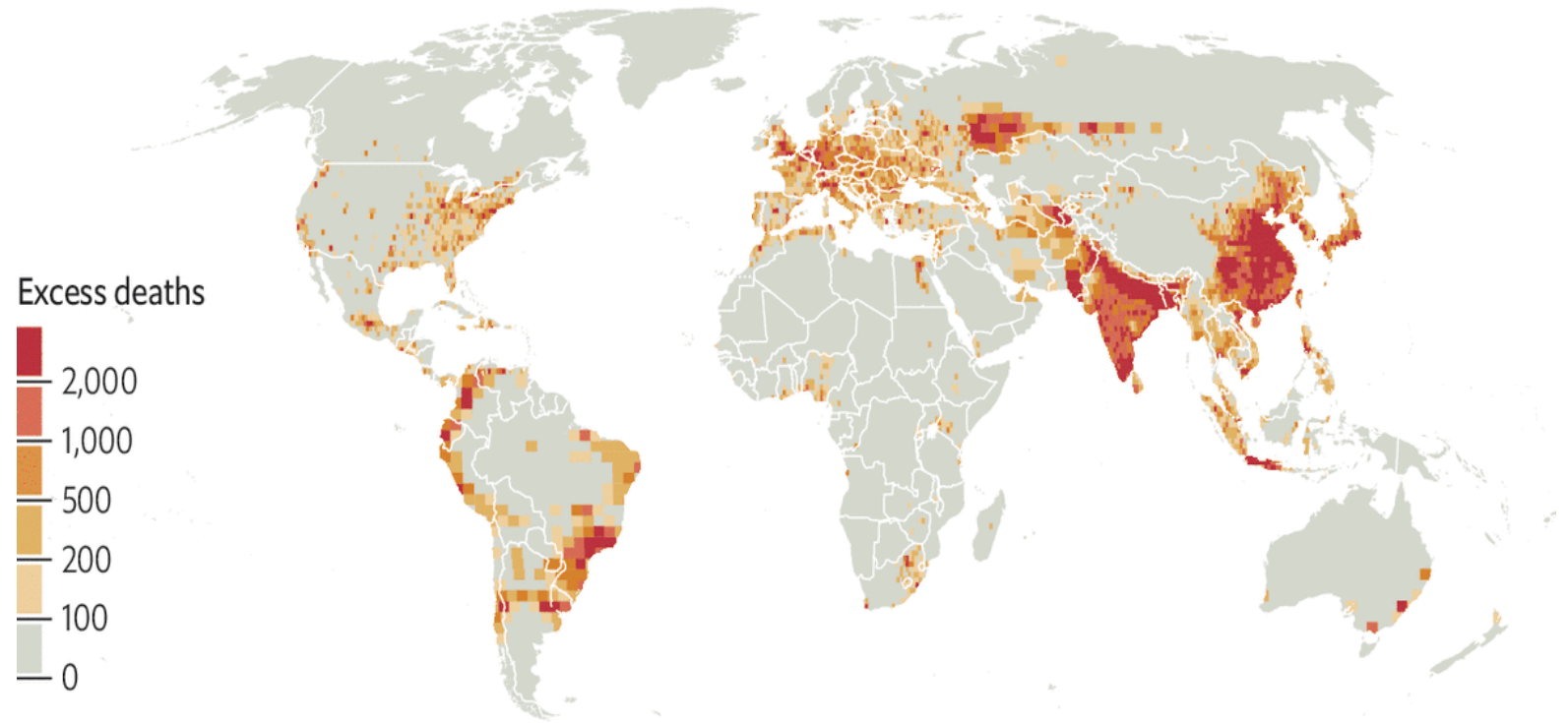
Global employment in fossil fuels vs. clean energy



# The Global South suffers the most from the impacts of fossil fuels

- The Global South suffers the most from fossil fuel air pollution: of the 8.7 million excess deaths per year identified by Vohra, most are in the Global South.
- The Global South is the worst affected by the impacts of climate change.
- The Global South is most vulnerable to the price volatility of fossil fuel commodities.

## Excess mortality induced by fossil fuel air pollution, per year

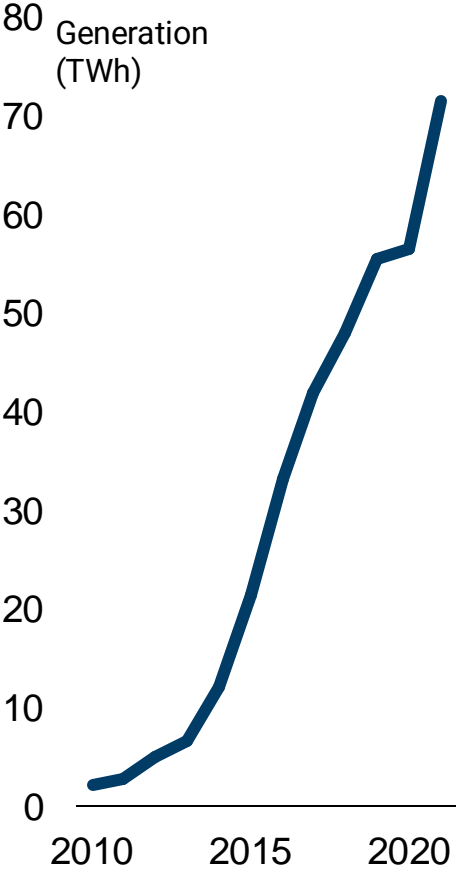




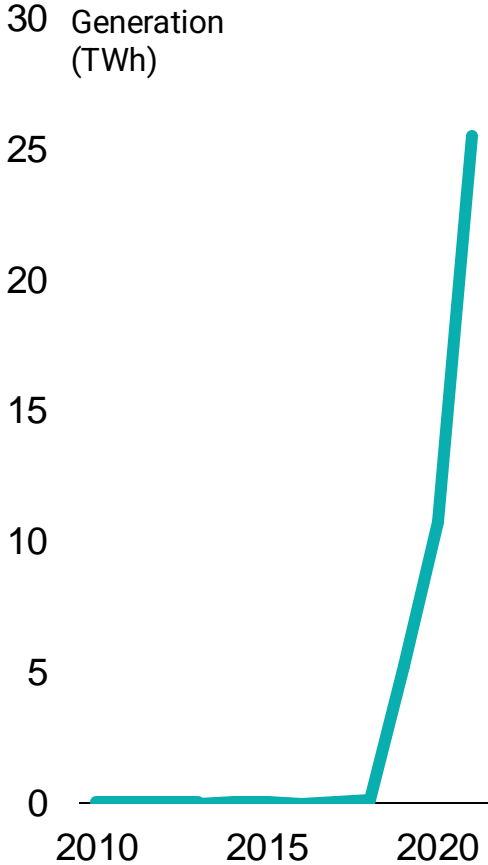
# Exponential change is happening across the world

Adoption of superior technology is not confined to the Global North

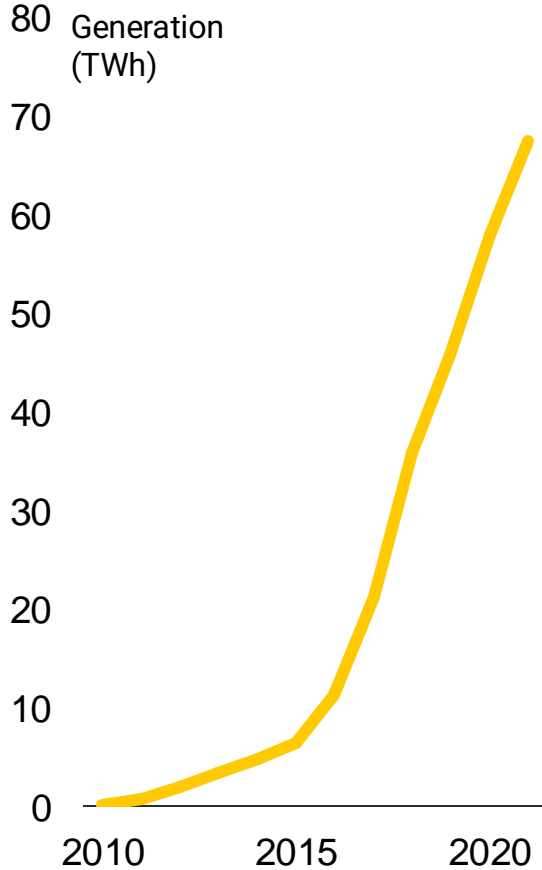
### Brazil wind



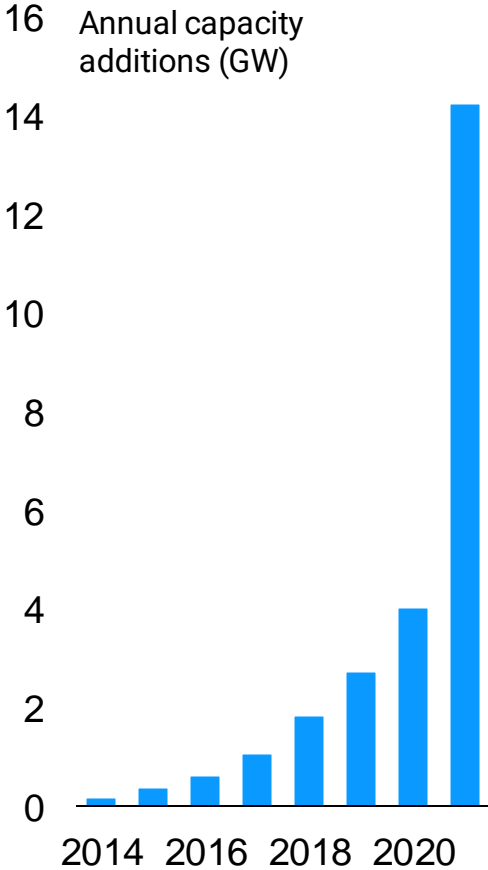
### Vietnam solar



### India solar



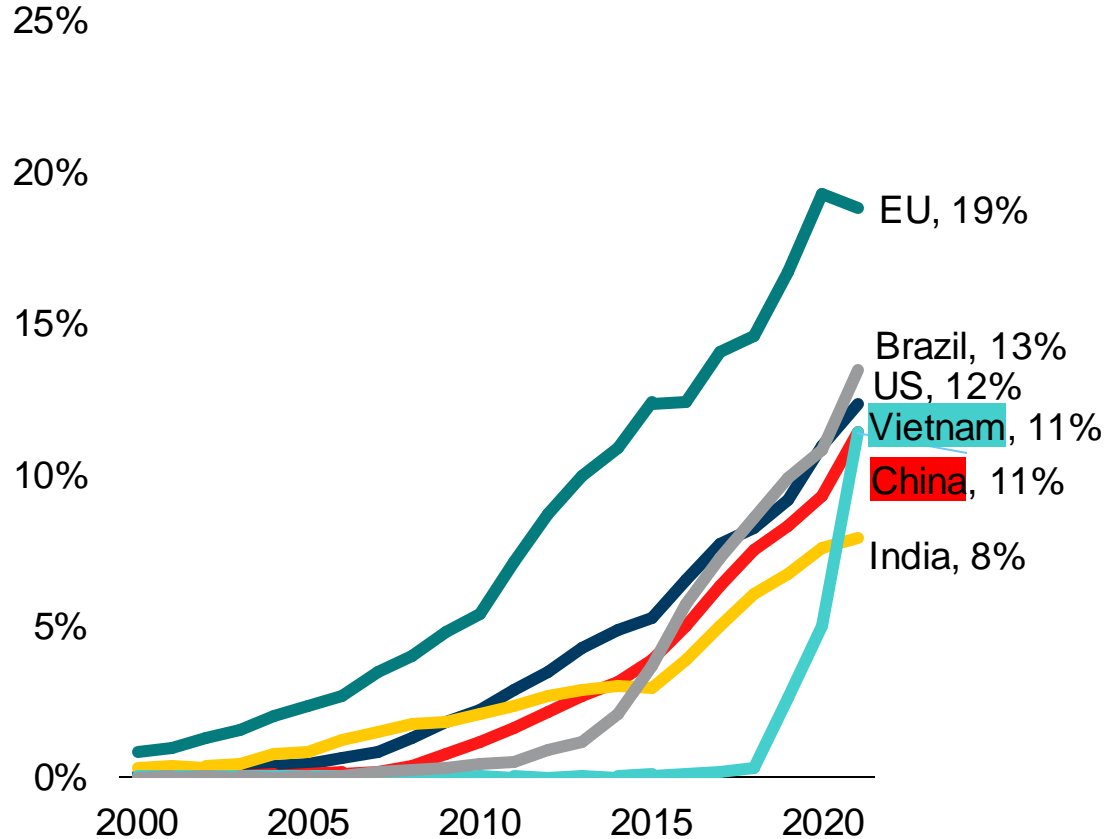
### China offshore wind



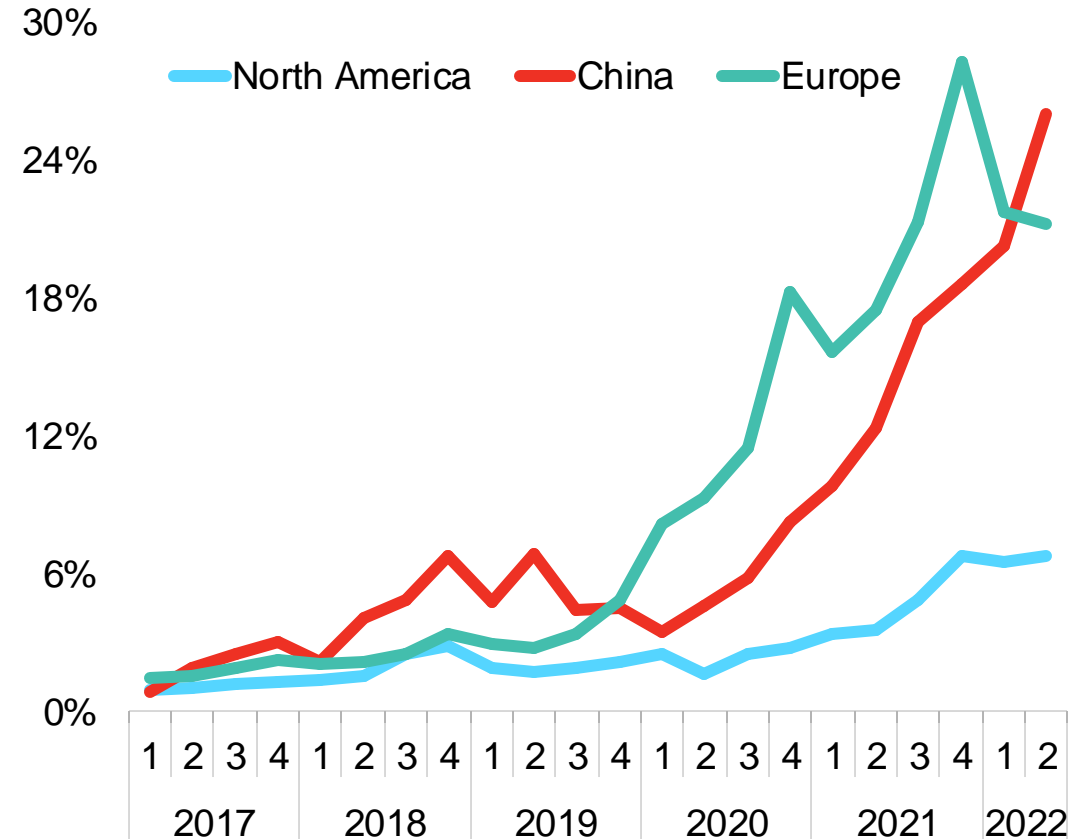
# The Global South is changing fast

The West led the Industrial Revolution; Asia could lead this one

Share of solar and wind in power generation (%)



Share of EV passenger vehicle sales (%)

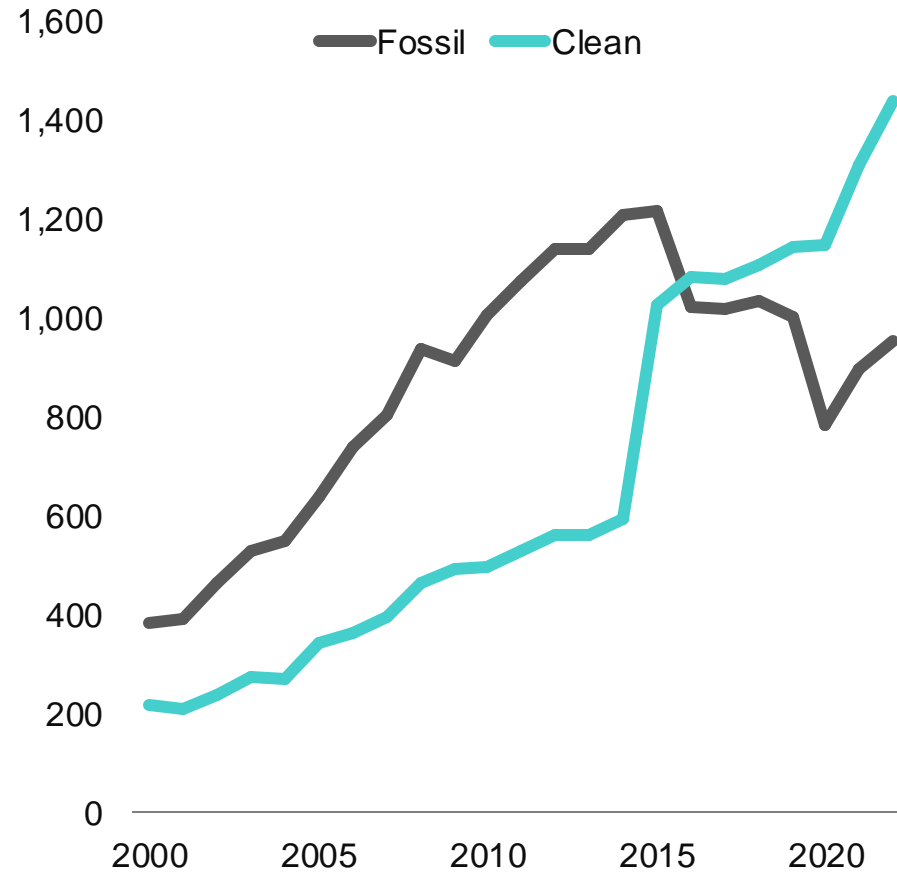


- Brazil's share of solar and wind in electricity is higher than the US. Vietnam may also overtake the US.
- China's share of EVs in car sales has leapfrogged Europe.

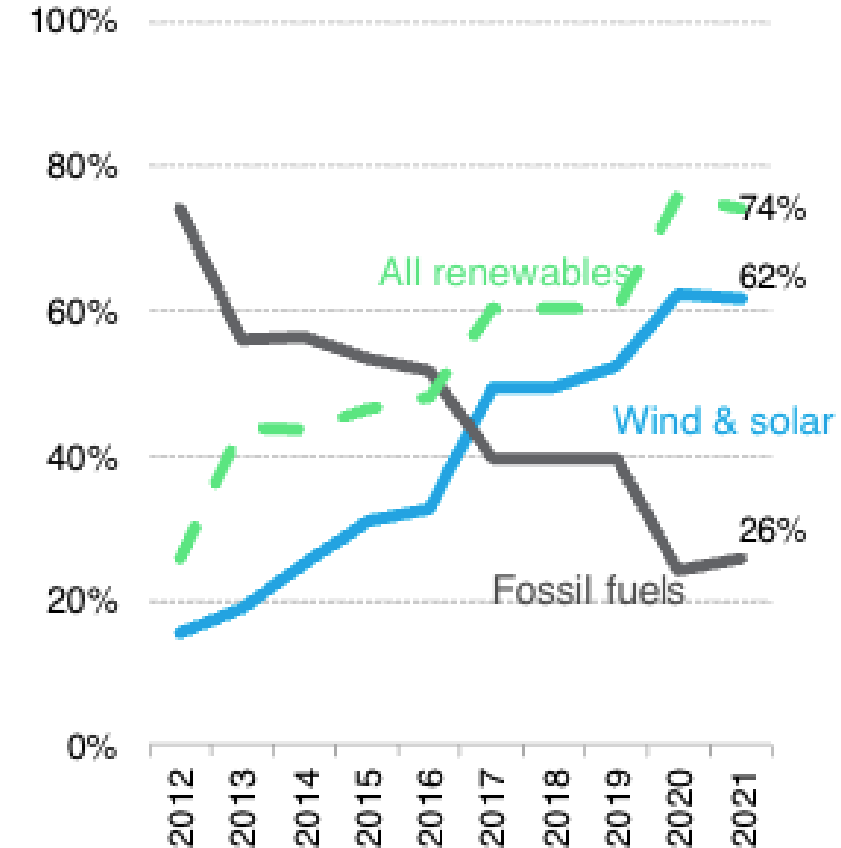
# And capital is flowing into clean energy

- 60% of global energy capital flows are now investing into clean technologies according to the IEA.
- As the cost advantages of clean energy continue to increase, an even larger share of capital will flow to it.
- And 74% of developing markets net capacity additions are into renewables according to BNEF.
- Investments into fossil fuels risk becoming stranded.

Global capital expenditure on fossil and clean energy \$bn



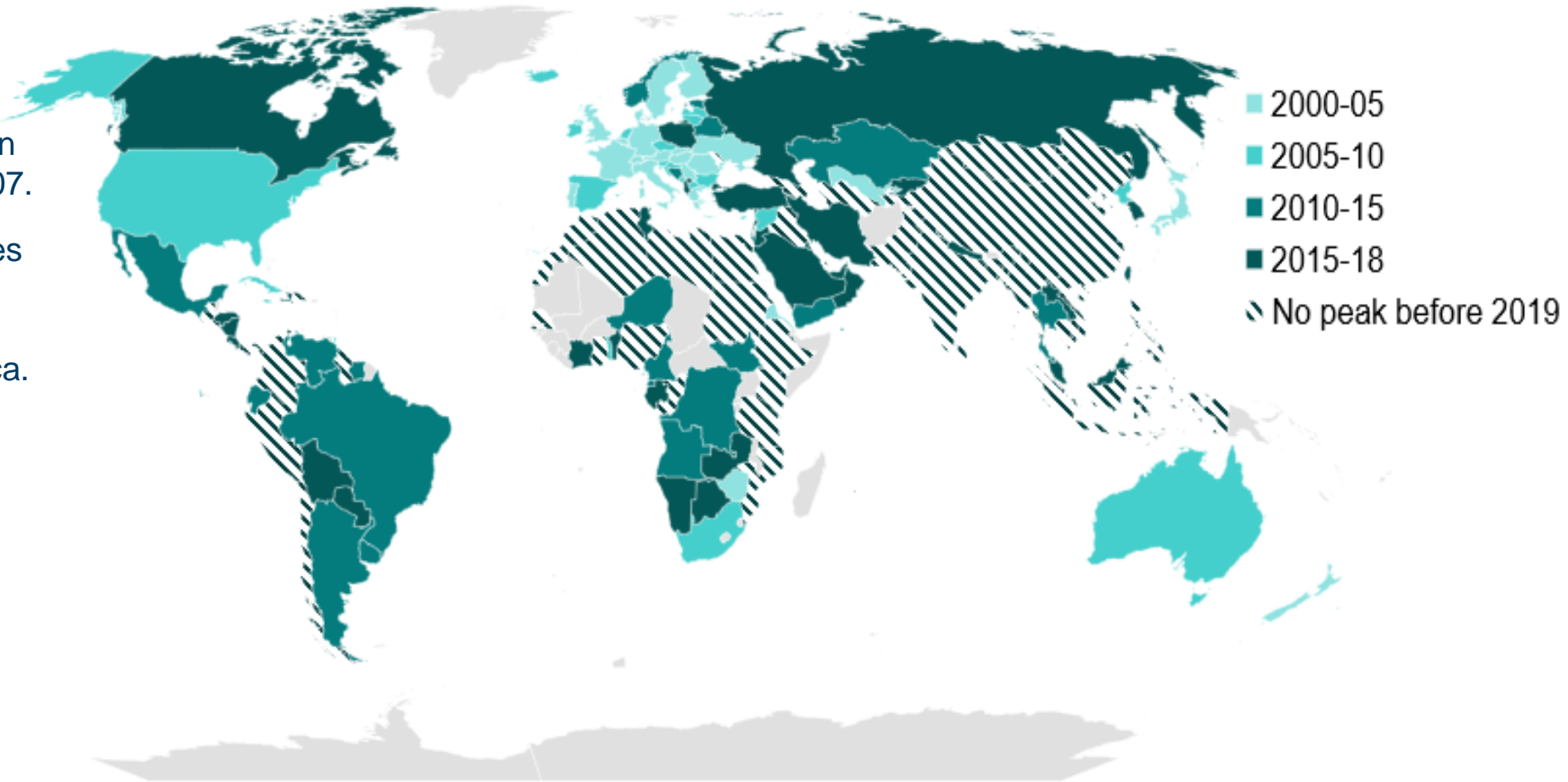
Share of new generation capacity in developing markets



# 60% of the world is past peak fossil fuels

## Countries that have already seen a peak and decline in fossil fuel demand

- 98% of OECD countries have seen peak fossil fuel demand.
- EU fossil fuel demand peaked in 2006 and the US peaked in 2007.
- Over half of non-OECD countries (excluding China) have seen peak fossil fuel demand, from Thailand to Brazil to South Africa.
- This means in-country sector peaks for those just before the total peak: for example, China's fossil fuel usage for industrial energy peaked in 2012.
- More detailed RMI analysis on [peaking demand](#) is available [here](#).



# 3

## Supporting Rapid Energy Growth in the Global South

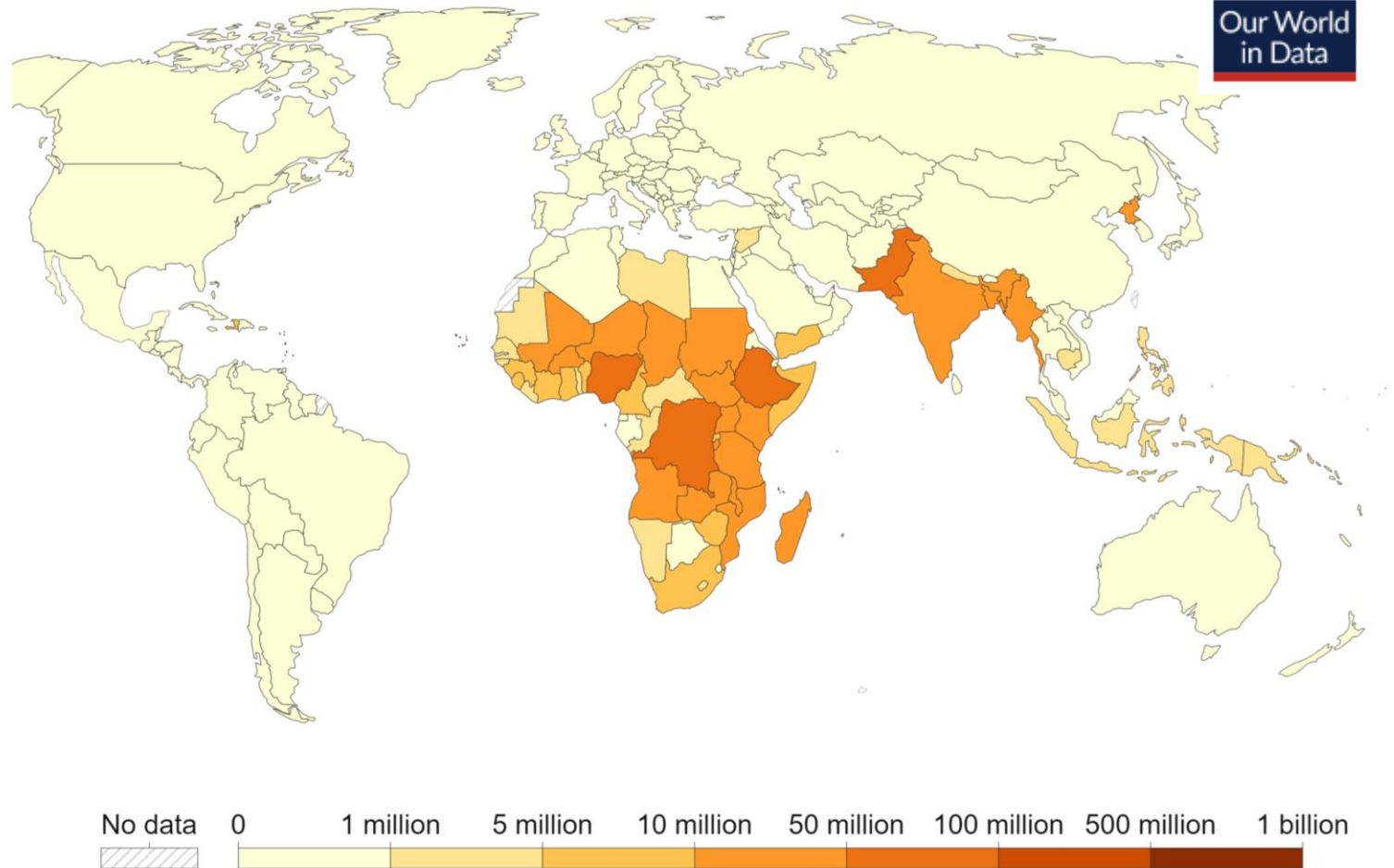
- Natural gas is a risky export industry
- International support and domestic policy can mobilize large flows of private capital
- Development banks need to reallocate capital for the renewable era



# Change is hard

- There is no doubt that the rapid deployment of clean energy technologies in parts of the Global South is difficult.
- The barriers to change include vertically integrated systems; weak offtakers; a lack of local capital; small markets and high domestic costs; a lack of expertise; poor governance and corruption; and inadequate procurement and planning regimes.
- Everywhere is different, and the diversity of the Global South should be matched by the diversity of energy solutions.
- The solution will require a combination of domestic policy setting and international support.
- Much of the Global South has the great advantage of growing energy demand. It is easier to build new renewables than to close down existing fossil fuel assets.

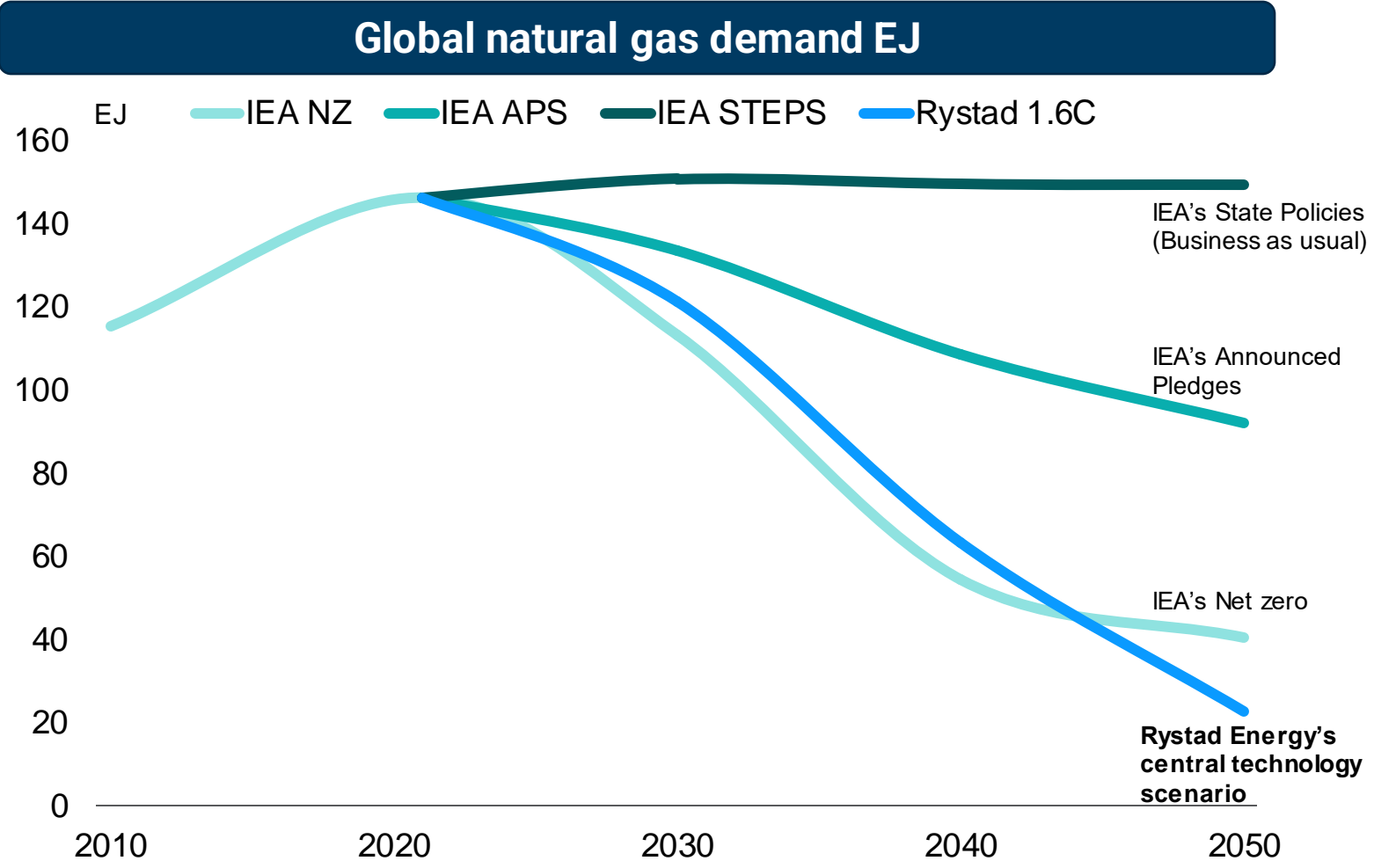
## Number of people without access to electricity, 2019



# Natural gas is a risky export industry given the looming demand peak

Natural gas will struggle to compete with the exponential growth and cost declines of renewables

- High natural gas prices curtail gas demand growth in Asia and accelerate Europe's exit from gas.
- The IEA sees natural gas peaking or plateauing in all its scenarios. A significant change to its previous outlook.
- So we are close to peak global natural gas demand, as it gets pushed out by the exponential growth and cost decline of renewables.
- Which means that developing new gas for export is a risky proposition.
- As is the case everywhere, low-cost domestic fossil fuels will continue to play a role in the energy system for a long time. It is the role of country analysis to examine the utility of domestic gas or coal.



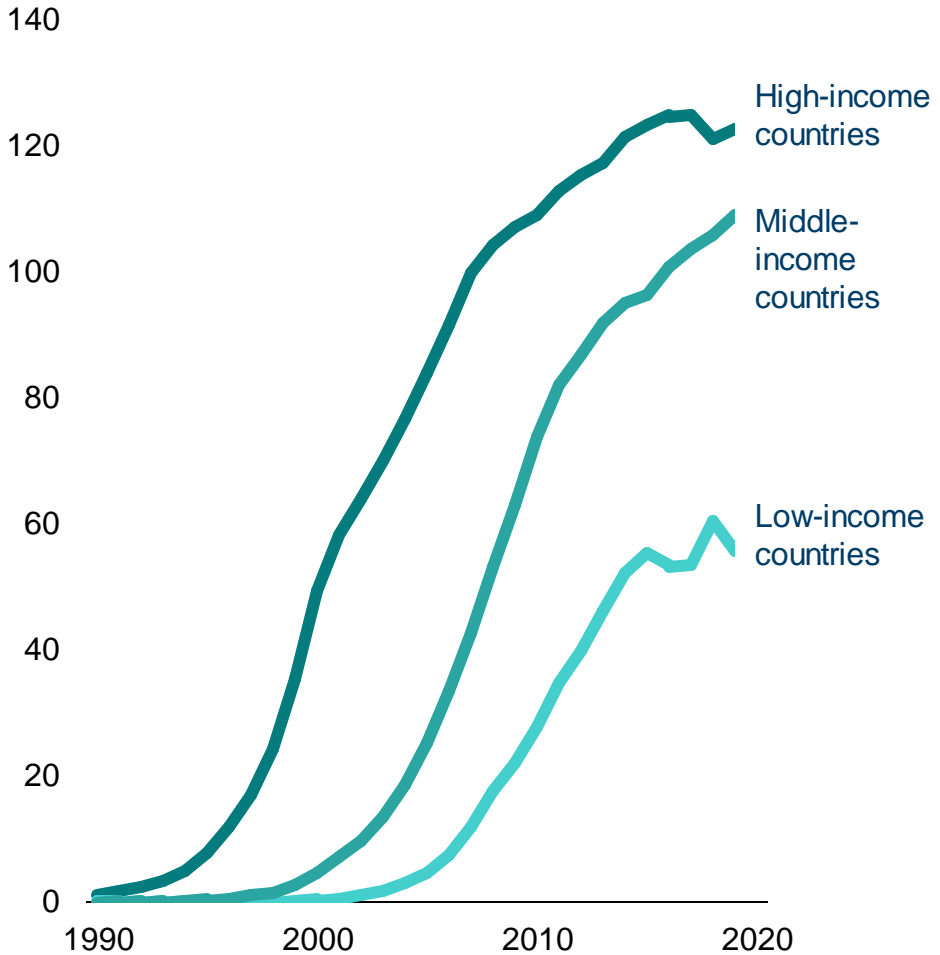
Source: IEA, Rystad Energy. NZ means Net Zero Scenario; APS is announced pledges and STEPS is stated policies. Note: data intervals are 10 years apart.

# High-income countries normally adopt new technology faster

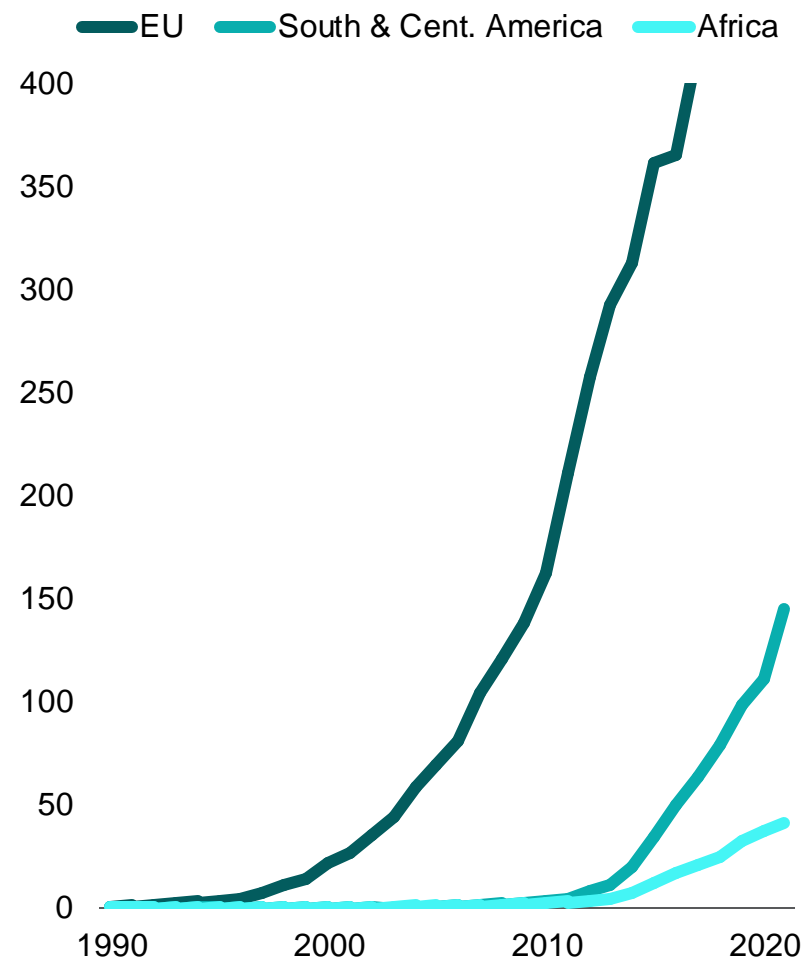
The key question is how to reduce this gap so that everyone has access to cheap, secure, and clean energy as fast as possible

- It is normal for wealthy countries to deploy new technologies first. This is what happened with the internet, mobile phones, and many other technologies.
- It is also normal for lower-income countries to adopt the technologies when they are cheaper and the initial teething problems have been solved.
- The key question is how to make this happen faster and more equitably.
- And it is here we need to focus on the solutions most capable of delivering the desired development goals: cheap, fast, secure, local, clean energy.

**Mobile cellular subscriptions (per 100 people)**



**Solar & wind generation (TWh)**

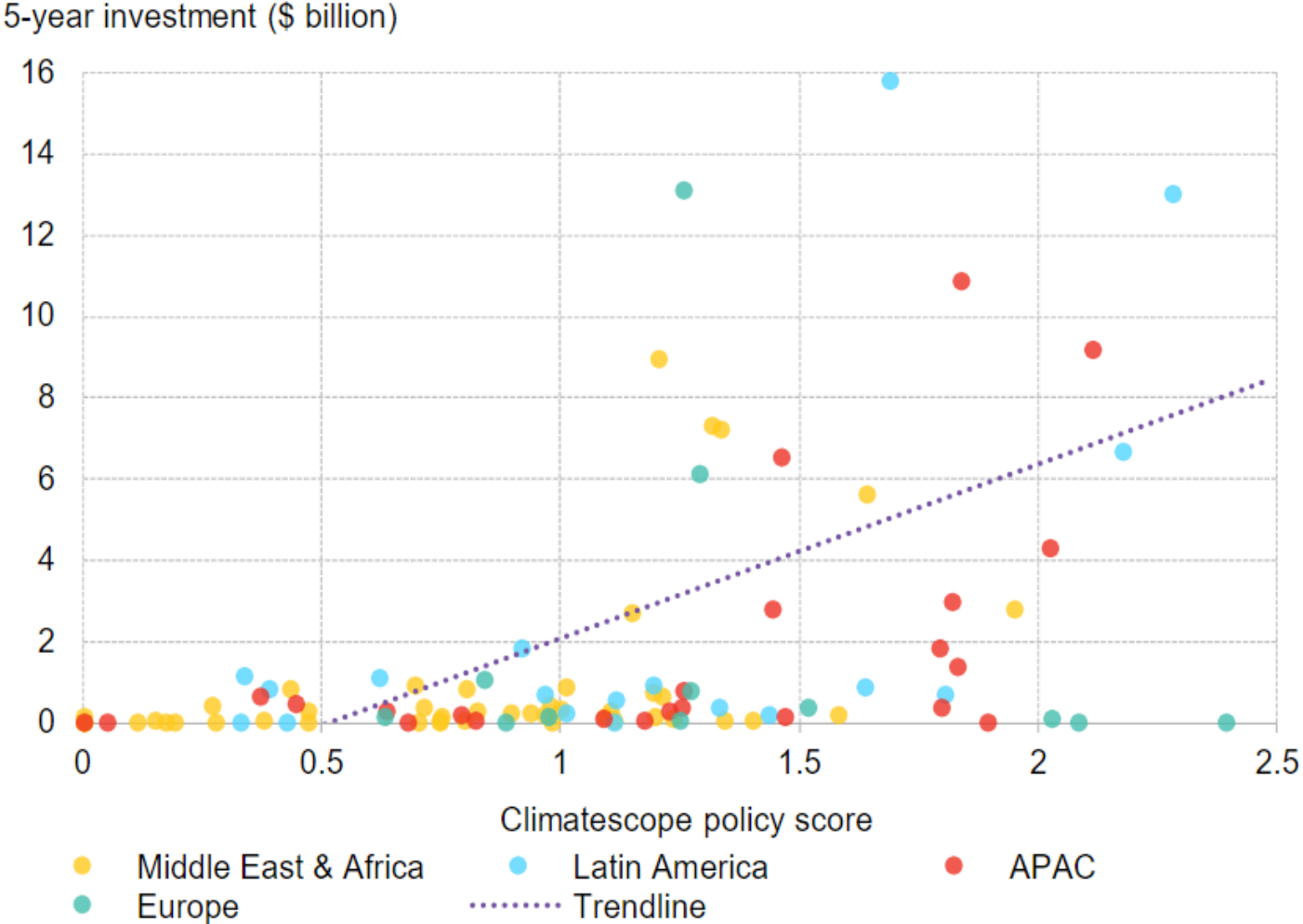




# Domestic policy is key to mobilizing private capital

- There is plenty of global capital, and the challenge is to unlock it.
- Good policies open doors to larger pools of private capital.
- According to BNEF, the 47 emerging markets with the highest climate policy score have attracted on average 17 times more clean energy investment than the bottom 60.
- Classic examples of good policy leading to rapid renewable deployment include Vietnam, India, or Morocco.

## The relationship between clean energy policies and clean investments

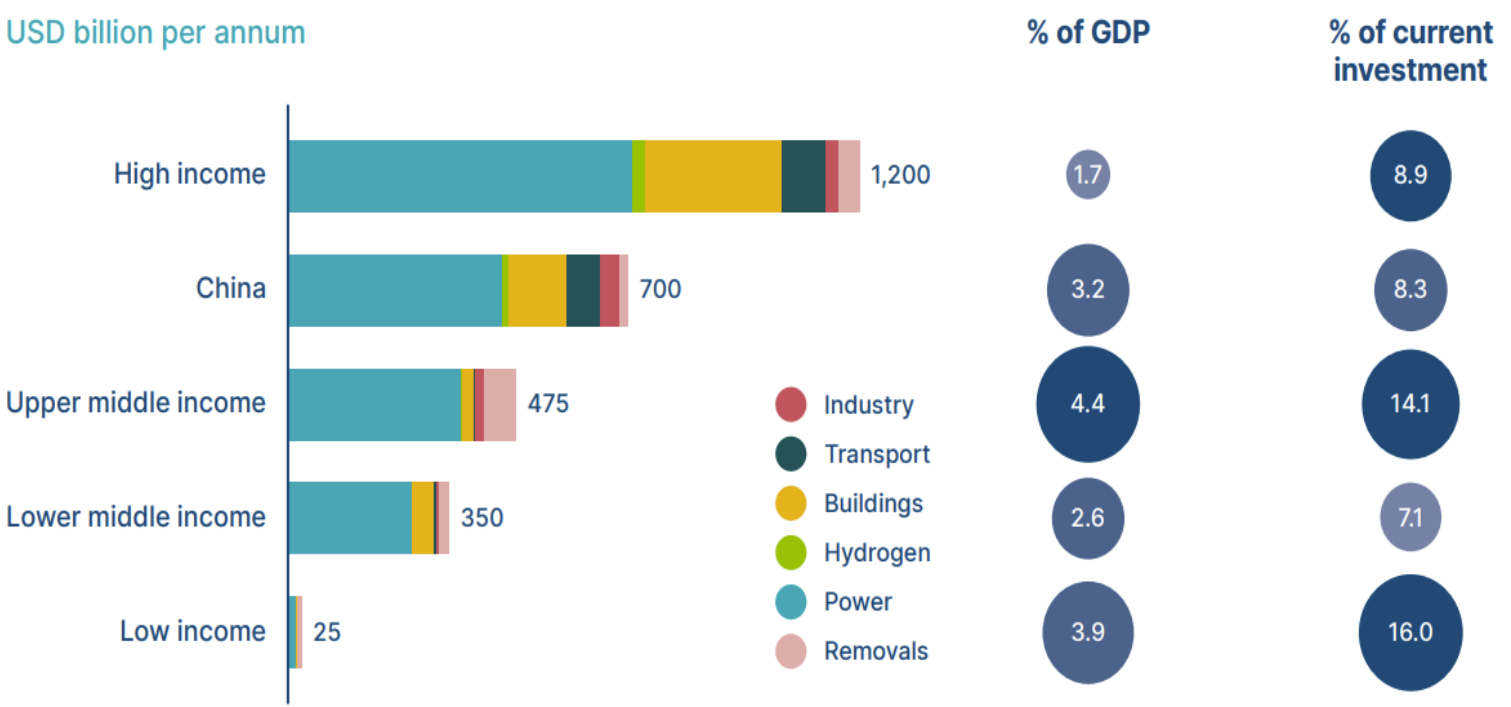


# Capital is available in most areas

- The Energy Transitions Commission (ETC) has calculated the capital requirement of the energy transition by income group.
- 70% of the capital is needed in high income countries and China. There is no doubt that capital is available in these locations.
- However, 30% of the capital is needed in the upper middle, lower middle and low income countries.

## Capital requirement of the energy transition by income group

Estimated annual investment by income group and sector, 2026-30



NOTE: Income groups are based on the World Bank's classifications, with China called out separately from upper middle income. GDP is market exchange rate based.

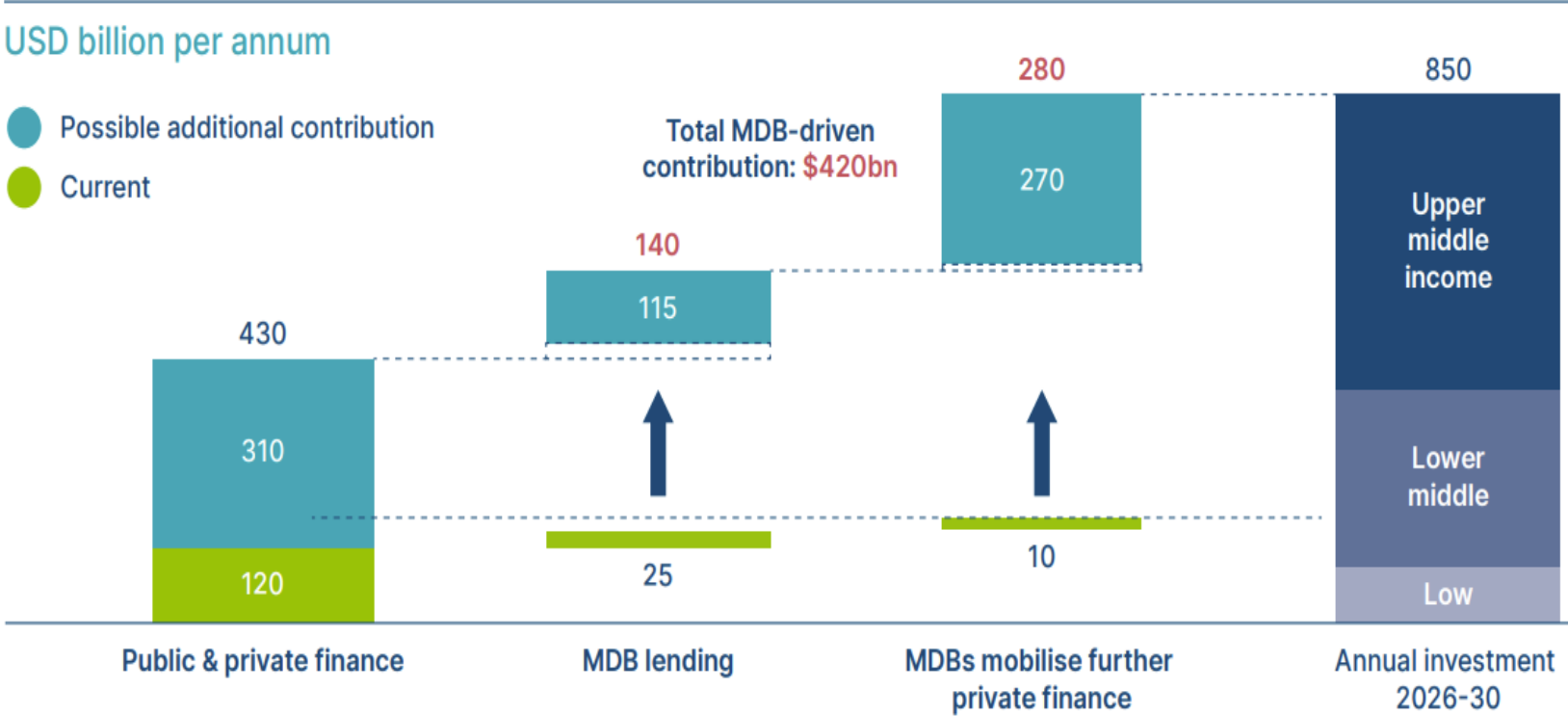
SOURCES: SYSTEMIQ analysis for the ETC (2022), SYSTEMIQ - Investments for green recovery and transformational growth 2020-30: Technical Note (2021), IMF World Economic Outlook October 2022

# Development Banks can unlock the gap in the Global South

- The ETC shows that development banks (MDBs) only lend \$25bn per annum to middle and low income countries, and mobilise only a further \$10bn per annum.
- An increase in development bank lending to \$140bn per annum by 2030 is feasible.
- With the right policies, this could unlock a further \$280bn per annum of private financing.
- That would go a long way to filling the financing gap.
- More domestic capital is also required.

## How Development Banks can unlock private capital

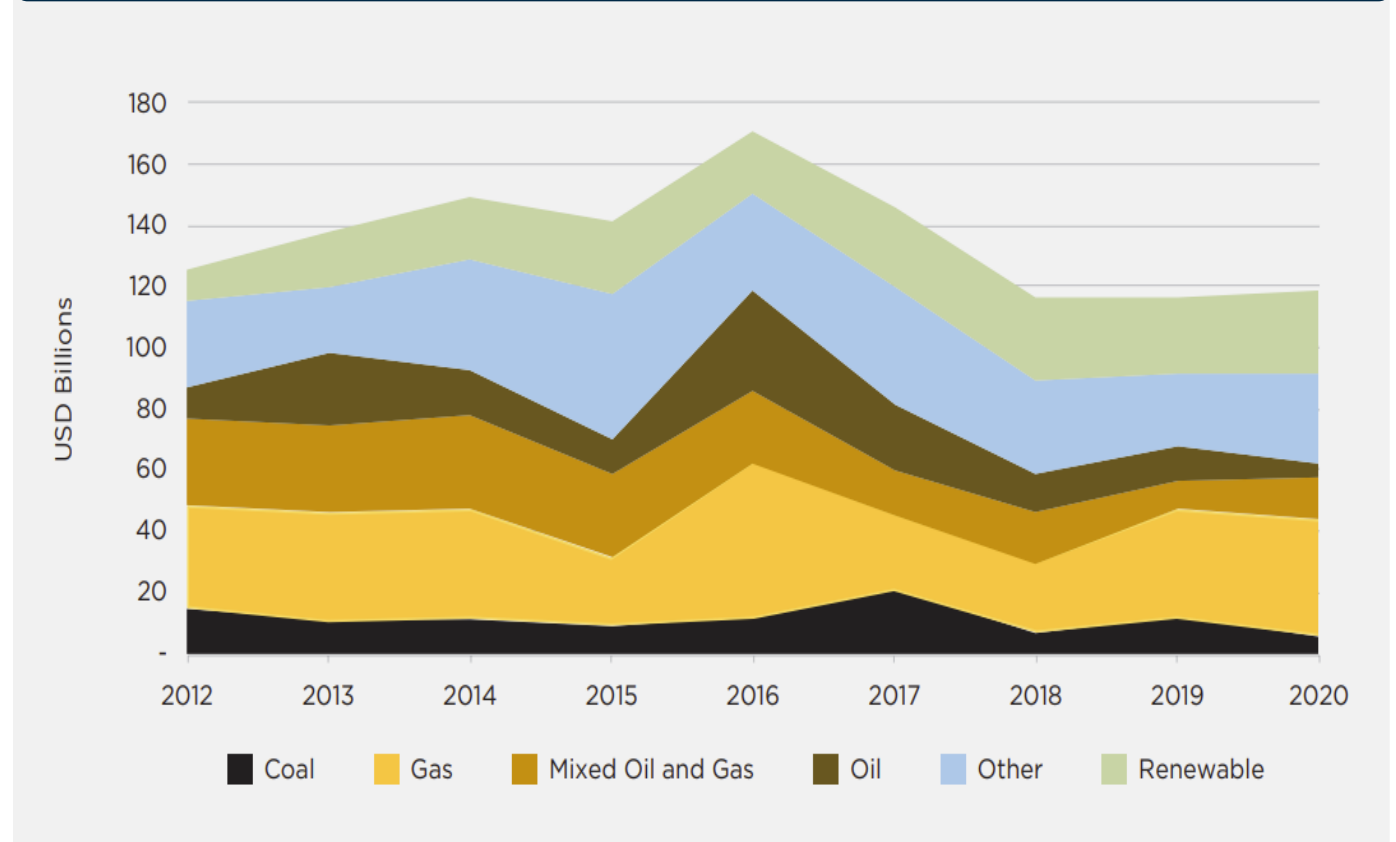
Illustrative scenario for financing climate mitigation in middle and low income countries by 2030<sup>1</sup>



# International support needs to be directed to renewables

- International support is required to help improve procurement and planning systems, incentivise local capital, and transfer key technologies.
- Especially in fragile states where this needs to be part of a wider package of support.
- Support is needed to build local capacity. For example, [RMI](#) is helping train the energy leaders of the future.
- There is still a long way to go as MDB finance needs to be reallocated to renewables.

Annual G20 and MDB public finance for fossil fuels vs. renewable energy



## About RMI

RMI is an independent nonprofit founded in 1982 that transforms global energy systems through market-driven solutions to align with a 1.5°C future and secure a clean, prosperous, zero-carbon future for all. We work in the world's most critical geographies and engage businesses, policymakers, communities, and NGOs to identify and scale energy system interventions that will cut greenhouse gas emissions at least 50 percent by 2030. RMI has offices in Basalt and Boulder, Colorado; New York City; Oakland, California; Washington, D.C.; and Beijing.

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*[Peaking: Why Fossil Fuel Demand Peaked in 2019](#)*

*[Peaking: Why Peaks Matter](#)*

*[The Energy Transition Narrative](#)*

