

An aerial photograph of a river delta, likely the Amazon, showing a large reservoir and a dam structure. The river branches out into a complex network of channels and floodplains, with varying shades of green and brown indicating different land uses and vegetation. The water in the reservoir is a deep blue, while the river channels show more sediment and lighter colors.

# **Climatescope 2022**

## **Power Transition Factbook**

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**November 2022**

**BloombergNEF**

# Executive summary

This marks the 11<sup>th</sup> anniversary of Climatescope, BloombergNEF's annual assessment of energy transition conditions in individual markets. It is the second year the project covers not only clean power but also the decarbonization of the transportation and buildings sectors. This year, the results for each sector are discussed in three separate reports. This is the first in that trilogy and focuses exclusively on power.

Climatescope represents the collective effort of over 30 BNEF analysts who gather detailed data on 136 markets globally, including 107 emerging markets and 29 developed nations. It offers macro analysis of trends while also scoring individual markets based on their attractiveness for receiving clean energy capital. This year's key findings:

Whether it was a desire to demonstrate progress ahead of the global climate talks, worries over energy security, fears about climate change, or the appeal of cost-competitive renewables, policy makers in developing markets upped their efforts around clean power in 2021.

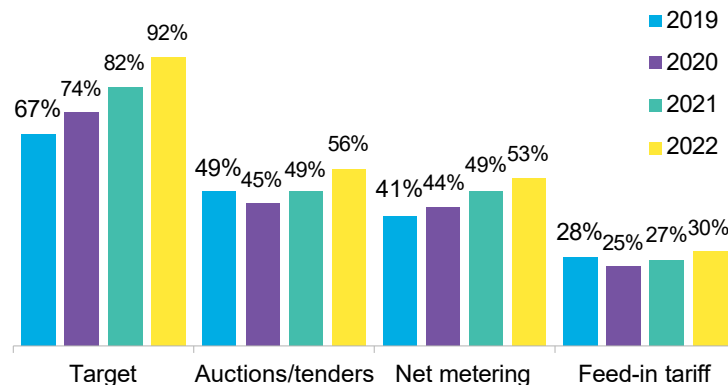
- Among the emerging markets surveyed, 92% now have long-term clean energy targets on their books. That's up from 82% a year ago and 67% in 2019. While follow-through on these pledges has been limited to date, the trend points in the right direction.
- Along those lines, no less than 56% of emerging markets now have policies to hold reverse auctions for clean power delivery contracts, up from 49% last year.

**92%** Of emerging markets with long-term clean energy targets

**15** Markets (excluding Mainland China) accounted for 89% of 2021 emerging market renewables investment

**34GW** New coal capacity was added in emerging markets in 2021

## Share of emerging markets with certain policy mechanisms in force



Source: BloombergNEF

# Executive summary (2)

- The popularity of net metering has also grown with 53% of emerging markets now having such policies in place, up from 49% last year. And feed-in tariffs are now on the books in 30% of emerging markets, up from 27% a year ago.

It is too soon to say if this new policy-making is moving the market forward. Taking Mainland China out of the picture due to its enormous size, emerging markets clean energy investment in 2021 fell but the volume of new renewables capacity brought online rose.

- Not counting Mainland China, emerging markets saw renewables investment slide to \$49 billion in 2021 from \$52 billion the year prior. Collectively, these markets accounted for just 15% of 2021 global investment and activity fell to its lowest level since 2016. The weakness reflected remaining uncertainties on investing in higher-risk markets after the pandemic.
- However, renewable energy deployment in emerging markets ex- Mainland China jumped in 2021 to 67.8GW from 56.4GW the year prior.
- Investment and deployment figures can move in opposite directions year-to-year as capital deployed at one point in time typically reflects projects that are due to be completed at a future date.
- Given that and given the 2020-2021 slide in clean energy investment, deployment could sink in 2022, particularly because clean energy equipment costs have not been declining in recent months.

Renewables are becoming ubiquitous.

- In 2021, 112 countries installed at least 1MW of solar capacity – a new high and up 11% from 2020. That included a total of 83 emerging markets, up from 72 in 2020. The modular nature of PV, along with steep equipment price declines over a decade explain the technology's proliferation.
- More countries than ever are making renewable energy technologies their top choice. In 2021, 78% of the world's nations installed more clean power (including hydro) than fossil-fueled power. That is up from 50% in 2012. Solar was the technology of choice in nearly half the world's nations. In 2021, 48% of countries surveyed made solar their top choice. Hydro followed with 15%, down from 20% a decade earlier.

# Executive summary (3)

Wealthy nations are subtracting coal-fired power-generating capacity from their grids, but emerging markets continue adding it.

- Developed countries shuttered 21GW of coal plants in 2021, the most ever in a single year. While natural gas capacity grew 3GW in these markets, it was far below the 12GW added in 2020.
- Coal additions in emerging markets including Mainland China totaled 34GW, their lowest level since BNEF began its survey 11 years ago. However, they remain significant. Net additions from natural gas bounced back to 36GW in 2021, up from 15GW the year prior.

For the second time in three years, Chile tops the Climatescope leaderboard.

- Climatescope creates scores for individual markets based on over 100 quantitative and qualitative indicators. Each year, it ranks markets based on their readiness to receive clean energy investment.
- Chile was the highest scorer in part due to its goal of increasing its target to reach 40% clean power generation by 2030, after already meeting their 2025 target five years early. While most of Chile's generation currently comes from thermal sources, the government has committed to shutter 1.7GW of coal-fired power by 2024 and phase it out completely by 2040.
- India, Mainland China, Colombia and Croatia round out the rest of the top five emerging markets.
- India's ambitious policy framework and extremely competitive renewable energy market resulted in the country finishing in 2<sup>nd</sup> position.
- Mainland China is the global leader in clean energy manufacturing, deployment and funds attracted. It has consistently landed in the Climatescope top five and was 3<sup>rd</sup> this year.
- Colombia was 4<sup>th</sup> thanks largely to a clean power auction system established by the now departed Duque government.
- Croatia finished 5<sup>th</sup> due largely to major strides in opening its wholesale market, building more clean energy capacity and improving its grid.



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# About Climatescope

Climatescope is an online market assessment tool, report and index that evaluates the relative readiness of individual nations to put energy transition investment to work effectively. It provides snapshots of current clean energy policy and finance conditions that can lead to future capital deployment and project development.

2022 marks the 11th year BloombergNEF has produced Climatescope. Over that time, the project has significantly evolved and now includes detailed information on 136 markets globally, including 107 emerging markets and 29 developed nations. While Climatescope has historically focused on just the power sector, in 2021 it has been expanded to include in-depth data on investment conditions for lower-carbon transportation and buildings.

Climatescope encompasses nearly every nation in the world with over 2 million inhabitants\*. Developed markets are defined as OECD countries minus Chile, Colombia, Costa Rica, Mexico and Turkey. These five are part of the OECD but remain attractive emerging markets for clean energy development. Developing markets include all non-OECD nations, plus these five countries.

This report summarizes the power-sector research undertaken by over 40 BNEF analysts compiling detailed data on Climatescope markets. It is the first of three Climatescope reports BNEF will produce with the next two focused on the transport and buildings sectors. Readers are encouraged to explore complete rankings, datasets, methodology, tools and country profiles on the [Climatescope website](https://global-climatescope.org/about) to leverage fully this deep-dive into how the countries surveyed are driving the energy transition.

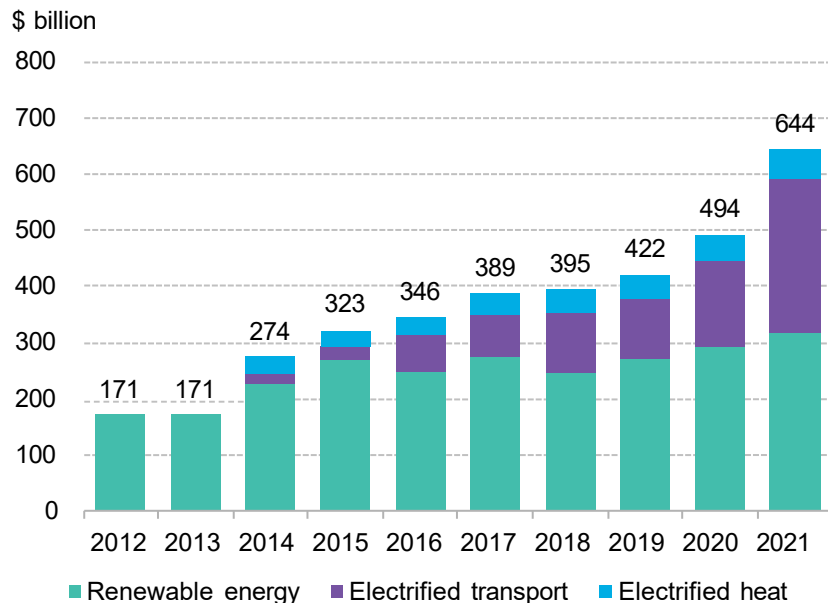
*\*For further details on how Climatescope has evolved over the years, please visit [global-climatescope.org/about](https://global-climatescope.org/about). Afghanistan, Cuba, Iran, North Korea, Yemen and Libya are not in the coverage due to local conflicts or international sanctions that make them particularly challenging to research.*



# 01. Investment

# In 2021, global energy transition investment surged to well past a half-trillion dollars

## Energy transition asset finance by sector



**Asset financing** – the funding of projects and infrastructure – for renewable energy, electrified transport and electrified heat set a new record at \$644 billion in 2021. This was up 30% from 2020, marking the fastest year-on-year growth in a decade in dollar terms. Renewable energy remains the single largest sector, accounting for about half the total at \$318 billion. However, electrified transport was the sector that grew fastest, at 77% year-on-year, to \$263 billion. It accounted for approximately four in 10 energy transition asset finance dollars deployed worldwide. Electrified heat topped \$52 billion, up 11% from 2020. This represents the smallest share among the three sectors, accounting for just 8% of the total.

**Renewables asset finance** grew 9% from 2020 to 2021, far faster than the 2019-2020 2% growth rate, but lower than the 11% from 2018-2019. The sector has been losing ground to other energy transition sectors and in 2021 accounted for the lowest share of total investment since BNEF began counting at 49%, down from 83% in 2014. This is mainly because wind and solar investment levels have remained approximately flat for six years. Meanwhile, the popularity of electric vehicles has surged recently.

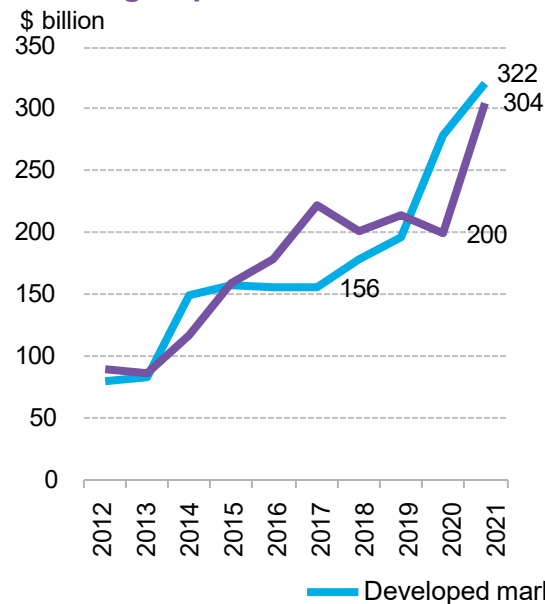
**Mainland China, the US and Germany** accounted for more than half of 2021 investment. Mainland China alone (\$254 billion) was more than a third of the total. The US (\$98 billion) followed at 15%, up from \$80 billion in 2020. Germany (\$43 billion) was 6% of the total.

Source: BloombergNEF. Note: energy transition asset finance encompasses renewable energy, electrified transport and electrified heat. For the last two, data is available from 2014.

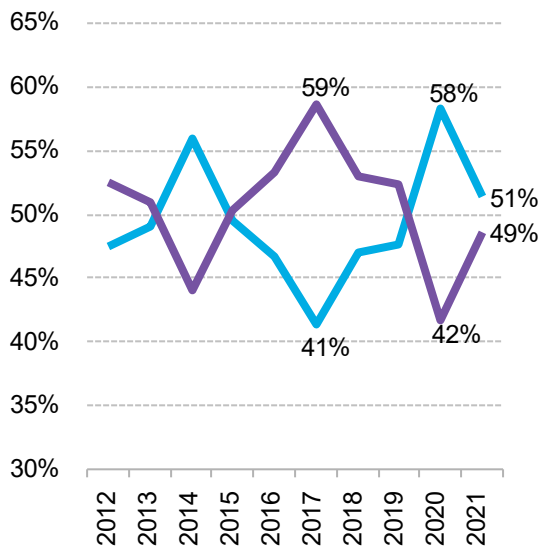


# ...with investment activity growing fastest in developing markets

## Energy transition asset finance by market group



## Developed vs. developing market asset finance



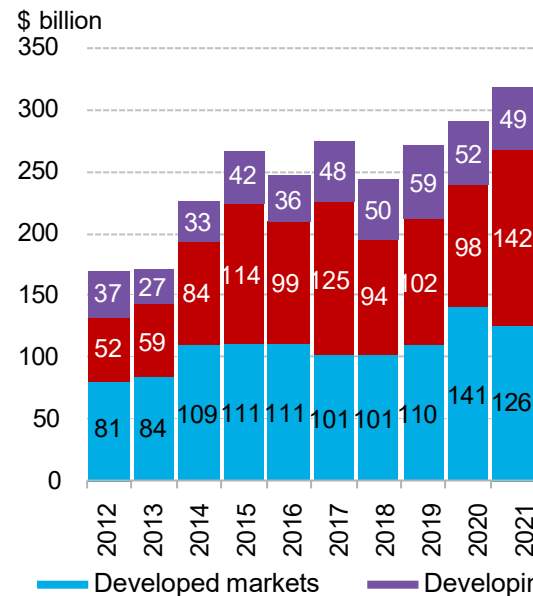
The pandemic's aftermath disrupted investment in developing nations. With \$304 billion, emerging markets accounted for 49% of the 2021 total, up from 42% in 2020 but well below the peak of 59% in 2017. In 2021, wealthier nations accounted for 51% of asset finance for renewables, electrified transport, and electrified heating, or \$322 billion, down from 58% in 2020.

Total energy transition asset finance skyrocketed 52% 2020-2021 in emerging markets but a more modest 15% in developed countries. Richer nations saw asset finance levels more than double 2017-2021, from \$156 billion to \$322 billion.

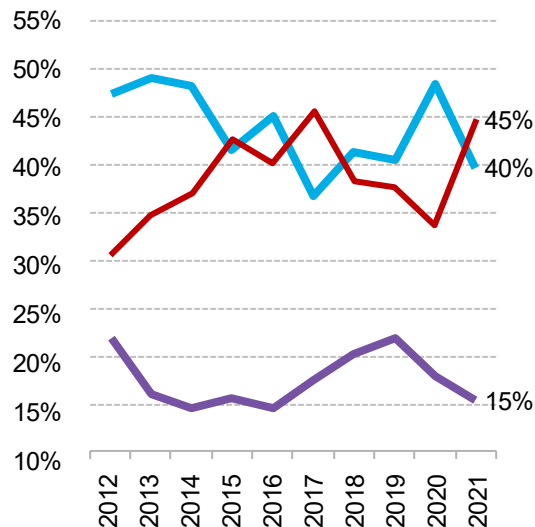
Source: BloombergNEF. Note: data includes asset finance for renewable energy, electrified transport and electrified heat. It does not include investment to undisclosed countries, which represented \$18.5 billion in 2021. Developed markets include OECD countries, minus Chile, Colombia, Costa Rica, Mexico and Turkey. Developing markets include all other economies.

# But Mainland China accounted for the vast majority of emerging markets activity

Renewable energy asset finance by income group, plus Mainland China



Renewable energy asset finance as share of total



Mainland China on its own in 2021 accounted for almost three times as much clean energy asset finance as all other emerging markets combined. China was also 45% of all global investment. The country saw its total reach a new high of \$142 billion, up from \$98 billion in 2020.

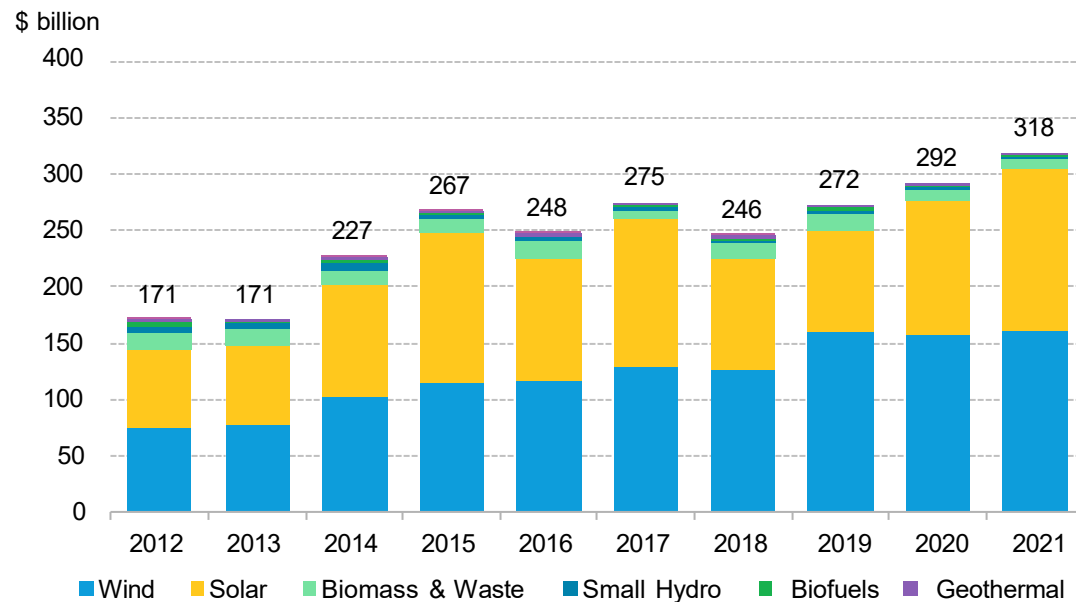
Not counting the Asian giant, all other emerging markets saw investment slide to \$49 billion in 2021 from \$52 billion the year prior.

Collectively, these markets accounted for just 15% of global investment in 2021. Activity fell to its lowest level since 2016. The weak levels in 2021 reflected remaining uncertainties on investing in higher-risk markets after the pandemic, which disrupted supply chains, boosted inflation and raised global interest rates.

Source: BloombergNEF. Note: data includes asset finance for renewable energy, electrified transport and electrified heat. Developed markets include OECD countries, minus Chile, Colombia, Costa Rica, Mexico and Turkey. Developing markets include all other economies.

# Global renewable energy asset finance jumped 9% in 2021

## Global new-build renewable energy asset finance by technology



Asset finance for renewable energy projects rose 9% in 2021 from the prior year. The average annual growth rate since 2015 has been 5%. With clean energy equipment costs no longer falling but deployment levels surging, asset finance for renewables is poised to rise again in 2022.

Wind and solar reached new heights in 2021, accounting for 96% of renewable asset finance. Wind was half the total at \$160 billion with solar at 45%, or \$143 billion. Solar asset finance jumped 20% from 2020-2021, while wind increased 2% on the same period.

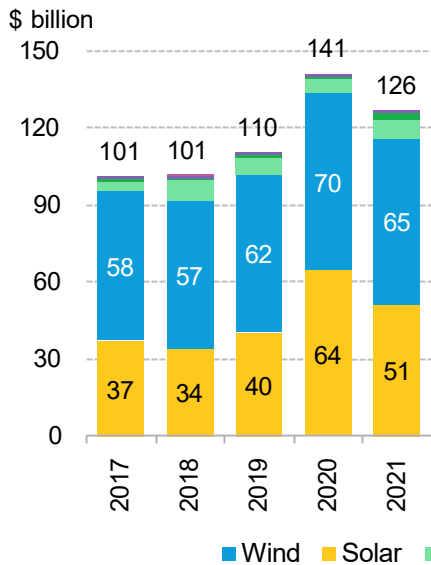
Source: BloombergNEF



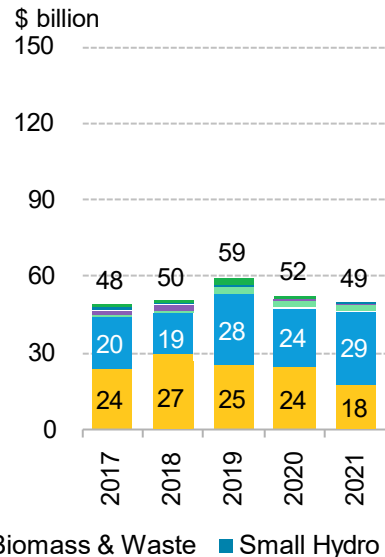
# Wind continues to account for the largest share of investment

## Renewable energy asset finance by market group

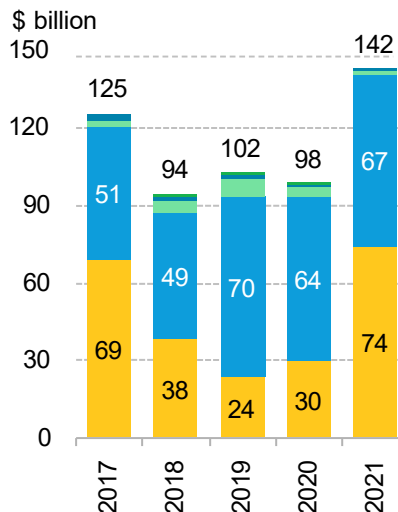
### Developed markets



### Developing markets excluding Mainland China



### Mainland China



Wind farms were the largest recipient of renewable energy asset finance in 2021, in both developed and developing markets (not including Mainland China). Solar followed with 41% of the total in developed nations and 36% in emerging markets. In Mainland China, however, solar was the top technology with 52% of the total, followed by wind with 47%.

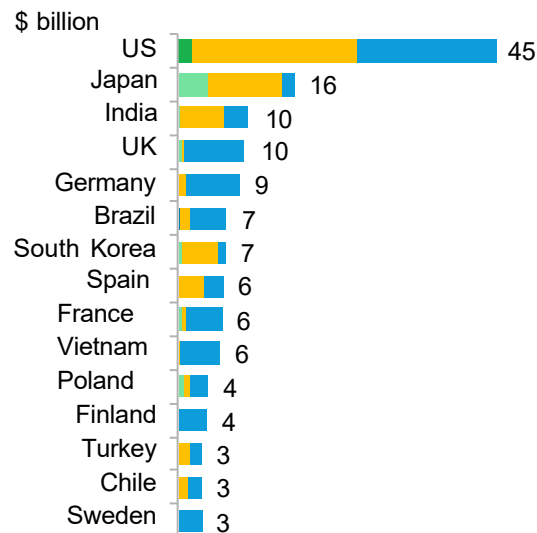
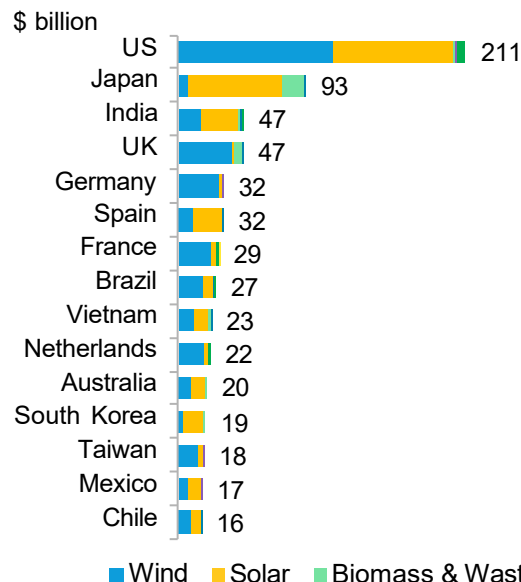
Renewable energy investment in emerging markets (excluding Mainland China) has remained somewhat flat 2017-21, averaging \$51 billion. In developed nations, the average was of \$115 billion over the same period.

Source: BloombergNEF. Note: Developed markets include OECD countries, minus Chile, Colombia, Costa Rica, Mexico and Turkey. It does not include investment to undisclosed countries. Developing markets include all other countries.

# Away from Mainland China, 15 markets account for 80% of all other investment

Top 15 markets for renewable energy asset finance ex-Mainland China, 2017-2021

Top 15 markets for renewable energy asset finance ex-Mainland China, 2021



Renewable energy investment remains highly concentrated in a relatively small number of markets. In 2021, the top 15 markets (excluding Mainland China) for new-build asset finance for renewable energy projects attracted \$141 billion, or 80% of all investment globally. The list remains basically the same for the cumulative renewable asset finance over the past five years, with the top five – the US, Japan, India, the UK and Germany – accounting for 31% of the \$1.4 trillion that went into renewables projects from 2017-2021.

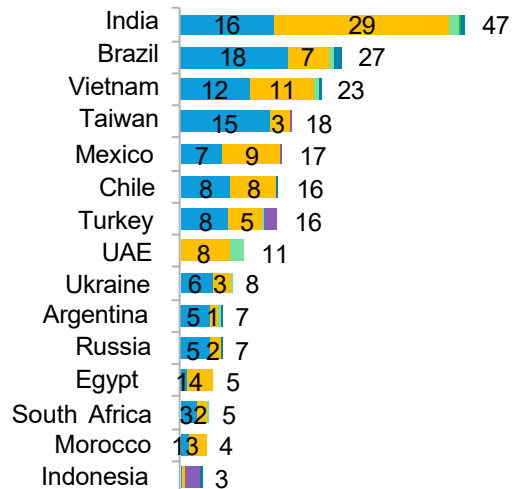
Only five emerging markets were present among the top 15 markets in 2021. India, Brazil, Vietnam, Turkey and Chile accounted for nearly \$30 billion or 17% of the total renewable energy asset finance in 2021.

Source: BloombergNEF

# Among non-Mainland China emerging markets, 15 accounted for 89% of 2021 asset finance

## Top 15 emerging markets for renewable energy asset finance excluding Mainland China, 2017-2021

\$ billion

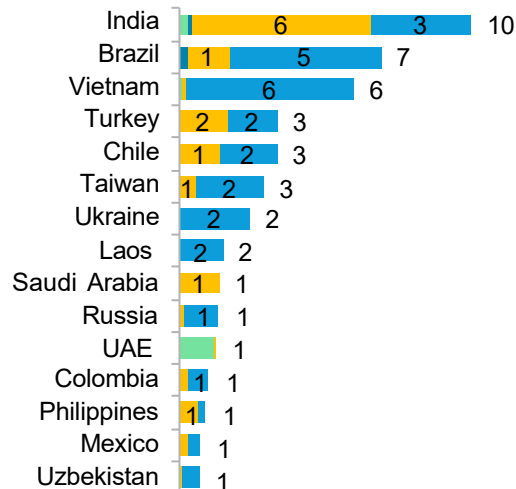


■ Wind ■ Solar ■ Biomass & Waste ■ Small Hydro ■ Biofuels ■ Geothermal

Source: BloombergNEF

## Top 15 emerging markets for renewable energy asset finance excluding Mainland China, 2021

\$ billion



Among emerging markets, clean energy financing is even more concentrated in a small number of nations with 15 (excluding Mainland China) accounting for 89% of 2021 investment.

India and Brazil top the table with 35% between them. India saw investment rise to \$10 billion in 2021 from \$6.3 billion in 2020. In Brazil, it jumped to \$7 billion from \$5.7 billion. Meanwhile, despite being third on the list, Vietnam saw invest shrink 30% year-on-year to \$5.7 billion in 2021.

However, in 2021 a few relatively new markets shined, including Colombia, Laos and Ukraine.

Colombia's renewable energy asset finance activity set a new high at almost \$1 billion thanks to successful reverse auctions for clean power contracts. Laos saw investment jump to \$1.5 billion to expand its Monsoon wind farm. Before the war, Ukraine had implemented key reforms to its power sector, which helped the country boost its 2021 investment to \$2 billion.

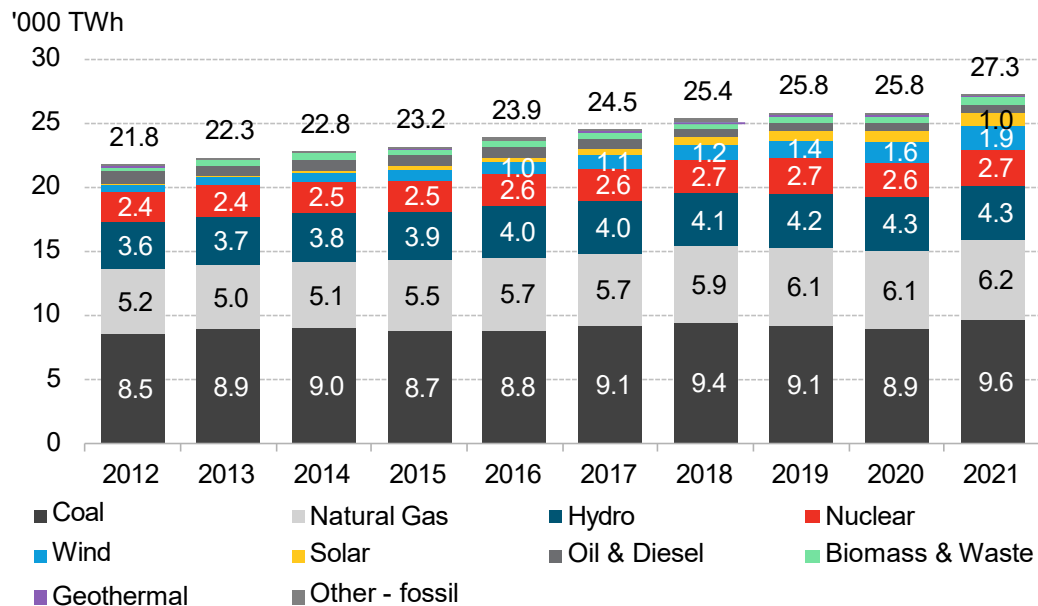


# 02.

## Power generation and capacity trends

# Global power generation rebounded in 2021

## Global annual generation by technology



Source: BloombergNEF

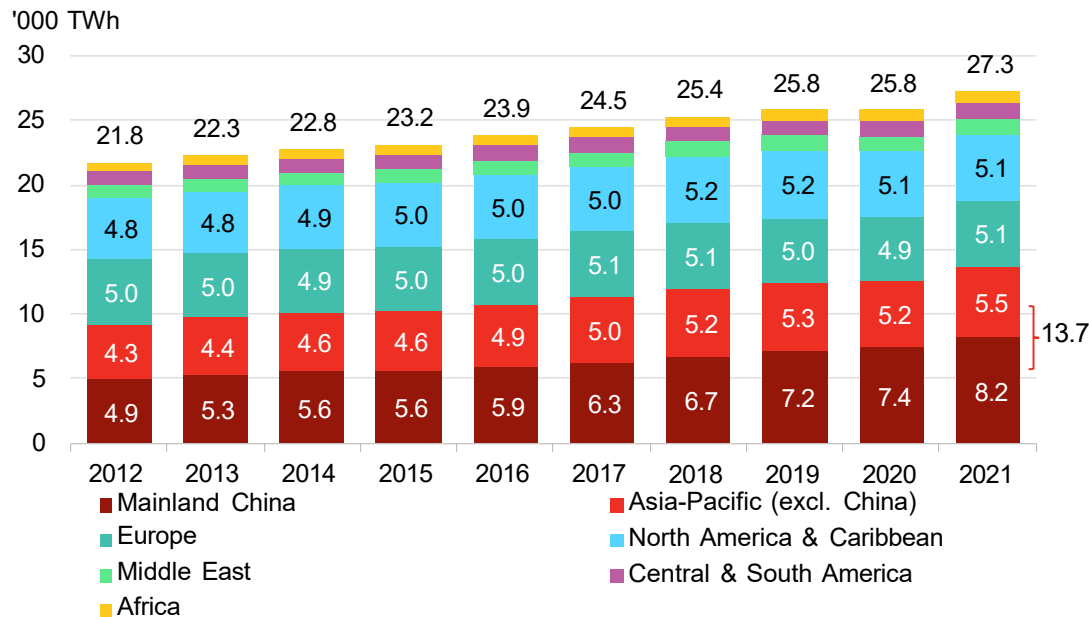
Total global power production jumped 5.6% in 2021 as economies rebounded from the worst of the Covid-19 pandemic. Generation spiked from 25,800 terawatt-hours (TWh) in 2020 to 27,300TWh in 2021. This marked a new high and came on the heels of three years of flat electricity demand.

Coal led the growth with an 8.5% jump from 2020-2021. Total global coal generation reached its highest level ever in 2021 at 9,600TWh. Over two thirds of markets with some coal capacity installed (52 around the world) saw coal generation grow 2020-2021. By comparison, from 2019-2020 coal usage rose in just 27 markets.

Global solar generation reached 1,000TWh for the first time, while wind neared 2,000TWh. All zero-carbon sources of generation (renewables, hydro and nuclear) totaled over 10,000TWh, or nearly 40% of global power production. Generation from natural gas and nuclear rose 3% and 4%, respectively, while hydro power's contribution slid by 0.7%.

# Asia drove the generation growth

## Global annual generation by region or country



The Asia-Pacific region led the spike in global electricity production with a 9% 2020-21 jump. Thanks to a strong economic rebound, Mainland China saw generation rise 10.5% to 8,200TWh. This marked its largest single year-on-year jump in a decade.

Power production in Asia-Pacific markets (excluding Mainland China) is now greater than in Europe or North America & Caribbean. These economies account for the largest growth in power production over 10 years and jumped 6% 2020-2021 to 5,500TWh. The uptake was led mainly by India, South Korea, Malaysia, Japan and Indonesia, which together represented 73% of Asia's ex-Mainland China total generation growth.

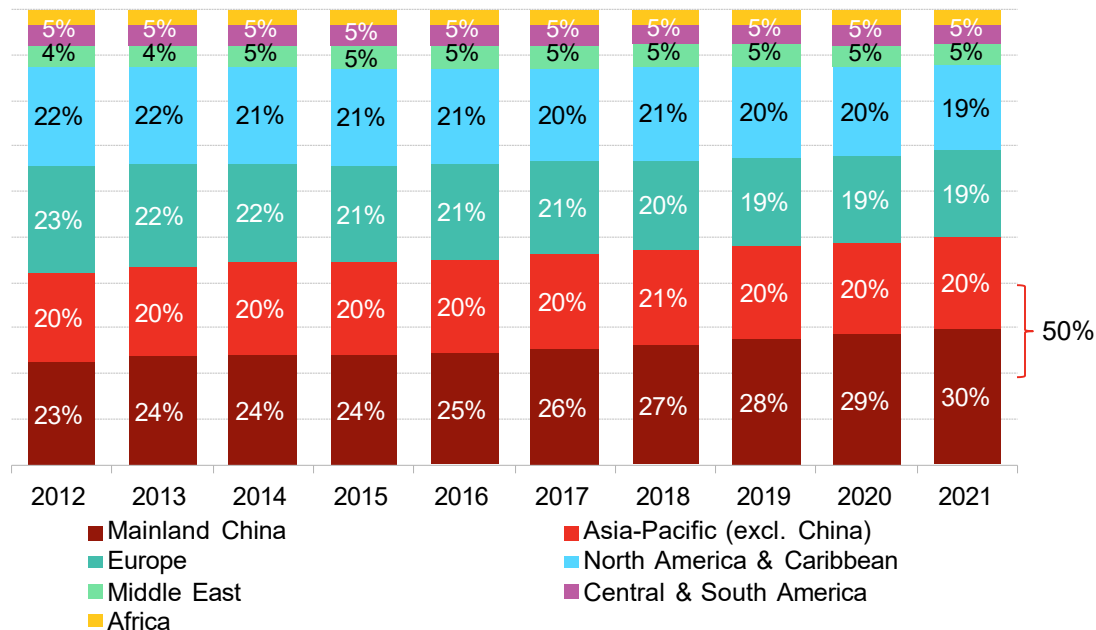
Central & South America and Europe saw generation grow 5.6% and 4.3%, respectively. Meanwhile in North America & Caribbean and Africa, power demand has remained roughly flat.

Source: BloombergNEF



# Asia accounts for half of global electricity demand

## Share of annual generation by region or country



Demand for electricity from the Asia-Pacific region has risen swiftly over the past decade and the continent now accounts for half of global generation. Mainland China alone accounts for 30% of the global power generation.

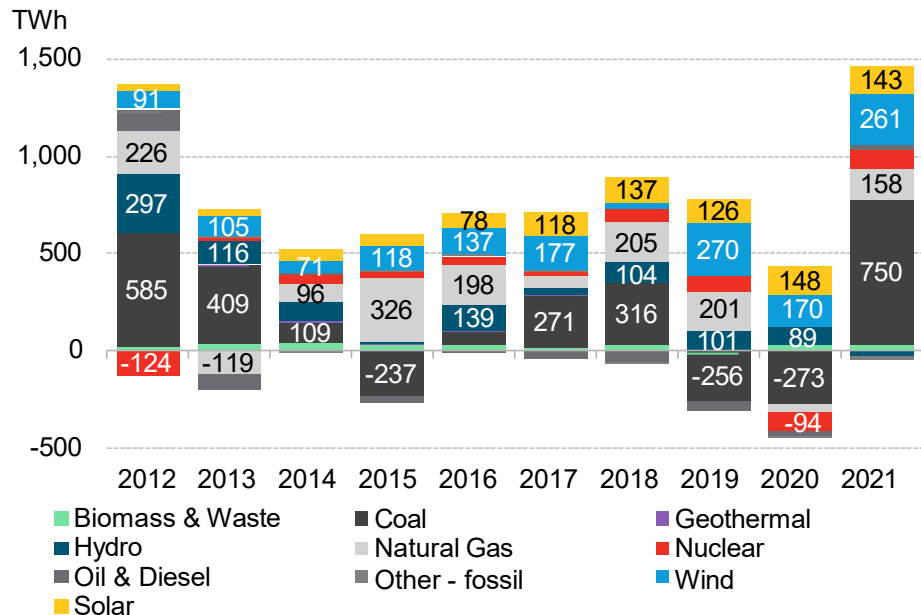
Demand in North America and Europe has declined over a decade and touched new lows in 2021. North America and Europe accounted for 19% each of the world's electricity production in 2021, down from 23% and 22%, respectively in 2020.

The Middle East, Central & South America and Africa have broadly held their shares of global generation, as the rate of growth in demand in these nations has generally matched the global growth rate. The Mideast and Central & South America account for 5% of global electricity generation each, while Africa represents 3%.

Source: BloombergNEF

# Coal accounted for the majority of additional generation in 2021

## Global annual generation change



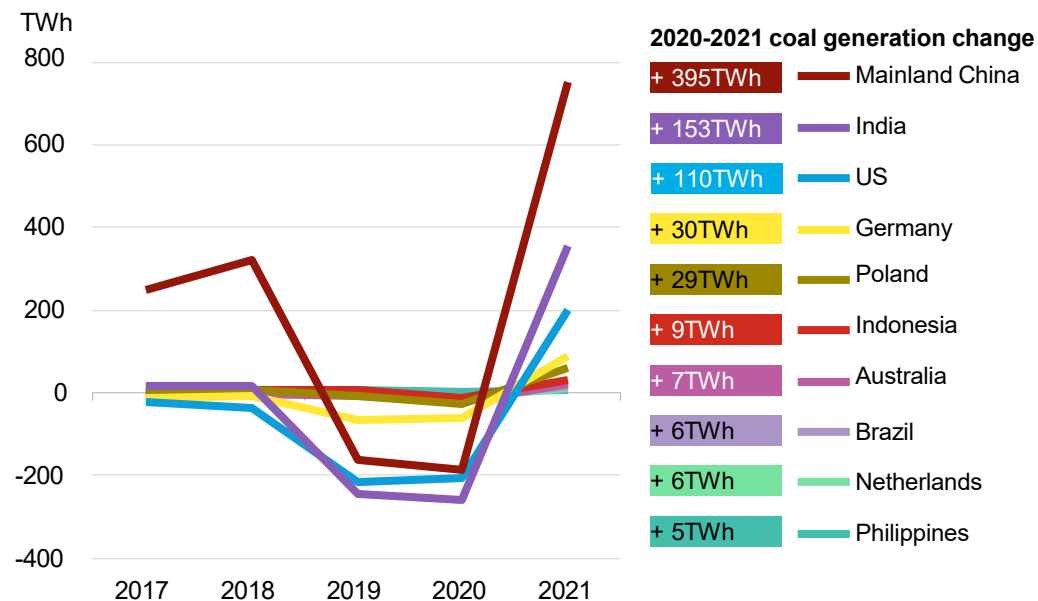
For the first time since 2013, coal-fired power plants were the top contributor to top-line power generation growth. Following two years of decline, coal generation jumped 750TWh in 2021 and accounted for over half of all net additional power generation. Three factors explained the surge: fast-growing post-pandemic electricity demand overall, depressed hydro generation due to droughts and higher natural gas prices.

Another coal generation spike is possible in 2022 as European nations seek short-term solutions to compensate for droughts and extremely high gas prices. Germany has this year reactivated 4.8GW of fossil fuel power plants, including 3.2GW of coal-fired capacity. Another 5.5GW of coal is expected online by year-end, along with 4GW of nuclear capacity. Other European countries are expected to follow similar paths.

Source: BloombergNEF

# Mainland China, India and the US led the coal generation spike

Annual coal generation change in top markets for coal electricity growth



Source: BloombergNEF

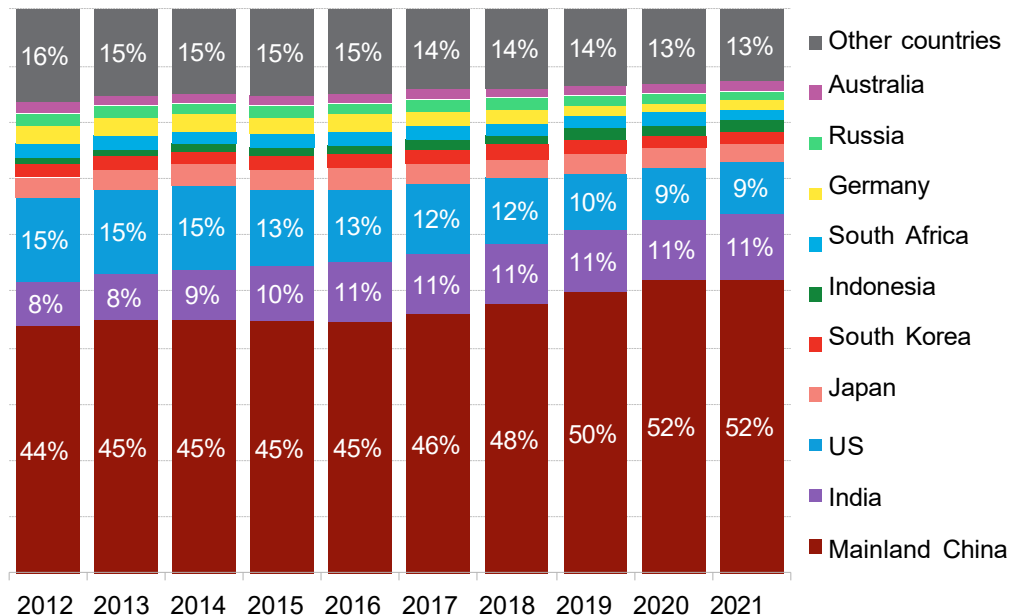
Mainland China, India and the US led the spike in coal power production. These markets saw coal generation jump 9%, 16% and 14%, respectively 2020-2021.

Coal's rebound in 2021 came after much-celebrated declines in previous years. The US, Germany, Netherlands and Italy are among countries where coal electricity has been trending down since at least 2017.

Half of the countries that pledged to phase out coal at COP26 recorded growth in coal generation in 2021. In November 2021, over 40 countries committed to retire coal capacity and nearly all world nations pledged to phase down unabated coal plants. Still, many countries trended in the opposite direction in 2021.

# Over 85% of coal generation occurs in just 10 countries

## Top countries for coal generation



Ten countries accounted for 87% of the total coal power produced globally in 2021. This was virtually unchanged from 2020. Mainland China, India and the US accounted together for 63%. Japan and South Korea completed the top five, with 3% and 2% of the total, respectively.

Mainland China has been the top coal generator for at least the last 15 years and in 2021 was responsible for 52% of coal generation, up from 44% in 2012. Its coal power production has consistently increased since 2015 and recorded a 9% jump 2020-2021.

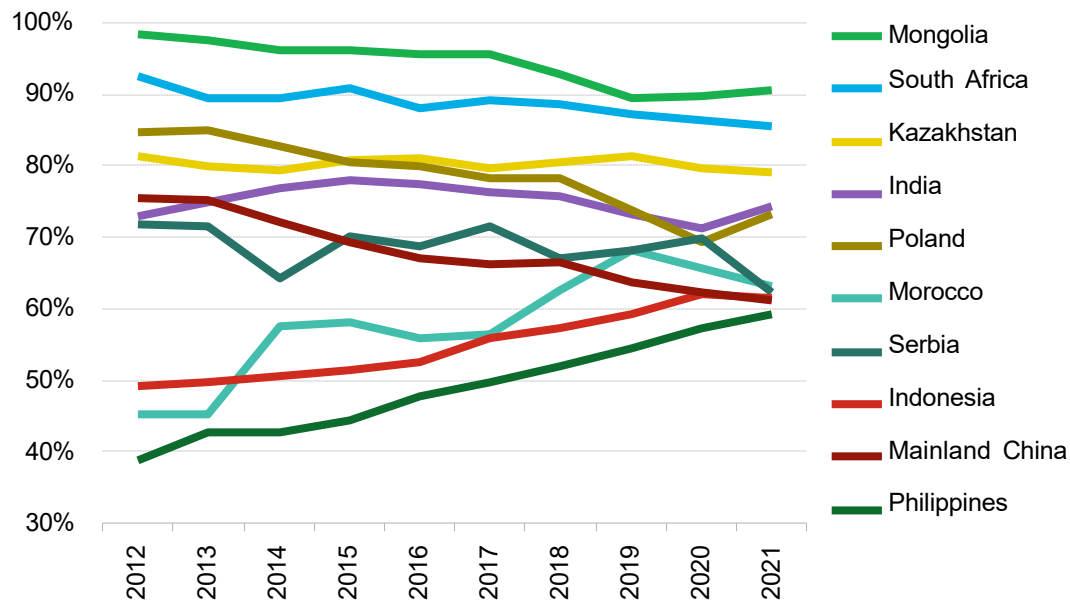
India was the second biggest coal generator and was responsible for 11% of the total, or 1,100TWh with the US right after with 9%, or 904TWh. Unlike all others in the top 10, the US has cut its coal generation share since the beginning of the decade. In 2012, the US was 15% of coal generation; in 2021, it was 9%.

Source: BloombergNEF



# Many markets continue to rely heavily on coal

## Leading nations' coal penetration rates



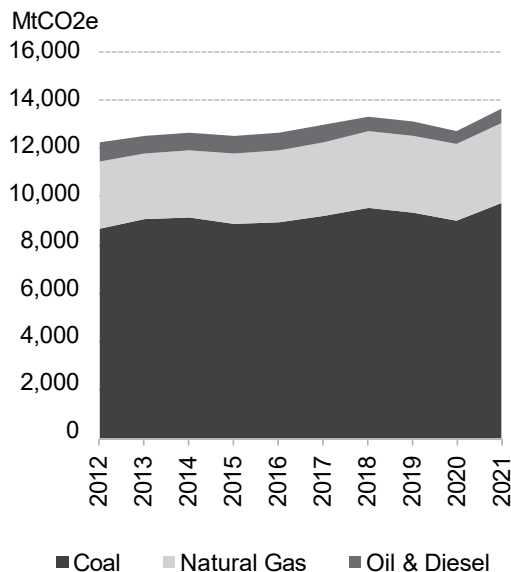
Ten countries rely on coal to meet at 60% of their power demand. Mongolia leads, with over 90% of its electricity coming from coal, followed by South Africa with 86%. In both nations, growth in wind and solar use has slowly helped reduce coal's share. Kazakhstan, India and Poland follow with 79%, 74% and 73%, respectively.

The Philippines and Indonesia has seen their reliance on coal rise most over the past decade. In both nations, coal has been nearly the only source meeting fast-growing demand. Renewables have seen limited progress by comparison. Philippines' coal reliance spiked from 39% in 2012 to 59% in 2021. In Indonesia, it jumped 49% to 61% over the same period.

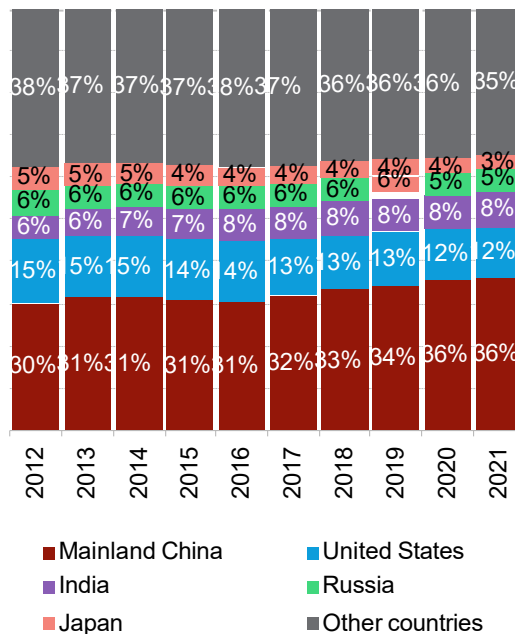
Source: BloombergNEF

# Higher coal generation boosted power sector emissions 7%

## Global power sector emissions by technology



## Global power sector emissions by country



Power sector CO<sub>2</sub> emissions rose 7% in 2021 from the year prior to set a new record. This was mainly due to the jump in year-on-year coal generation. Emissions from coal-fired power plants rose 8% in 2021 from the prior year. Natural gas emissions also increased 4% compared to 2020. This marked the biggest year-on-year rise in gas-related emissions since 2014-2015.

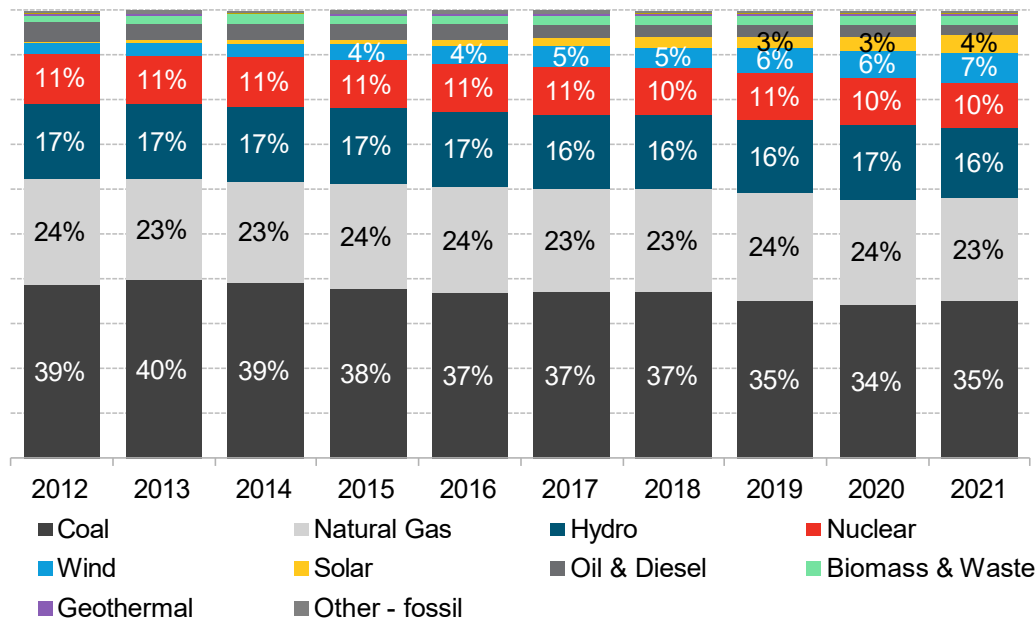
Due to high coal generation, Mainland China, the US and India are responsible for 57% of global power sector emissions. Russia and Japan follow far behind with 5% and 3%, respectively.

While emissions remained flat or slid slightly 2019-2020 in absolute terms in most nations, in Mainland China they rose 1% in 2020 and 9% in 2021. Since 2015, the country has consistently raised its share of total global power sector emissions. In six years, Mainland China's power-sector emissions have soared 28% over the last six years.

Source: BloombergNEF and NEO 2020

# Wind and solar surpassed 10% of global generation for the first time

## Share of global generation by technology



With nearly 3,000TWh of power produced in 2021, wind and solar accounted for a combined 10.5% of 2021 generation. Wind's contribution rose to 6.8%, up from just 0.7% a decade ago, while solar reached 3.7% up from virtually nothing in 2012. Non-hydro renewables (wind, solar, geothermal and biomass) reached 13% of total generation, compared to 5% at the beginning of this decade.

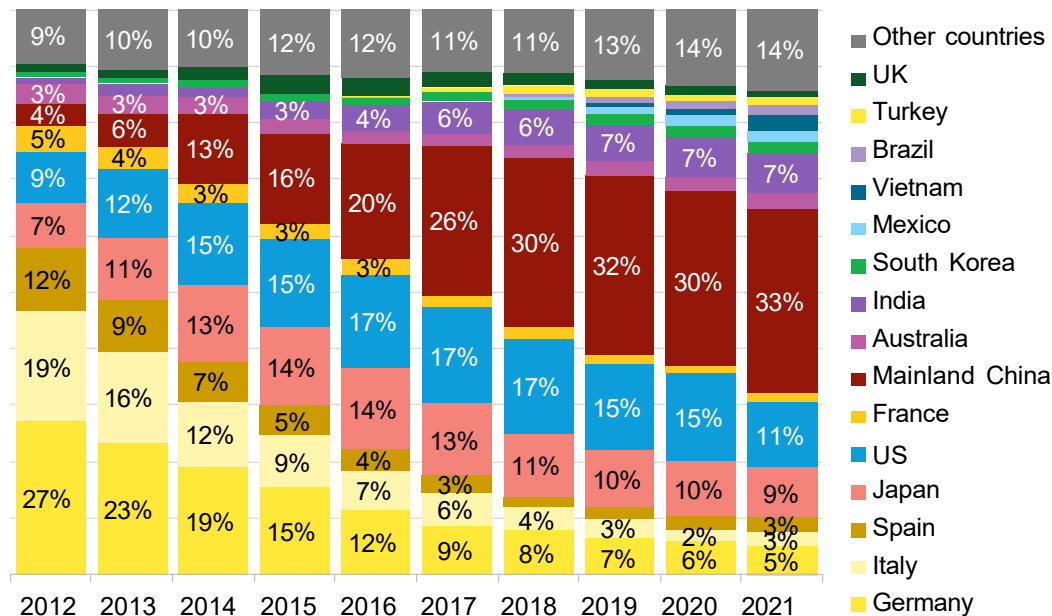
Zero-carbon technologies accounted for 39% of total generation in 2021. Hydro and nuclear were 16% and 10% respectively in 2021, but the participation of these technologies in grids has just fluctuated over the decade.

Fossil fuels remain the world's main power source and accounted for 61% of 2021 global generation. Coal remained the top technology in 2021 at 35%. Natural gas followed with a 23% contribution.

Source: BloombergNEF

# Solar is concentrated in a small number of markets, but others are growing

## Leading nations' shares of global solar generation



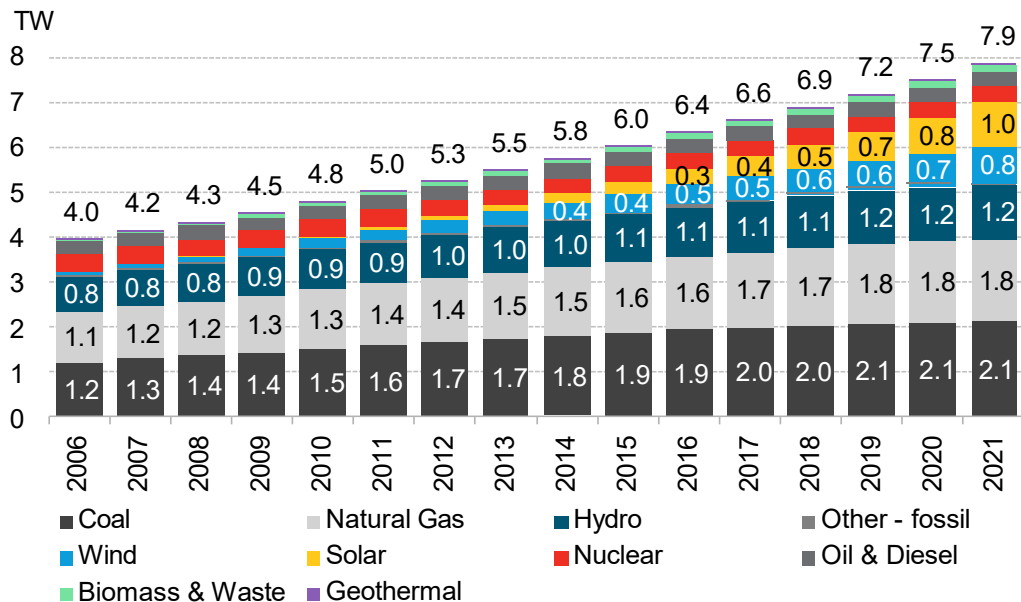
While solar generation remains concentrated in a relatively small group of countries, new leaders have emerged over the decade. In 2012, most solar power production was concentrated in developed nations, but over the decade it has gained momentum in a growing and diverse number of nations. In 2012, only 33 countries had solar generation above 20GWh. By 2021, this had more than tripled to 118 countries.

A third of global solar generation occurred in Mainland China in 2021. The US, Japan and India followed with 11%, 9% and 7%, respectively. Vietnam, Mexico and Brazil are other emerging markets that have seen solar generation grow over past few years. Together, they accounted for 6% of 2021 global solar generation.

Source: BloombergNEF

# Total installed capacity has nearly doubled in 15 years

## Global installed capacity by technology



Global installed power-generating capacity reached a new high in 2021 of 7.9TW, nearly double the 4TW installed 15 years ago. From 2020 to 2021, capacity grew 4.8%, the biggest increase since 2015-2016.

Wind and solar grew fastest. Solar PV capacity jumped 23% 2020-2021 to 973GW in 2021. That is more than nine times the 103GW that was online in 2012 and 139 times the 7GW that was installed in 2006. Global wind capacity jumped 12% 2020-2021 to 833GW. Total wind capacity installed has nearly tripled in a decade.

We expect wind and solar to account for over a quarter global capacity by the end of 2022. Together, these technologies were 23% of global capacity as of year-end 2021. Zero-carbon technologies reached 45% of global capacity, up from just 11% in 2012.

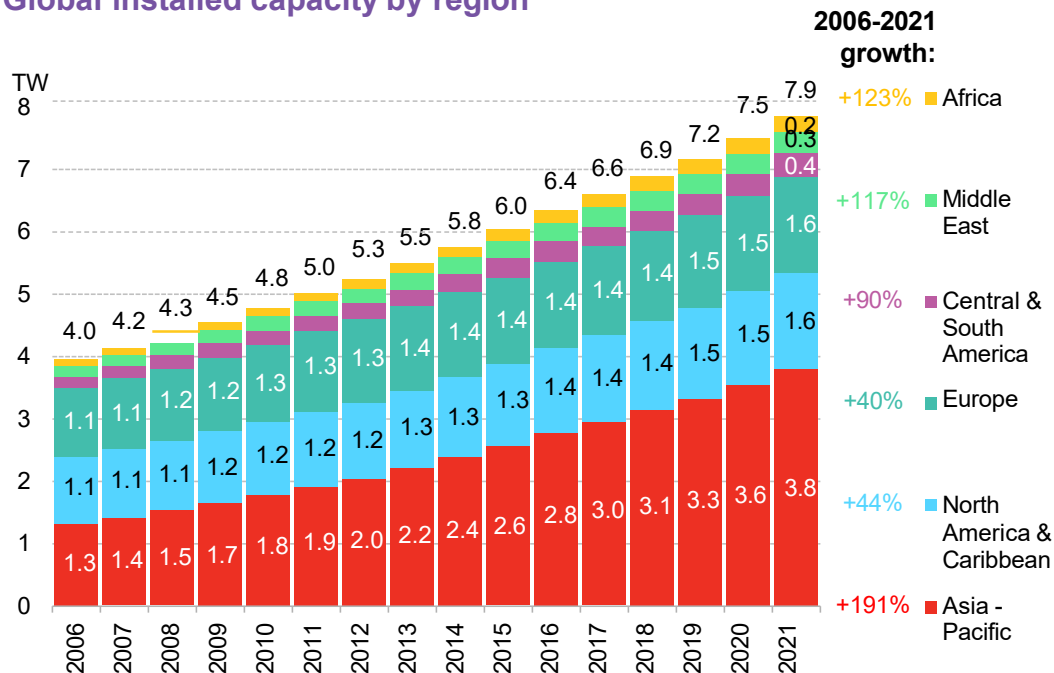
Coal still accounts for the largest individual share of global capacity. Coal capacity online continues to rise even as its share on percentage basis declines.

Source: BloombergNEF



# Asia and Africa's capacity has grown fastest in the past 15 years

## Global installed capacity by region



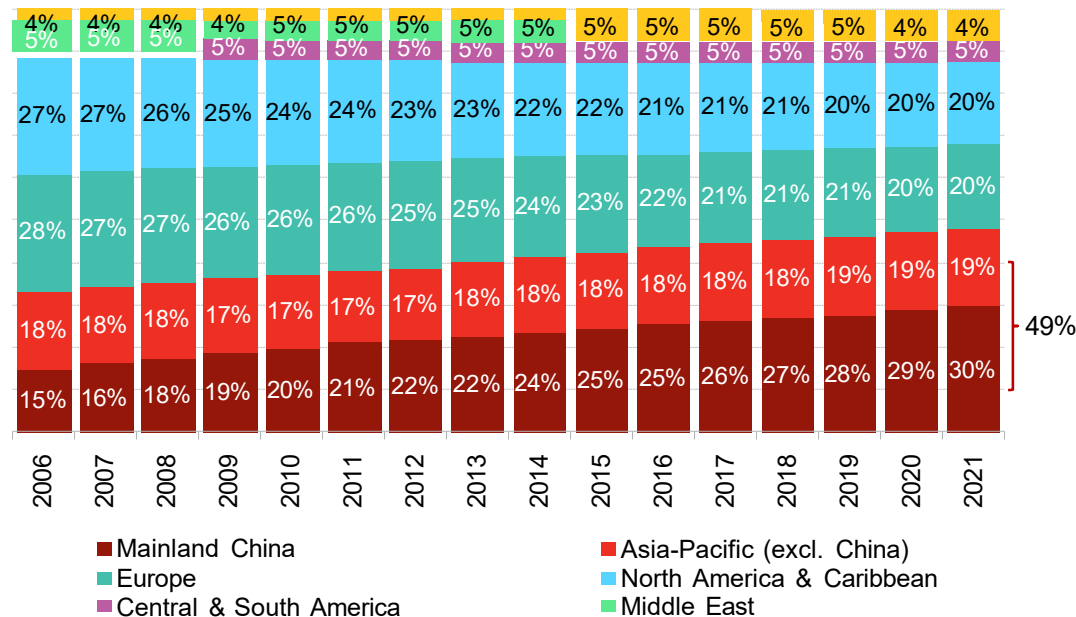
Source: BloombergNEF

The Asia-Pacific's power-generating capacity has nearly tripled in a decade and a half. In absolute numbers, APAC's total installed capacity jumped from 1.3TW in 2006 to 3.8TW in 2021. Laos, Cambodia and Vietnam all recorded impressive expansions of their power matrices, with growth rates ranging from 528% to over 1,100% since 2006. Africa followed with a 123% jump over the period. In 2021, the continent reached 249GW of capacity, up from 111GW in 2006, Angola, Ethiopia and Rwanda are among the African nations that saw their installed capacity grow most over the period.

Europe and North America were the regions that have grown least since 2006. These regions saw their power matrixes grow by just 40% and 44%, respectively.

# Asia is home to nearly half of global installed capacity

## Share of global installed capacity by region or country



2021 reaffirmed the Asia-Pacific region's role in the global power mix and the region now is home to 49% of global installed capacity. As of year-end 2021, APAC totaled 3.8TW installed, with Mainland China accounting alone for 30% of the total global. The country's capacity has more than doubled over a decade, from 1.1TW in 2012 to 2.3TW in 2021.

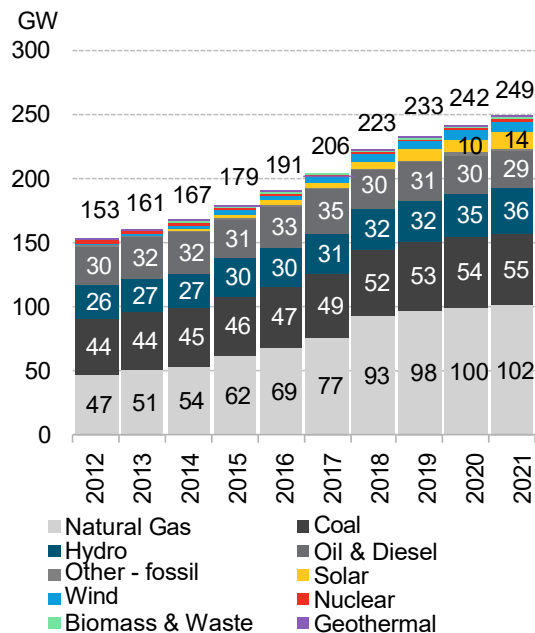
Apart from Asia, all other regions broadly held their shares 2020-2021 with Europe and North America remaining the second largest regions for installed capacity, accounting for 20% each. However, these were also the only two regions to see their shares of capacity drop sharply since 2006, when each accounted for 27% of global capacity.

Despite being home to 16% of the world's population, Africa has just 3% of installed global capacity. This share has remained stable over the past 15 years.

Source: BloombergNEF

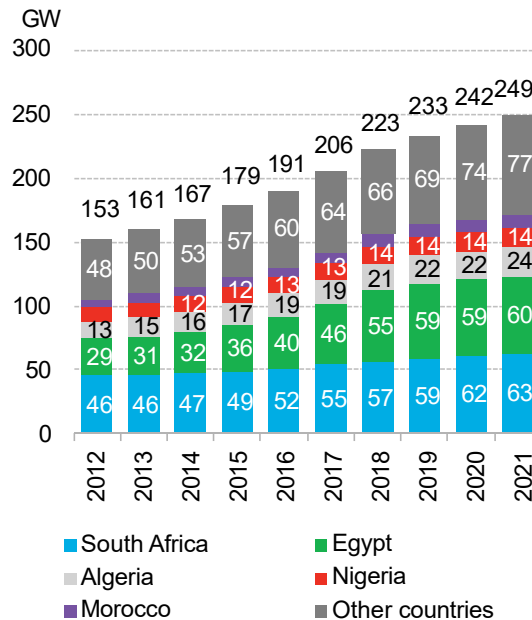
# Fossil fuels predominate in Africa but are concentrated in five countries

## Africa installed capacity by technology



Source: BloombergNEF

## Africa installed capacity by market



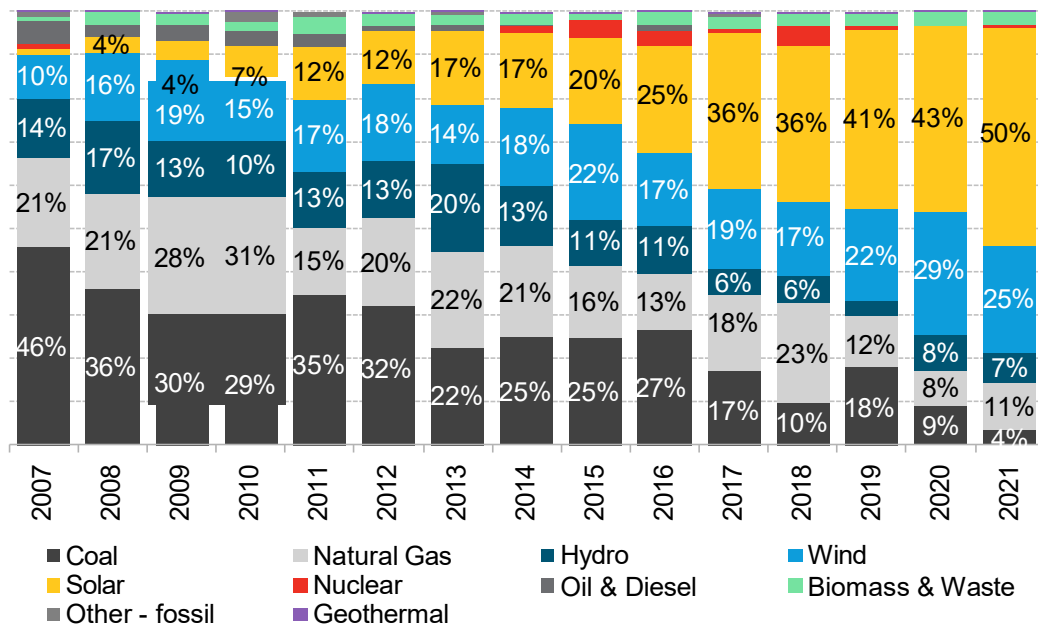
Fossil fuels dominate Africa's power matrix with natural gas accounting for 41% capacity installed, followed by coal with 22%. Renewables (including large hydro) have consistently grown over the decade and now account for 23% of the continent's total capacity. Solar jumped from just 0.3GW in 2012 to 14GW in 2021, while wind grew from 1.2GW to 8GW over the period.

Africa's total installed capacity is heavily concentrated in five countries, which are also home to five of the six highest electrification rates on the continent. South Africa, Egypt, Algeria, Nigeria and Morocco account for 69% of the region's power matrix at 172GW.

Solar has the potential to close Africa's electrification rate gap as around three quarters of the Sub-Saharan Africa (SSA) population still lacks access to reliable electricity. BNEF's 2020 New Energy Outlook projects that solar in SSA could reach 55GW in 2030 and over 400GW in 2050. However, to allow PV to flourish, financial and regulatory barriers must be addressed.

# Solar was half of all capacity installed in 2021

## Share of global capacity additions by technology



New power-generating capacity added globally set a new record in 2021 at 364GW. This was up 7% from 339GW in 2020, and up 41% from 257GW added in 2012.

Solar was 50% of all capacity added, followed by wind at 25%. PV additions in 2021 were 25.5% larger than those in 2020. Wind saw a 7.5% decline compared to the year prior.

Renewables (including hydro) comprised 85% of total capacity additions. This was up from just 46% in 2012.

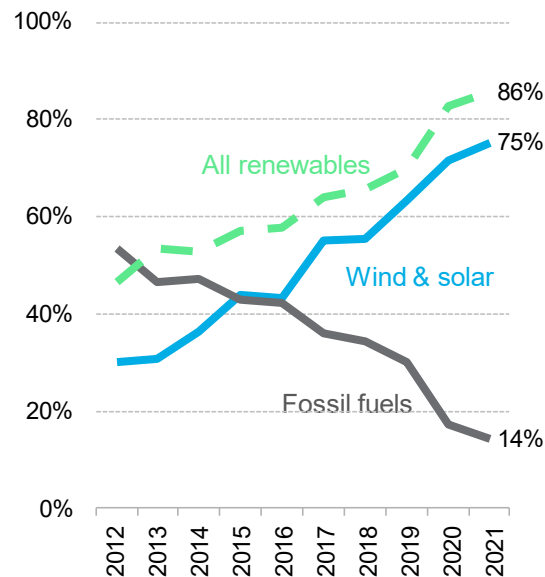
Coal's contribution to year-on-year growth was lowest at 4%. Natural gas accounted for 11% of new capacity in 2021, up from 8% in 2020.

Source: BloombergNEF. Note: Share of global capacity additions excluding retirements.

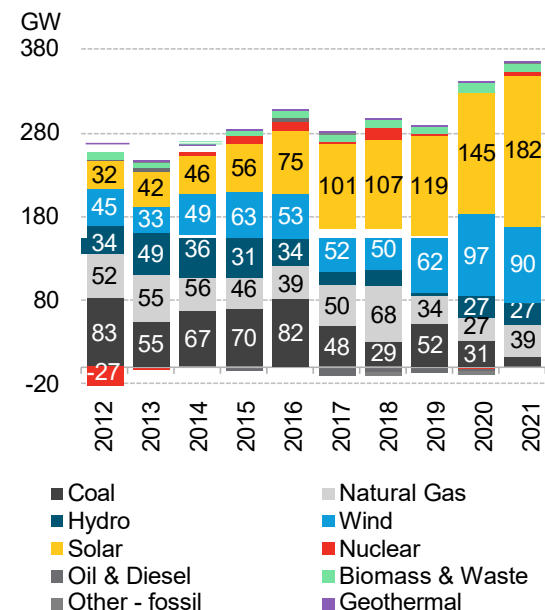


# Wind and solar were three quarters of all capacity added globally in 2021

## Global share of net capacity additions



## Global year-on-year capacity change



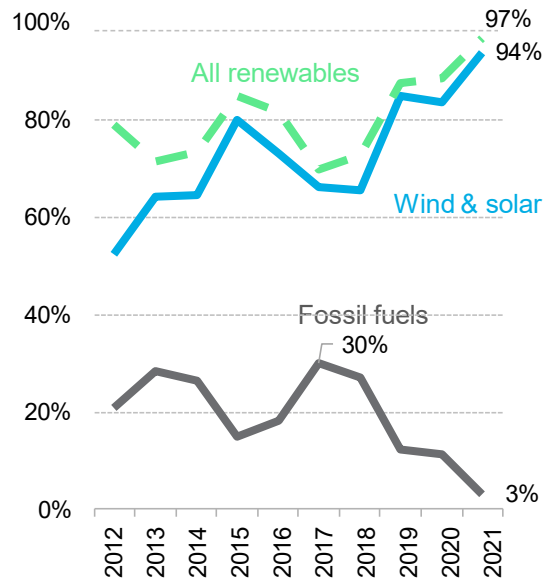
Together, wind and solar accounted for 75% of capacity added globally in 2021. Net additions of these technologies totaled 272GW, up from 77GW in 2012 when they were 30% of the total. Steep drops in costs have spurred the massive growth of these technologies. Wind and solar are now the cheapest sources of new bulk power generation in countries that make up two-thirds of world population and three-quarters of global GDP.

Fossil fuels' net capacity additions as a share of all new build slumped to their lowest level ever in 2021 at 14%. Coal led the decline. It slid to 13GW added compared to 82GW in 2012 and 52MW in 2019. Natural gas was the top fossil fuel added in 2021, accounting for 11% of total build, up 41% from 2020.

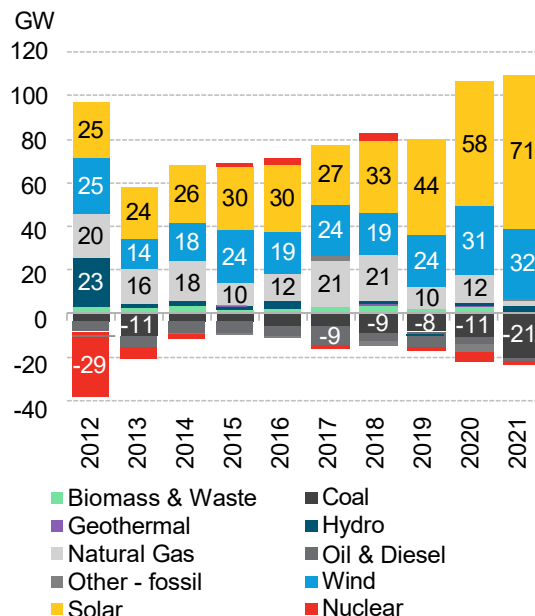
Source: BloombergNEF.

# 2021 was a record for coal retirements in developed markets

## Developed markets' share of net capacity additions



## Developed markets' year-on-year capacity change



Developed countries shuttered 21GW of coal capacity in 2021, the most ever in a single year.

Fossil fuels' net additions in developed countries collapsed in 2021, totaling just 3% of new build compared to 30% as recently as 2017. Natural gas accounted for just 3GW, compared to 12GW in 2020.

Developed nations could see coal retirements slow in 2022. As European nations have struggled with droughts and gas supply cuts from Russia, coal has become a short-term crutch to meet energy needs. As result, many nations have delayed coal phase-out plans and even restarted capacity that had been mothballed.

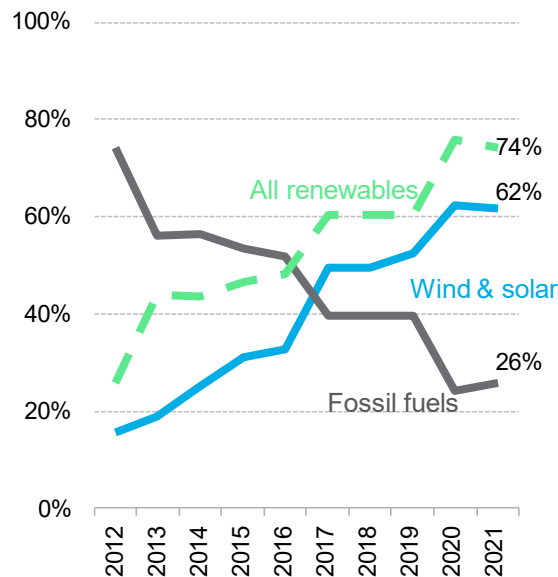
Across all technologies, a record 86GW of new capacity was added in wealthy nations in 2021.

Wind accounted for the second most added technology at 32GW. Renewables, including hydro, totaled 106GW.

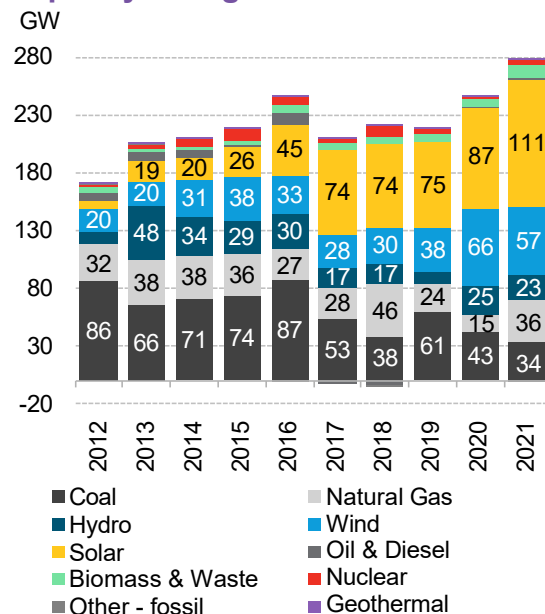
Source: BloombergNEF

# Coal and gas were a quarter of capacity additions in developing markets

## Developing markets' share of net capacity additions



## Developing markets' year-on-year capacity change



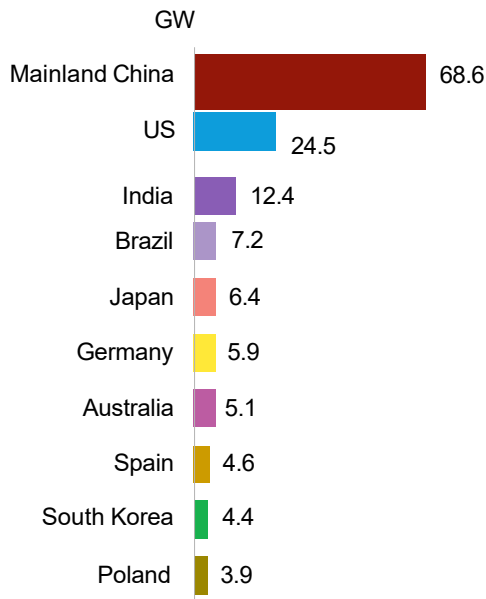
Developing markets added 70GW of fossil fuel capacity to their grids in 2021. At 34GW, coal additions dropped to their lowest level ever, but remained significant. Net additions from natural gas bounced back to 36GW in 2021, up from 15GW the year prior.

With solar and wind taking the lead, developing markets have added more capacity than ever. These nations saw a 13% growth in net additions in one year to 278GW in 2021. Solar set a new record at 111GW, 27% more than in 2020. Wind followed with 57GW added in 2021.

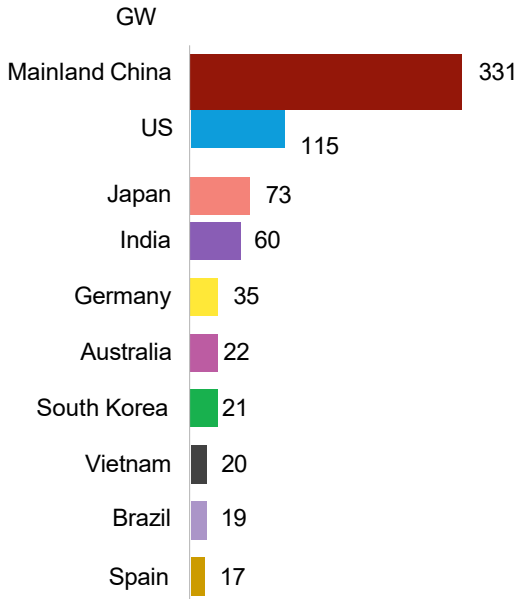
Source: BloombergNEF

# Solar growth is concentrated in a limited number of markets

Top 10 countries for solar capacity additions, 2021



Top 10 markets for solar capacity additions, 2012-2021



Ten countries were responsible for 85% of all solar capacity added in 2021 and 80% of all capacity added over 2012-2021. Mainland China, the US and India led both in 2021 and over the past decade. The three nations alone were 57% of global capacity added 2012-2021.

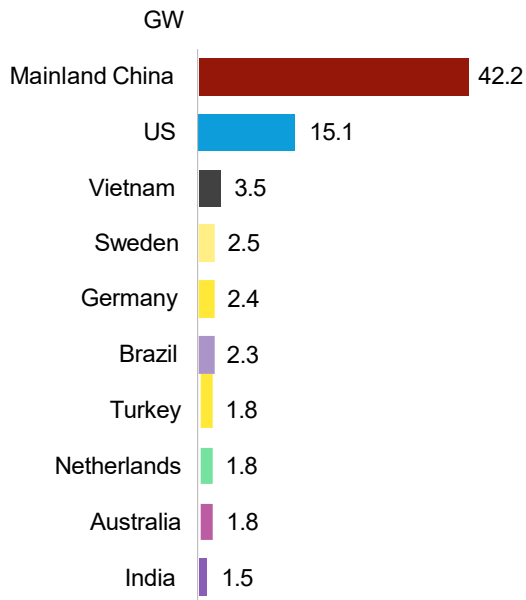
New solar markets are emerging quickly as enabling policy frameworks improve. Brazil and Vietnam are developing nations where solar has boomed in recent years. Brazil's net metering policy brought 10GW of distributed PV capacity online from 2019 through 2021. Vietnam's feed-in tariff led to nearly 20GW of new utility-scale and small-scale solar.

Source: BloombergNEF. Note: Graphs show net capacity additions.

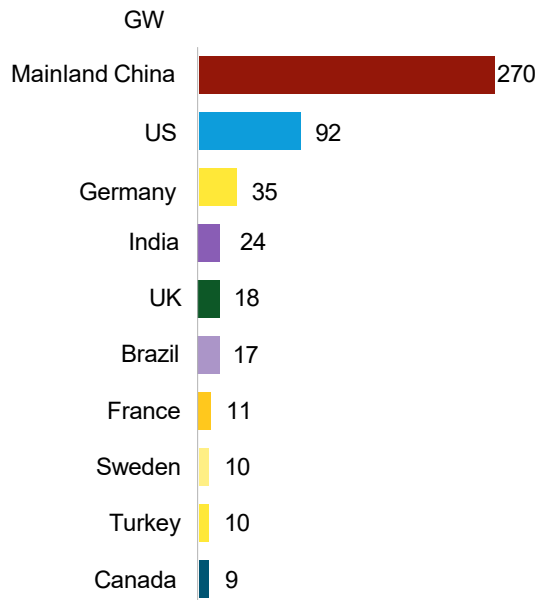


# 89% of wind capacity is located in 10 countries

## Top 10 countries for wind capacity additions, 2021



## Top 10 markets for wind capacity additions, 2012-2021



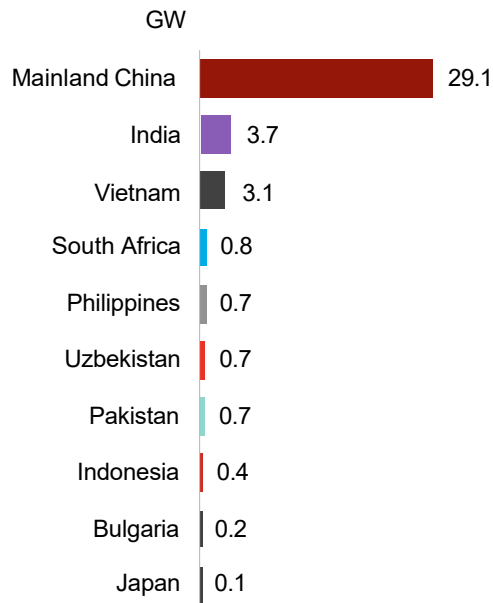
Wind installations are concentrated in a relatively small number of nations, with the top ten countries accounting for 89% of the global capacity additions in 2021. Mainland China alone represented 47% of all wind build in 2021 and 40% of global cumulative wind installed capacity as year-end 2021.

The US, the second biggest market for wind, accounted for 17% of the total added in 2021. It installed 15GW last year, 8% less than in 2020. Vietnam followed with 3.5GW in 2021, representing 4% of all wind capacity added in the year.

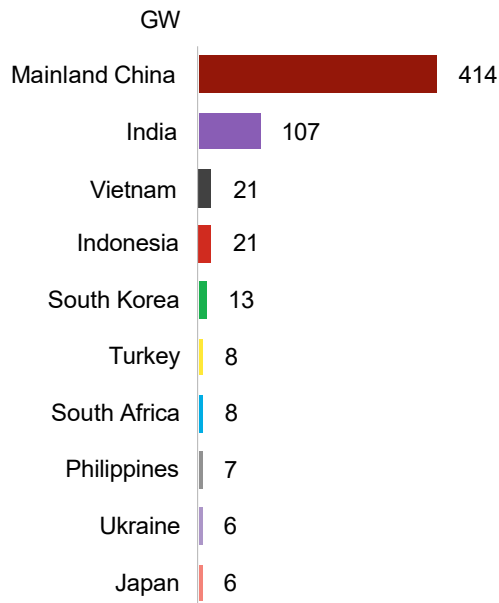
Source: BloombergNEF. Note: Graphs show net capacity additions.

# Asia markets dominate coal additions

## Top 10 countries for coal capacity additions, 2021



## Top 10 countries for coal capacity additions, 2012-2021



Mainland China and India continue to lead in the building of new coal-fired power generating capacity. The two countries accounted for 83% of new coal additions in 2021.

Mainland China alone added 414GW of coal 2012-2021, or 62% of the total global, while India installed 107GW over the same period. Despite the high numbers, both nations are slowing their coal build. Mainland China's 2021 additions represented less than half of what the country installed at the beginning of the decade and dropped 18% from what it installed in 2020.

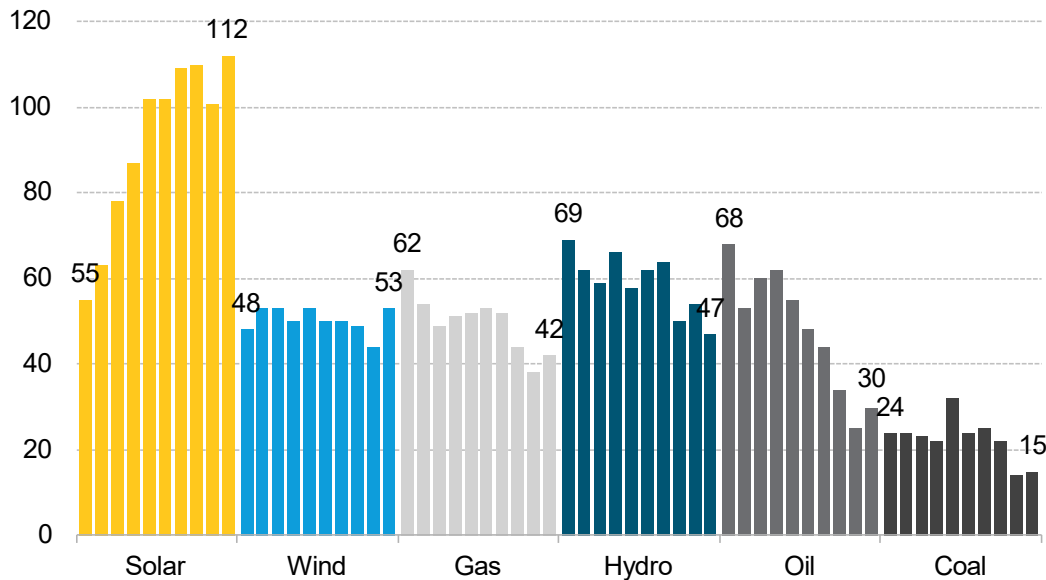
Six other Asian markets are among top 10 countries for coal additions in 2021, representing 14% of the total. Vietnam, Philippines, Uzbekistan, Pakistan, Indonesia and Japan added together 5.7GW last year.

Source: BloombergNEF. Note: Graphs show net capacity additions.

# Solar is quickly spreading to new markets

## Countries with >1MW installed per year, 2012-2021

Number of markets



In 2021, 112 countries installed at least 1MW of solar capacity – a new high. That is up 11% from the 101 nations in 2020 and more than double the 55 countries in 2012. The modular nature of PV, along with steep equipment price declines over a decade explain the technology's proliferation.

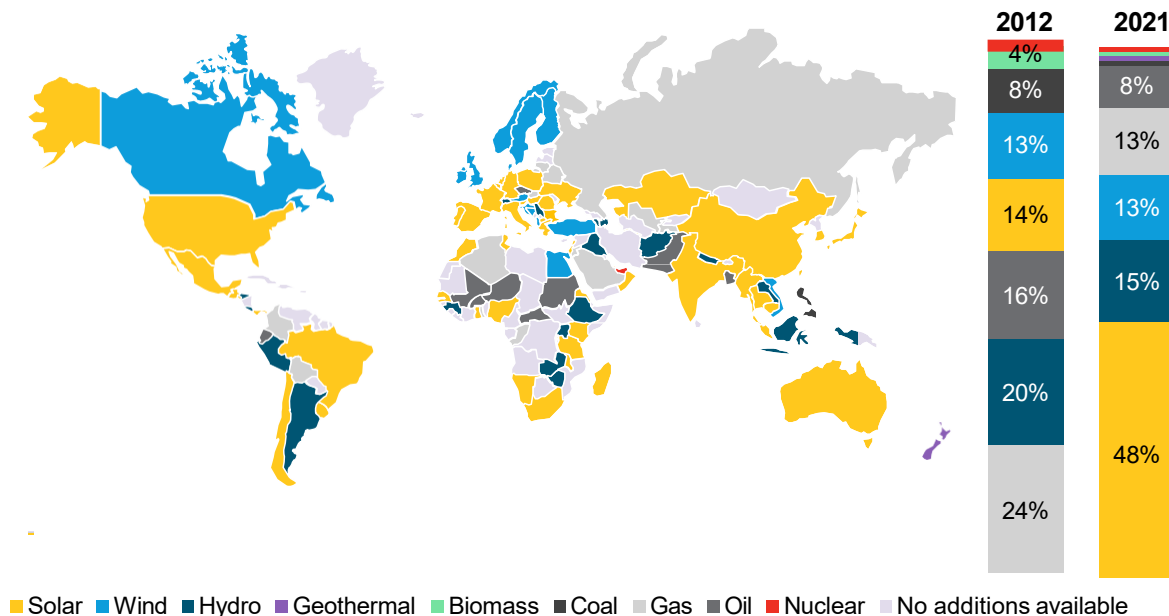
Wind also established a new record and is now the second most popular technology. 53 markets added some capacity of the technology in 2021, up from 44 in 2020.

More countries added oil, gas and coal capacity in 2021 than in 2020. Gas was the fossil fuel technology installed in the greatest number of countries (42), followed by oil (24) and coal (15).

Source: BloombergNEF

# Renewables were the top choice in three quarters of the world's markets

## Most popular new power-generating technology installed, 2021



More countries than ever are making renewable energy technologies their top choice. In 2021, 78% of the world's nations installed more clean power (including hydro) than fossil-fueled power. That is up from 50% in 2012.

Solar was the technology of choice in nearly half the world's nations. In 2021, 48% of countries surveyed made solar their top choice. Hydro followed with 15%, down from 20% a decade earlier.

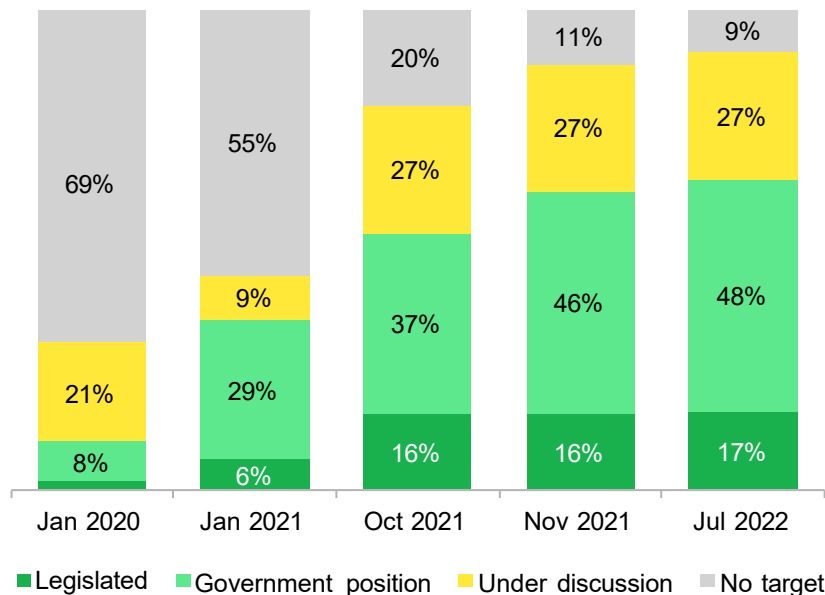
In 2012, 49% of the world's nations added more fossil fuel technologies than any other power source. By 2021, that had fallen to 21%. Only one country made coal its top choice in 2021: the Philippines.

Source: BloombergNEF. Note: Map colored by which technology was most installed in 2021 alone. Depicts the percentage of nations that installed the most MW of each technology. It is based on country-level data for 136 countries but excludes countries that have not recorded any capacity additions. Solar includes small-scale PV.

# 03. Policy

# Progress on net-zero targets has slowed since COP26

Global greenhouse-gas emissions covered by net-zero targets



A slew of nations adopted net-zero goals in the run-up to COP26 in Glasgow in 2021, but the pace of such policymaking has slowed since those climate talks. As of July 2022, 91% of global emissions occur in nations that have legislated commitments to achieve net-zero or are at least discussing such pledges. That's a major leap from just 31% in January 2020 with COP26 clearly having served as a motivator. The biggest announcement came from India, which committed to reach net-zero emissions by 2070.

Since COP26, from November 2021 through July 2022, the world saw almost no improvement on net-zero targets. New pledges have resulted in just 1% more of global emissions now occurring in countries with legislated net-zero pledges for a total of 17%. The share in countries with a pledge at least under discussion has risen modestly to 75% from 73% in November 2021.

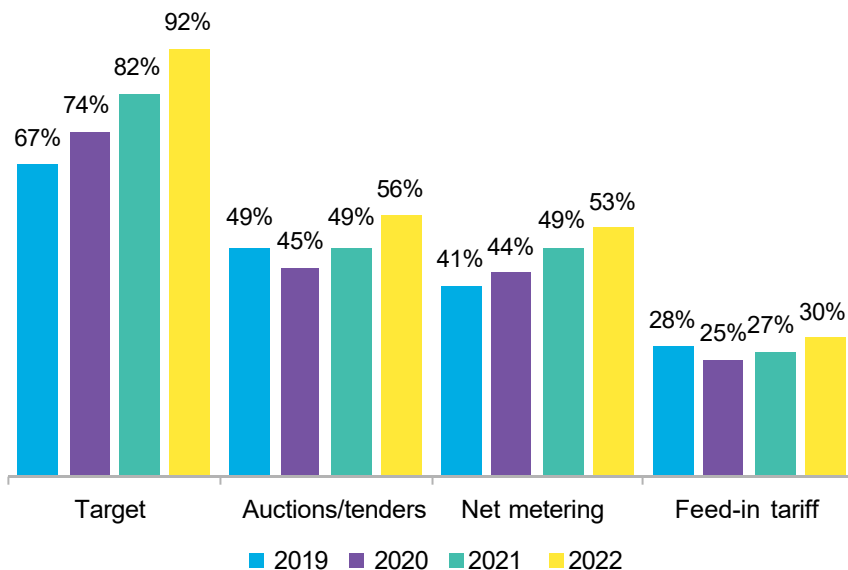
The likelihood of further, major net-zero commitments ahead of COP27 are low. The forthcoming talks in Sharm el-Sheikh, Egypt are likely to focus on more technical areas and on the \$100 billion wealthy nations have promised but thus far failed to deliver to less developed countries.

Source: WRI CAIT, BloombergNEF. Note: includes land use, land-use change and forestry, 2018.



# Emerging markets have made major progress adopting clean power policies

Share of emerging markets surveyed where key renewable power policies are present, 2019-2022



Developing markets continue to make significant strides in adopting new policies to support clean power deployment with the last year having been particularly fruitful. The desire to demonstrate progress ahead of the climate talks, energy security concerns, climate change fears, and cost-competitive renewables have prompted many developing countries to up their games on clean power policy making.

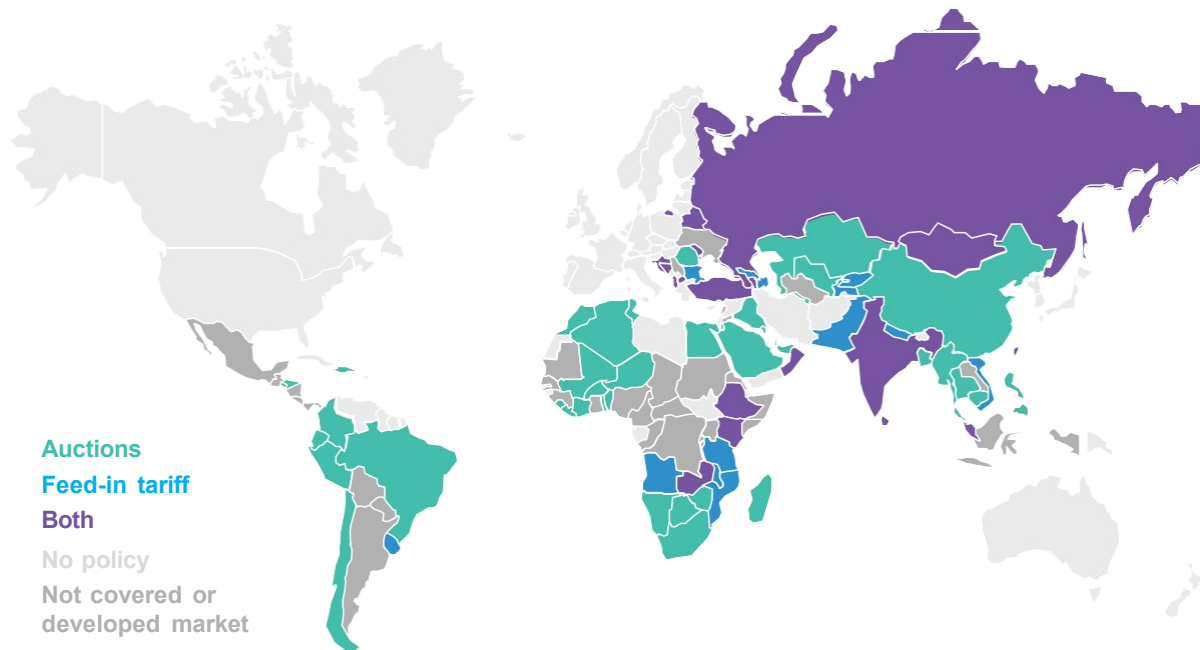
Long-term targets for clean power adoption are the most popular policies these nations adopt. Almost all emerging markets (92%) now have such goals on the books compared to 82% in 2021 and 67% in 2019. However, relatively few of these pledges have been accompanied by enforcement mechanisms such as penalties for utilities or others that fail to meet clean power goals.

Reverse auctions for clean power delivery contracts and “net metering” to support rooftop solar are also growing rapidly in popularity. In 2022, 56% of markets surveyed had auction policies in force compared to 49% in 2021. Net metering is the only policy type that has grown year-on-year each year since 2019. Such policies are now present in 53% of emerging markets compared to 41% in 2019. The growth of net metering incentives is helping distributed solar spread to more nations.

Source: BloombergNEF, Climatescope. Note: Includes 107 emerging markets surveyed until end of June 2022.

# Nearly half of emerging markets now hold auctions for clean power contracts

Emerging markets with auctions, feed-in tariff or both policies in force



Reverse auctions for clean power delivery contracts and feed-in tariffs have proved to be two of the more effective policies for spurring renewable energy build. As of 2022, 73 of 107 emerging markets have auctions, feed-in tariffs or both policies in place. Sixty such markets have auction mechanisms. Thirty-two have feed-in tariffs. Nineteen markets have both policies in force.

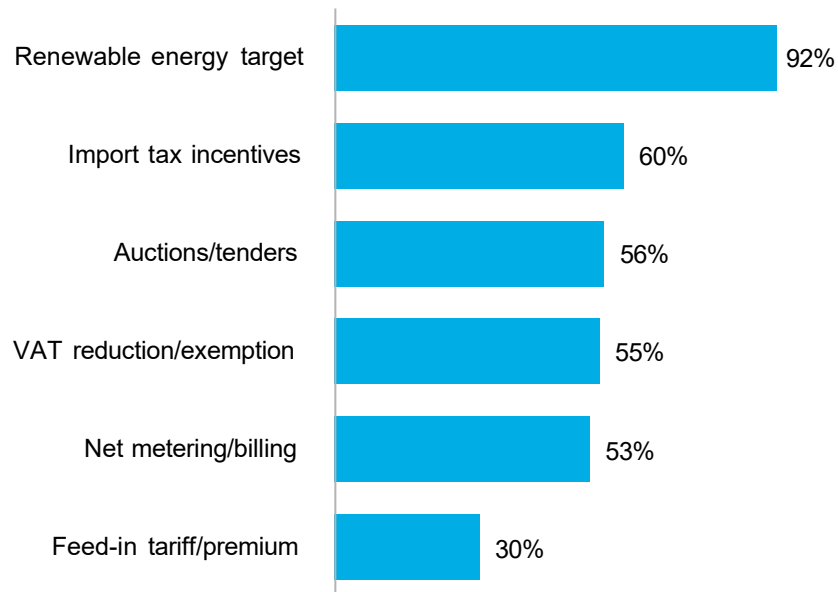
Among regions, Europe has the highest share (75%) of its developing countries with such policies present. In Central and South America, auctions are the most popular mechanism to enable the development of renewables, present in 50% of the region's countries.

African countries were slow to adopt these policies but have made significant strides recently with half now having auctions in place. The adoption of such policies has helped support clean energy investment and capacity deployment in these nations.

Source: BloombergNEF. Note: data shows only emerging markets covered by Climatescope with at least one of the policies in force.

# 92% of emerging markets have renewables targets but many lack accompanying policies

## Share of Climatescope emerging markets with a renewable energy policy in force



The share of emerging markets with renewable energy targets in place has jumped to 92% from 82% a year ago. However, many countries still lack the accompanying policies needed to propel their power sectors towards a cleaner future.

Auctions have proven to be the most effective policy to boost clean energy investment in developing nations but are in force in just 56% of markets. Net metering, one of the key policies to drive deployment of small-scale solar, is available in just 53% of the markets surveyed.

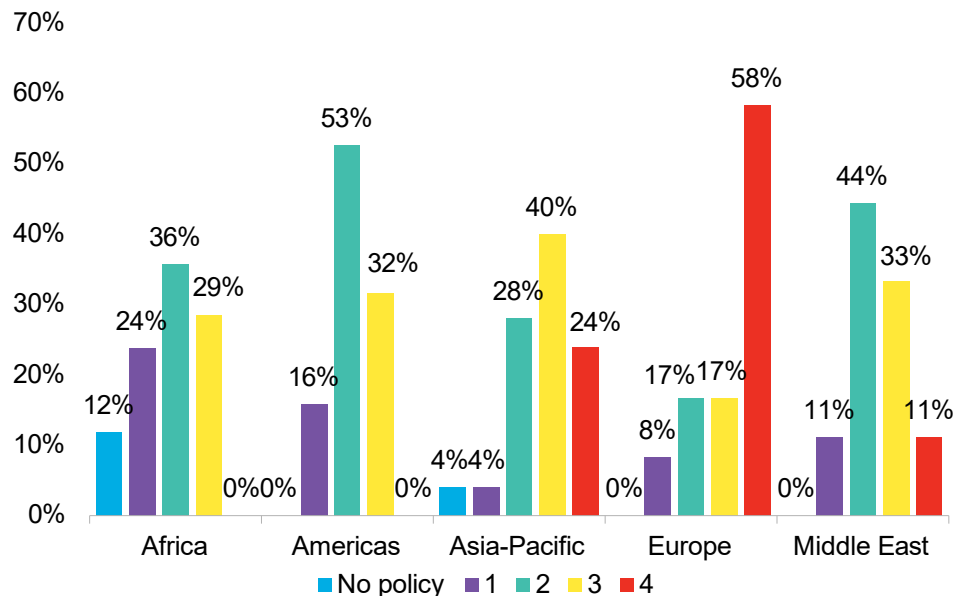
Tax incentives to ease clean energy equipment imports are in place in three-fifths of markets. VAT reductions or exemptions for renewables equipment were on the books in 55% of countries, up from 49% a year earlier.

Feed-in tariffs are present in one third of the nations surveyed. The policy remains highly effective to kick-off new clean energy markets.

Source: BloombergNEF, Climatescope. Note: includes 107 emerging markets.

# Policy adoption rates vary widely by region

Share of countries by number of policy mechanisms in force



Among regions, Africa has the lowest adoption of renewable energy policies, with 12% of countries there having no such mechanisms at all in force. Renewable energy targets are the most popular policy choice in Africa with 36 out of 42 markets having them on the books. However, because most of these targets are not legislated, there is often little pressure to adopt other, enabling policies. Feed-in tariff are the second most popular policy, with half of the nations surveyed having a FiT in force.

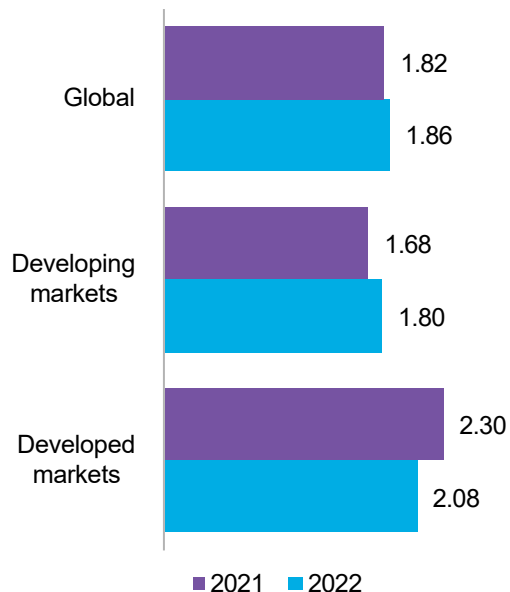
Europe is the leader among regions with 58% of its emerging markets having at least four clean power policies in force. All have renewables targets, while auctions, feed-in tariff and net-metering are present in three quarters of the markets.

Renewable energy targets also predominate in the Asia-Pacific, Americas and Middle East regions, with almost all countries having the policies in place. Net metering is the second most popular policy in the Americas and Asia-Pacific, while in the Middle East, auctions are more widely available.

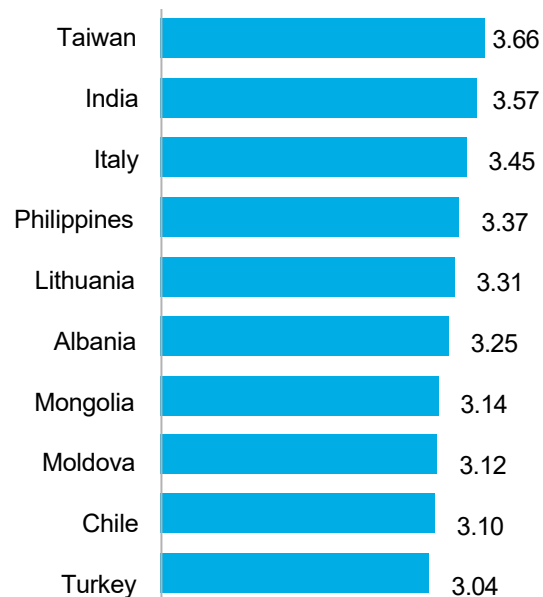
Source: BloombergNEF. Note: data considers only renewable energy target, feed-in tariff, net metering/billing and auctions/tenders policies for emerging markets only.

# Developing markets' power policy scores have improved

Average Climatescope power policy scores by market type



Top 10 markets for Climatescope 2022 power policy scores



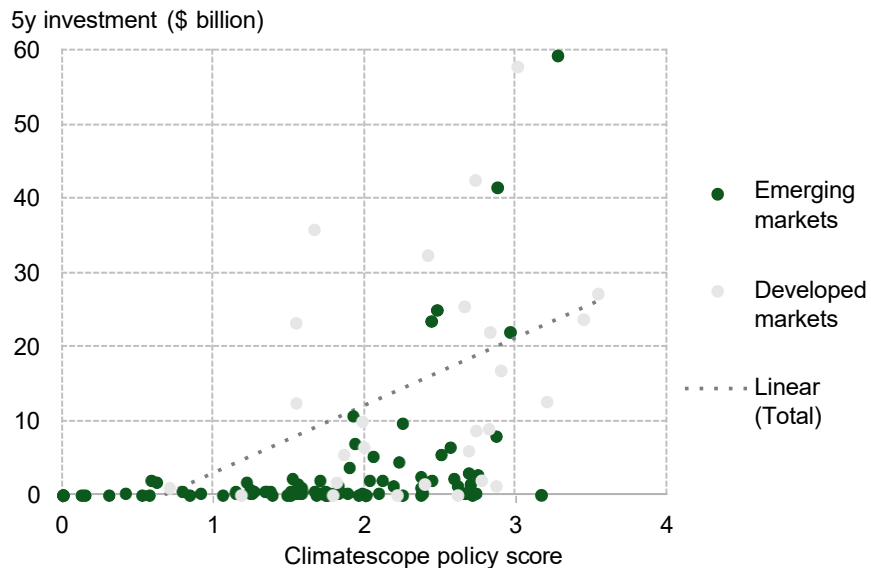
Climatescope scores markets' overall clean power policy regimes by analyzing the ambition, accessibility and stability of the specific measures they have adopted. This year, the global average power policy score reached 1.86 (out of a maximum of 5) compared to 1.82 last year. Developing markets saw a 0.12-point rise in 2022 while the average for developed markets slipped 0.22 in the same period.

Among the top 10 highest scorers, eight were developing markets. The number of developing markets within this group has consistently improved with the adoption of more policies. In developed markets, the clean energy sector has in a number of cases matured to the point of no longer being reliant on policy for growth. Developed markets are, as a result, starting to retire some policies or at least allowing them to sunset.

Source: BloombergNEF. Note: Climatescope power policy scores range 0-5 with 5 as best.

# Weak policy environments attract less investment

## Climatescope policy score vs. 5-year clean energy asset finance in emerging markets



Despite 131 markets having some form of clean energy-friendly policy on their books, a limited number today provide the requisite amount of transparency about implementation to produce substantial results. Comparing countries' policy scores against the levels of investment attracted illuminates the critical role policies can play in mobilizing capital.

Among the 15 developed and emerging nations that finished at the bottom of the Climatescope scoring table, only one managed to secure more than \$2 billion in clean power investment from 2017-2021. On average, these low-scoring economies attracted \$385 million apiece over the 5-year period. By contrast, the remaining markets surveyed (excluding Mainland China), attracted on average \$12.72 billion over the period. Emerging markets received an average \$3.6 billion over the five years while developed nations averaged \$36.5 billion.

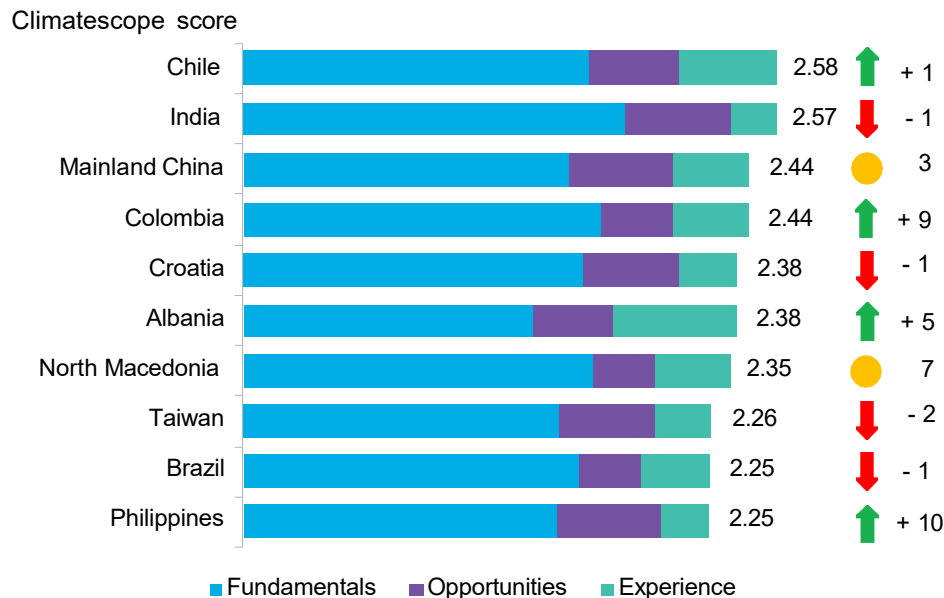
Source: BloombergNEF, GFANZ.



# 04. Results

# Chile scores best among emerging markets

## 10 highest scoring emerging markets

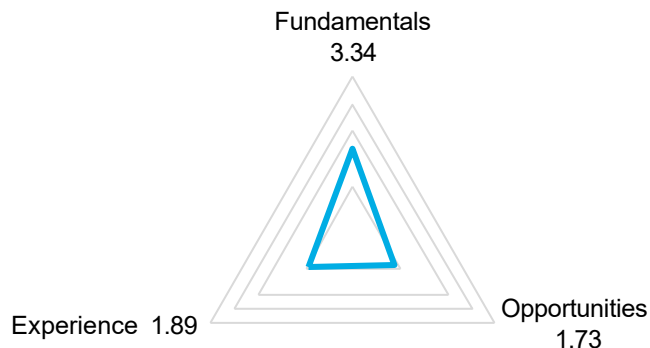


Climatescope scores all 136 markets in the survey on a 0-5 scale based on their relative attractiveness for clean power investment and deployment. Scores take into account 100 indicators, or data inputs, which fall under three parameters: *fundamentals, opportunities and experience*. These key topic areas encompass each market's previous accomplishments, its current investment environment and the future opportunities it presents. The 2022 edition marks the third year the project has covered 107 emerging markets, the vast majority of such countries on Earth. It also includes 29 developed economies.

*Chile tops the Climatescope leaderboard this year with a score of 2.58.* Every year since 2018, Chile or India have had the highest score with the two countries swapping places each year. In 2022, Chile returns to the top spot, followed by India, Mainland China, Colombia and Croatia.

Source: BloombergNEF. Note: Maximum score is 5. Fundamentals, Opportunities and Experience are the parameters that total up to a market's overall score for clean power. Between them, the parameters encompass over 100 indicators, or individual data inputs collected by Climatescope researchers

# 1. Chile



For the second time in three years, Chile tops the Climatescope power ranking. A well-established system of auctions, aggressive targets, and an overall commitment to greening the grid explain the comparatively strong scores on all parameters. Significant volumes of renewable energy investment already deployed have also made the country attractive to clean energy investors.

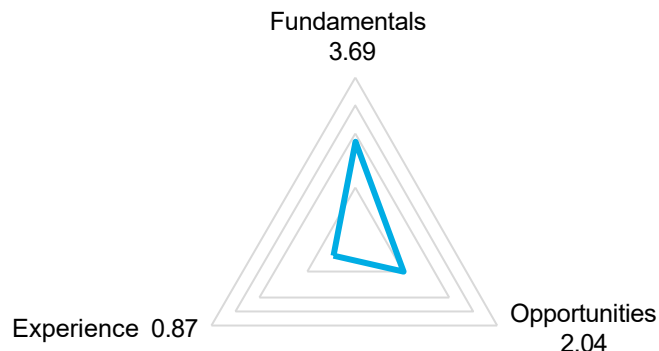
After reaching its 20% of clean energy generation by 2025 goal early five years, the country aims to reach 40% of clean power generation by 2030. While 57% of Chile's generation currently comes from thermal sources the country has committed to shutter 1.7GW of coal-fired power by 2024 and completely phase out coal by 2040.

At the end of 2021, Chile had 5.3GW of solar and 3.1GW of wind online. This represented 28% of the country's total installed capacity. Wind generation in Chile surged from 3.2TWh in 2018 to 5.9TWh in 2021, while solar output spiked from 5.1TWh to 8TWh.

Chile attracted around \$20.8 billion of clean energy investment over the past seven years. This is mainly due to its well-structured power sector, that has for example, renewable energy auctions for standardized power purchase agreements (PPAs) denominated in US dollars and the ability for developers to sign bilateral contracts outside the regulated market with large consumers.

Source: BloombergNEF

## 2. India



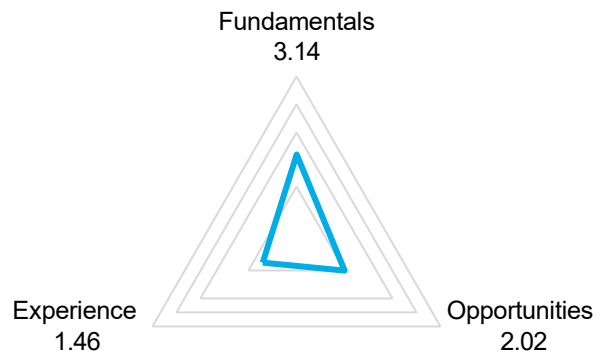
India's ambitious policy framework and extremely competitive renewable energy market resulted in the country finishing in 2nd position. The Indian market is home to the largest and most competitive system of clean energy auctions in the world. The government has set one of the world's highest renewable energy targets at 175GW by March 2022 (of which 100GW would come from solar and 60GW from wind), and 500GW by 2030. As of year-end 2021, the country had 115GW of renewables installed, including 60GW of solar, 40GW wind, and 15GW from other clean sources excluding large hydro. Including large hydro, total renewable installed capacity reached 157GW. The deadline for achieving the 2022 target was pushed to be met in December 2022, but according to the government the country is still unlikely to achieve it.

India's spot in 2<sup>nd</sup> in the Climatescope scores reflects strong fundamentals in place. Since 2012, the country has implemented specific and efficient policies such as auctions, renewable energy targets, and a feed-in tariff. These transparent mechanisms and ambitious targets have prompted domestic and foreign players to deploy a combined \$47 billion for clean energy assets in the past five years.

In 2021, India built almost three times more solar than the year prior and renewables additions overall have exceeded those of coal from 2018 to 2021. Solar build jumped to a new annual high of 12GW and included utility-scale, rooftop and off-grid capacity. The country's solar market has almost doubled in size since 2018. Despite the bold targets and renewables additions, the country ranked 64<sup>th</sup> on the experience ranking, mainly due to lower direct foreign investment in 2021.

Source: BloombergNEF

### 3. Mainland China



Mainland China is the global leader in clean energy manufacturing, deployment and funds attracted and has therefore consistently landed in the Climatescope top five among emerging markets. Among this year's top five, Mainland China scores best on the Opportunities parameter, a reflection of the country's massive potential for growth.

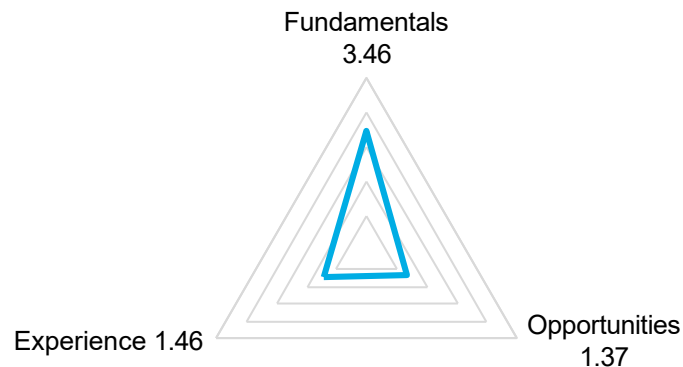
Coal still dominates Mainland China's power system and accounted for 47.5% of the total 2021 installed capacity. A total of 65% of the country's generation currently comes from thermal sources, with coal alone accounting for 61%. However, the country is drafting a plan to phase down coal consumption from 2026-30 and will have to follow through if it hopes to improve local air quality.

At the end of 2021, Mainland China had 334GW of solar and 331GW of wind online – by far, the most in the world. This represented 37% of total global solar and wind installed capacity. Renewables excluding large hydro accounted for 16% of all power generated, or 1,349TWh. Wind generation has more than doubled since 2018 to 655TWh while solar generation jumped to 327TWh from 177TWh in 2018.

Clean energy investment in Mainland China in 2021 grew an incredible 45% from the year prior to a world-leading \$142 billion. The country alone was 44% of the global clean energy investment deployed worldwide. Its investment was almost 10 times the size of the other four emerging markets in the Climatescope top five combined.

Source: BloombergNEF

# 4. Colombia



For the first time ever, Colombia is ranked among the top five nations. Stable clean energy policies and transparent incentives have propelled the country to 4<sup>th</sup> this year from 13<sup>th</sup> in last year's study. Notably, these policies were put in place during the previous presidential administration of Ivan Duque.

Colombia's wind and solar sectors are now poised to boom. In 2019, the country held its first successful long-term wind and solar auctions, awarding 15-year power purchase agreements to 1.3GW of wind and solar projects.

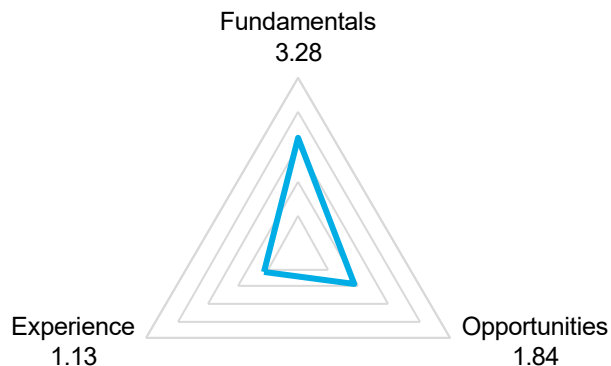
As of year-end 2021, Colombia had a total installed capacity of nearly 18GW, 8% of which was non large hydro renewables. Large hydro is the country's primary technology on the grid, accounting for 61% of total installed capacity and 73% of generation in 2021. Natural gas followed at 10% of generation. Solar and wind were just 1% combined.

Renewables investment into Colombia reached a new high at \$952 million in 2021. Wind was 71% of this at \$678 million, followed by solar at \$274 million. This was the first time in at least a decade that the country recorded investment in wind. Solar saw the biggest jump on investment over the past five years, growing more than 18 times from 2017 to 2021. Colombia renewables boom has been fueled by the policies established during the Duque administration, such as VAT and import tax exemptions and reverse-auctions for renewables contracts. In August 2022, Gustavo Petro became Colombia's first well left-of-center president. While it is early days, it appears likely he will continue to support renewables development in the country.

Source: BloombergNEF



# 5. Croatia



For the second consecutive year Croatia is among the top five emerging markets in the Climatescope ranking, finishing this year in 5<sup>th</sup>, down from 4<sup>th</sup> a year ago. In the past five years the country has made major strides, opening its wholesale market, building more clean energy capacity and improving its grid infrastructure. Croatia has also established consistent policies, setting an enabling environment to attract more investors.

The country launched its first-ever renewables auction scheme in 2020 and held a 638MW auction in June 2022. The Croatian Energy Market Operator (HROTE), intends to hold reverse auctions for renewables contracts at least once per year and will offer 14-year PPAs.

Croatia has a goal of having 36% of its gross final energy consumption by 2030 be green, up from an estimated 20% in 2020. In 2021, 31% of the country's power generation already came from renewables with wind accounting for 13%, double coal's contribution. Moreover, the country is expected to install 3.5GW of solar capacity and 1GW of wind by 2030.

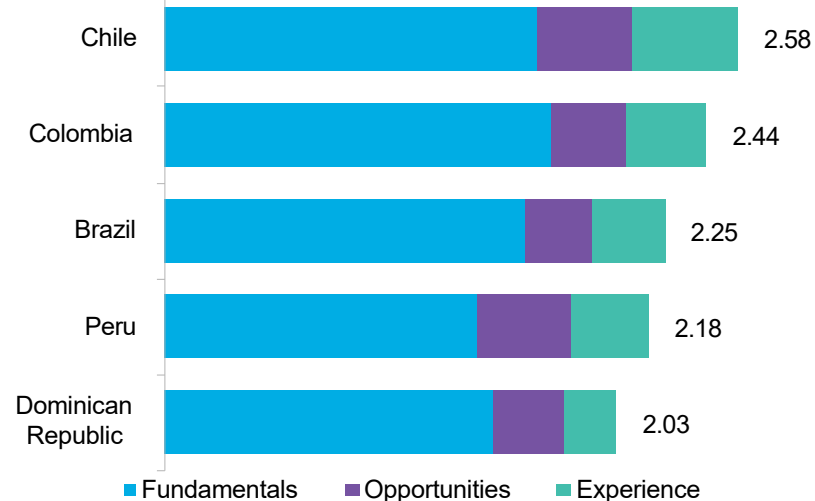
Croatia has attracted \$1.1 billion in clean energy investment over the past five years. Wind is the technology that attracted the majority of the total, accounting for \$733 million from 2017 to 2021. Investment in Croatia's solar sector has just kicked off with the country receiving \$33 million in such funding in 2020 and 2021.

Source: BloombergNEF

# Latin America's top five markets took 93% of the region's renewables funding

## Climatescope scores of top five emerging markets in Latin America

Climatescope score



Source: BloombergNEF

Chile, Colombia, Brazil, Peru and Dominican Republic are the most attractive countries for renewable energy investment in Latin America, according to the Climatescope survey. In fact, the top four nations in the region are among the top 20 most attractive markets for clean energy investment overall. One factor in common is that all of them have well established and effective policies, in addition to structured power sectors open for private investors.

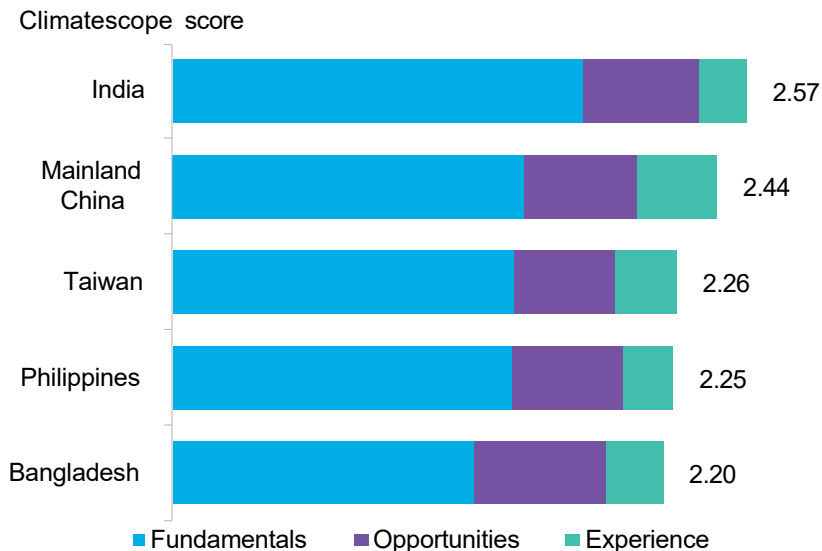
Latin America expects to install 3.6GW of wind and 13GW of solar capacity by 2025, according to BNEF's 1H 2022 Latin America Market Outlook. Brazil is expected to install 57% of the total wind and solar capacity, while Chile and Colombia are expected to account for 10% and 5%, respectively, of the region's projected new wind and solar.

Colombia saw an upsurge in installed renewables due to recent auctions and bold targets, while Peru has restructured its renewable auctions in the past years. The nations increased their clean energy installed capacity by 36% and 20%, respectively, from 2018 to 2021. They are also expecting to hold new auctions in coming years.

Latin America accounted for only 6% of the global clean energy investment in 2021, at \$12.9 billion. Investment in the region is highly concentrated with the top five nations accounting for 93% of the total.

# Asia's coal reliance offers major opportunities for renewables

## Climatescope scores of top five emerging markets in Asia-Pacific



Source: BloombergNEF

Asia-Pacific markets are four of the top 10 scoring emerging markets in Climatescope: India, Mainland China, Taiwan and Philippines. The region is home of 3.8TW, or 49% of the world's total installed capacity, with renewables accounting for 1.2TW in 2021. The top five Asian markets account for 75% of the region's total capacity.

Asian markets achieve some of the highest scores under the Opportunities parameter due to their great reliance on coal – and their potential to replace the fuel with renewables. Asia-Pacific has more coal-fired power generating capacity than any other region and its markets keep building more. Despite many of these markets having some renewable energy policies in force, they generally lack sufficient incentives specifically targeting the phase out of coal.

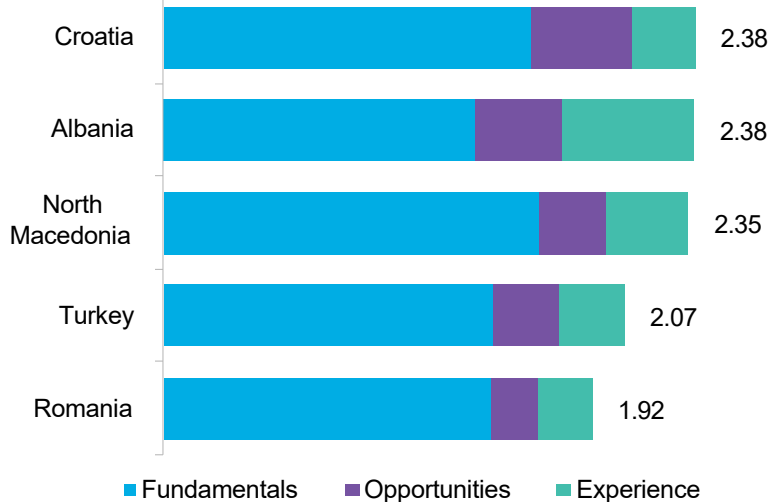
In the past five years, Bangladesh and Philippines improved their grid infrastructure and raised their electrification rates. Bangladesh has now boosted its rate all the way to 100% while the Philippines is at 92%. Electricity demand jumped 14% in Bangladesh and 16% in the Philippines, creating new opportunities for renewable energy projects.

In 2021, the region attracted \$166 billion, or 86% of the global renewable investment. The top five Asia-Pacific markets accounted for 94% of the region's total. Excluding Mainland China, however, the other four nations attracted only \$14 billion.

# Strong policy commitments boost European scores

## Climatescope scores of top five emerging markets in Europe

Climatescope score



Source: BloombergNEF

European countries Croatia, Albania and North Macedonia rank among the top 10 overall emerging market scorers. European countries in the survey reveal the importance of establishing solid policy structures for developing renewables. The European emerging markets benefit from having higher average Fundamentals parameter scores than other regions.

North Macedonia is trying to steer away from its high dependence on coal and gas imports. The country has faced a prolonged energy crisis since November 2021 due to high import costs and accompanying higher power prices. This has served as an extra impetus for clean energy adoption and the country contracted about 80MW of solar capacity in the last auction round.

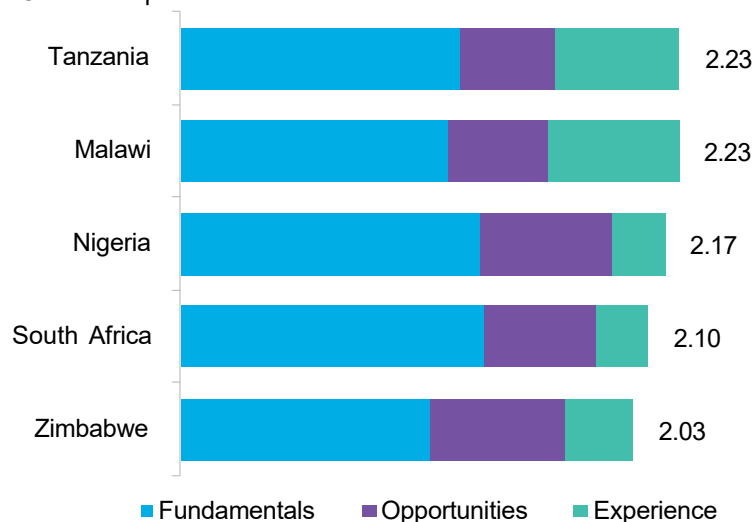
In 2022, Romania launched its first tender for wind and solar in an effort to meet rising electricity demand and to switch to cleaner sources. The country aims to phase out coal power production by 2032 and has a target of reaching 30.7% renewables share of total installed capacity by 2030.

Emerging markets in Europe attracted \$7.8 billion in 2021, the least since 2019. A key factor was the impact of the energy crisis with countries having to devote more financial resources for high-priced imports. Turkey was 42% of the total at \$3.3 billion with wind projects accounting for the bulk of that investment.

# Africa suffers from lack of policies, uncertain power markets

## Climatescope scores of top five emerging markets in Africa

Climatescope score



Source: BloombergNEF

Tanzania, Malawi, Nigeria, South Africa and Zimbabwe are the five most attractive markets for renewable energy investment in Africa, under Climatescope's scoring. Despite being the region with the most countries surveyed, Africa has no representation in the top 10 highest scorers globally. This is mainly due to the lack of supportive policies and well-structured, reliable power markets.

Tanzania and Malawi scored best among African nations, mainly due to recent renewables build-outs. Tanzania's renewable installed capacity has nearly tripled from 61MW in 2018 to 177MW in 2021. Malawi's similarly reached a new high of 173MW compared to 68MW in 2017.

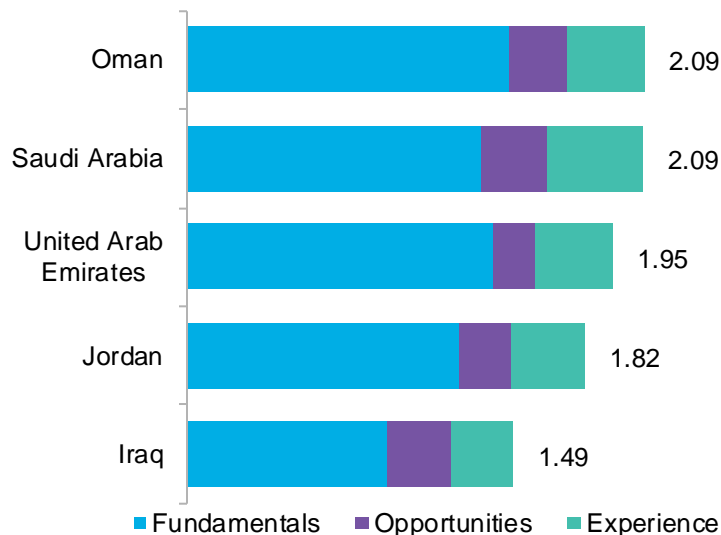
Nigeria accounted for the second highest investment among African countries in 2021 at \$279 million, behind Cote d'Ivoire. In 2021, the top five African markets attracted 39% of the region's total. African countries in general secured on average just \$1.3 million apiece in 2021, the least compared to markets in other regions.

South Africa and Zimbabwe are slowly reducing their coal reliance and renewables offer the best alternative. Both are among Africa's top countries for coal generation, however from 2017 to 2021 it dropped nearly 18% in each country. Renewable energy generation, on the other hand, rose 4% in South Africa and 29% in Zimbabwe to meet market needs.

# The Mideast's fossil fuels surplus slows renewables growth

## Climatescope score of top five emerging markets in the Middle East

Climatescope score



Source: BloombergNEF

Oman and Saudi Arabia are the only two Middle Eastern nations to make even the overall top 20 best Climatescope scorers. The region in general scores poorly due to readily available low-cost fossil options and lack of policy support. However, this is slowly changing as countries begin to set increasingly ambitious renewable energy targets.

Saudi Arabia, the United Arab Emirates and Jordan all saw booms in renewables investment in prior years but have been quieter recently. Since 2019, a lack of clean power auctions low renewables build have revealed large gaps for these markets to meet their targets.

Oman has ambitious plans to transition to a cleaner economy. It aims for 16% of electricity generation to come from renewables by 2025, up from 2% generation in 2021. Already, installed capacity rose to 9% in 2021 from 1% the year prior. Clean generation jumped to 958GWh in 2021 compared to 66GWh in 2019.

Despite increasingly ambitious targets and new policies, the region has seen renewable energy investment fall over the past three years. In 2019, the region attracted \$5.4 billion compared to \$3.6 billion in 2020 and just \$2.9 billion in 2021. The Middle East attracted only 1% of the global renewable energy investment in 2021, with Saudi Arabia being responsible for 47% of the region's total.



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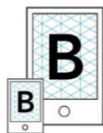
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