

The transition to clean energy – where are we now?



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“In Europe, the Green Deal Industrial Plan, introduced in February 2023, sets out a path to enhancing the competitiveness of the continent’s nascent net zero industry.”

In this report, we explore developments in the clean energy sector and answer key questions.

- How have inflation and rising interest rates affected the growth and investment prospects of clean energy companies?
- What progress has been made on expanding existing renewable energy capacity and advancing new forms of clean power?
- What are the next key challenges facing the world as we progress towards the target of net zero carbon emissions?

Last year was one of progress in the development of clean energy but also frustration, as political discourse continued to detract from the global aim of reducing reliance on carbon-intensive energy sources.

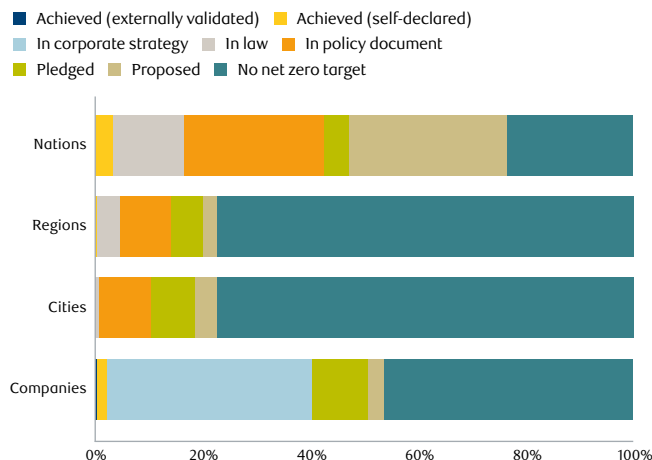
The summer of 2023 was the hottest on record, with extreme weather events linked to climate change causing major damage and loss of life around the world. The COP 28 conference in Dubai was overshadowed by political debates that did little to support a common solution to climate change.

At the same time, supply chain issues and the rising costs of raw materials have impacted the development of new renewable energy projects. Inflation has prompted calls for a rethink on how offshore wind and similar developments are priced.

However, there were also many positive developments. Throughout the year, we saw significant investment from governments into clean energy infrastructure and technology. The Inflation Reduction Act in the US allocates approximately \$400 billion¹ in direct investments into energy security projects, including energy-related innovation, with the goal of substantially lowering the nation’s carbon emissions - committing the US to reduce its carbon emissions by 40 percent by 2030.

In Europe, the Green Deal Industrial Plan, introduced in February 2023, sets out a path to enhancing the competitiveness of the continent’s nascent net zero industry. Other European initiatives such as the Strategic Technologies for Europe Platform are also supporting companies in these areas.

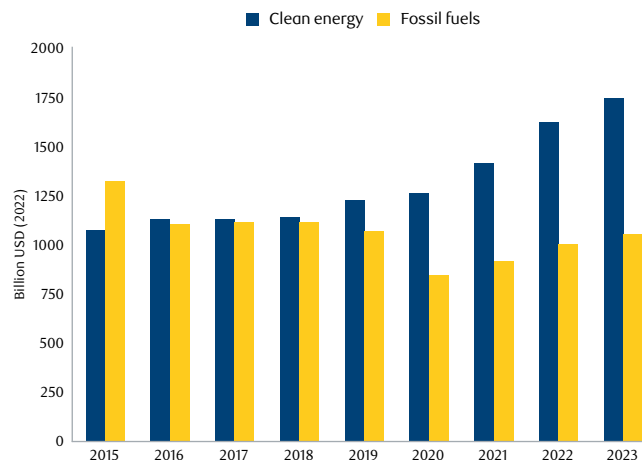
¹ Think.ing.com Published: 17 August 2023.

Chart 1: How are nations doing on net zero targets compared with companies?

Source: Data explorer, zerotracker.net.

Most major economies have now set net zero targets, and many of these have passed into law, including Canada, the U.S., U.K. and the E.U. While some of the political rhetoric around the COP 28 conference was disappointing, it is important to highlight that progress was made on some key climate issues. There was agreement on the first 'Global Stocktake' on progress towards limiting the global average temperature rise to 1.5°C above pre-industrial levels, with a call for countries to accelerate their move away from fossil fuels. Led by the EU, there was an internationally agreed pledge to triple renewable energy capacity to "at least 11,000 gigawatts by 2030, accelerate energy efficiency and prioritise this at government and policy levels².

The road to a clean energy economy was never going to be easy. There remain significant challenges ahead, but an even more promising multi-trillion-dollar, multi-year investment opportunity.

**Chart 2: Global energy investment in clean energy and in fossil fuels**

Source: World energy investment in 2023, iea.org.

The pandemic, Russia, and inflation

As with most other sectors, the Covid-19 pandemic hit the energy industry hard as societies were forced to quickly adjust to social distancing requirements and remote working. However, the period also seemed to trigger an uptick in investment into companies, projects and technology supporting the energy transition. Global clean energy investment rose from \$1.23 trillion in 2019 to \$1.26 trillion in 2020, and has increased each year since to an estimated \$1.74 trillion in 2023³.

China has also emerged as a major investor in clean energy. In 2022, it accounted for almost half of global spending on clean energy, according to BloombergNEF⁴, spending \$546 billion as the global total surpassed \$1 trillion for the first time⁵.

The biggest impact on the energy sector, however, stemmed from the Russian invasion of the Ukraine in early 2022. The ongoing hostilities and sanctions placed on Russia by the European Union have prompted a major rethink of energy security issues, given the bloc's reliance on Russian oil and gas.

The price of oil spiked in the first half of 2022, increasing by more than 60 percent to a peak in June. Natural gas, meanwhile, almost tripled in price between January and August 2022⁶. These price increases fuelled a cost-of-living crisis across many economies that were dependent on Russian fossil fuels. Prices have since fallen back below where they were two years ago, which has helped reduce inflationary pressures.

² European Commission, 'Global Renewables and Energy Efficiency Pledge', published 2 December 2023.

³ International Energy Agency, 'World Energy Investment 2023 – Overview and key findings', published May 2023.

^{4,5} BloombergNEF, 'Global Low-Carbon Energy Technology Investment Surges Past \$1 Trillion for the First Time', published 26 January 2023.

⁶ WTI crude oil and natural gas price data sourced from Bloomberg.



Headwinds for renewable developments

After a period of strong investment returns from the renewable energy sector, 2022 saw significant headwinds emerge. Supply chain issues and spiralling costs for steel, cement and other materials meant construction costs suddenly increased significantly, putting pressure on developers, and making pricing less attractive for investors.

In addition, several companies in the renewable energy sector did not factor in indexation into their supply contracts. This meant that while supply chain and material costs increased significantly since 2020, suppliers' were unable to offset the impact on their margins by adjusting their price to the consumer.

Several major projects were cancelled in 2023 amid these pressures, including a planned allocation of up to 5 gigawatts of contracts of offshore wind capacity in the UK. The UK government set the price cap too low and failed to reflect the rising costs of materials in their pricing⁷. It will have to learn lessons quickly if it is to meet its target of 50 gigawatts of offshore wind capacity by 2030.

These and other issues have meant that renewable energy investments largely underperformed the wider market in 2023. However, we believe the sector has been oversold and is due for an improvement in performance. Production and supply should be improved by the reopening of China's manufacturing sector after lengthy pandemic-induced shutdowns, with the country expected to add 62 gigawatts of capacity in wind power alone in 2024⁸.

The next era of clean energy

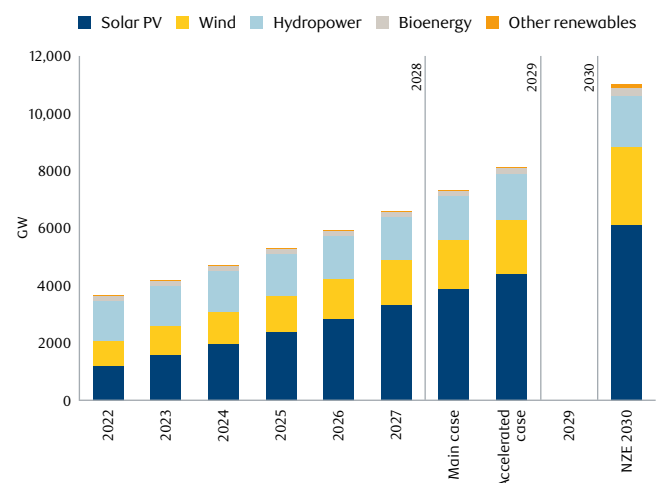
At COP28, 118 countries adopted a pledge to triple global renewable energy capacity to at least 11,000GW by 2030. Wind and solar energy are well established as the two primary renewable energy sources, despite the headwinds outlined above, capacity is still expected to increase in 2024. A total of 340 gigawatts of new renewable capacity was added in 2022, according to the International Energy Agency, with solar alone adding 220 gigawatts worldwide. An estimated 510 gigawatts of new capacity is expected to have been added in 2023, and the latest IEA report shows that under existing policies and market conditions, global renewable power capacity is now expected to grow to 7,300GW over the 2023-2028 period⁹.

One of the biggest areas in which development is needed is battery storage. Fortunately, there has been a significant increase in investment, particularly in the US. Capacity more than tripled between 2020 and 2022 to reach 8.8 gigawatts¹⁰.

“One of the biggest areas in which development is needed is battery storage.”

We are still at the very early stages of battery technology however, and more investment into research and development of this technology is required. Grid-scale batteries can be expensive, particularly where new connections to the grid are required, but improving battery storage would reduce the need for expensive new transmission lines.

Chart 3: Cumulative renewable electricity capacity in the main and accelerated cases and net zero scenario



Source: Executive summary 2003, iea.org.

⁷ Reuters, 'UK mulls revamp of offshore wind pricing after failed auction', published 13 October 2023.

⁸ International Energy Agency, 'Renewable Energy Market Update – June 2023', published June 2023.

⁹ International Energy Agency, 'Renewables 2023 January 2024', published January 2024.

¹⁰ US Energy Information Administration, 'Battery Storage in the United States: An Update on Market Trends', published 24 July 2023.

One of the biggest challenges for battery technology development is China's dominance of the markets for many of the raw materials involved. China provides two thirds of the world's processed lithium and 95 percent of manganese sulphate, 93 percent of finished anodes and 78 percent of cathodes¹¹.

This dominance comes amid increased trade issues between Europe, the US and China. While the new policies in western markets may go some way to localising development in this area, this may take many years to materialise.

There now appears to be more acceptance of nuclear as a source of low-carbon energy. It is a divisive issue, but it is difficult to envisage a path to net zero by 2050 without it. According to the International Energy Agency, nuclear capacity needs to triple by 2030 in order to meet global decarbonisation goals¹².

At COP 28, 22 countries backed a pledge to advance this aim to triple nuclear capacity by 2050, including the US, France, the UK, and the United Arab Emirates, while South Africa is also considering nuclear energy.

This marks an important change in attitudes towards nuclear energy. Some countries began to turn their back on the technology in the wake of the 2011 Fukushima disaster, but the safety record is far better than public perception suggests. New reactors are being developed by companies such as EDF in Europe that are more economical than older reactors.

That said, there is still a significant issue around the afterlife of nuclear waste and its safe disposal. As a result, currently, BlueBay Investment platform does not invest materially into nuclear energy.

Hydrogen is widely considered to be the most promising long-term replacement fuel as the world seeks to phase out oil and gas. It is an abundant, non-toxic energy vector, more efficient than many other renewables, and – in its greenest form – carbon-free.

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However, it remains expensive to produce, store and transport. This means that most current use cases are focused on localised storage for heavy industry, or for long distance transport or aviation.

The Inflation Reduction Act in the US includes major subsidies for the development of hydrogen and fuel cell technology designed to support domestic renewable energy production. Meanwhile, Europe is emerging as a potential leader in the hydrogen space. Of an estimated \$320 billion invested directly in hydrogen projects as of May 2023, \$117 billion (36.6 percent) has been invested in Europe, according to McKinsey¹³.



¹¹ Benchmark Mineral Intelligence, 'Infographic: China's lithium ion battery supply chain dominance', published 3 October 2022.

¹² International Energy Agency, 'Nuclear Power', updated 11 July 2023.

¹³ McKinsey, 'What is hydrogen energy?', published 27 September 2023.

Ensuring robust energy distribution

Expanding renewable energy production and investing in new power sources is only part of the story, however. Ensuring that this clean energy gets to where it is needed requires a significant amount of investment into transmission and distribution through upgrading energy grids.

Energy sources such as wind have peaks and troughs of power production, which requires storage or efficient transmission – preferably both – to reliably meet demand. However, as outlined earlier in this paper, storage technology is still in its infancy. This means it is essential to invest in improving the capacity and resilience of energy transmission networks to ensure the clean power generated does not go to waste.

A reliable and robust transmission and distribution network is also essential to Europe's energy security goals. Renewable energy companies have warned that the current state of the continent's energy grid requires urgent investment to meet the surge in demand for clean energy and support the growing electric vehicle sector¹⁴.

The Russia-Ukraine war and its impact on the energy supply landscape in Europe has prompted the EU to accelerate plans to invest in its energy grid as well as renewable sources. This will require “a deep digital and sustainable transformation of our energy system”, according to the European Commission's October 2022 Action Plan¹⁵. It has estimated that approximately €584 billion (\$643 billion) would need to be invested in energy transmission by 2030 to meet its goals.

The US is facing similar issues. While renewable energy development has increased significantly in recent years, there remain problems with connecting these new sources to the country's energy grid as much of it is regulated at a state level. More localised ‘islands’ generating their own energy is a solution under consideration in many places across the US¹⁶.

“According to the International Energy Agency, global spending on energy grids needs to rise by as much as 50 percent by 2030 (compared to 2020 levels) if net zero pledges are to be achieved.”

Grid investment is increasing – more than \$300 billion is expected to have been spent in 2023¹⁷ – but more is required to facilitate the new generation projects funded by the Inflation Reduction Act. This means that there is a significant potential investment opportunity in the distribution and transmission space to support the development of modern, robust infrastructure.

According to the International Energy Agency¹⁸, global spending on energy grids needs to rise by as much as 50 percent by 2030 (compared to 2020 levels) if net zero pledges are to be achieved. This presents another significant investment opportunity for investors with sufficient knowledge and expertise.

In conclusion

It is clear that there is still a significant investment gap across the board in clean energy. More spending is needed to develop cleaner forms of hydrogen, to expand and improve capacity and efficiency, and to overhaul transmission systems to get this clean power to where it is needed.

Trillions of dollars are being spent each year on clean energy technologies, but there is a huge amount of capacity for additional investment. However, to make such investments attractive requires robust and cohesive policies that protect investors and other stakeholders from the issues that have curbed investment in 2023. As a society, we cannot afford to repeat the pricing mistakes that have already proven costly over the past year.

Collaboration will be key to future success. For example, some of Europe's leading fossil fuel companies are making significant inroads into developing renewable energy – most notably, BP has been promoting its “beyond petroleum” ambitions. But for this to succeed, investors need to hold such companies to account to ensure they meet their promises. Equally, collaboration between investors and companies is needed to address the transition to a net zero economy in order to mitigate climate-related risks.

It has been a difficult period for clean energy investors, but we firmly believe that the long-term investment prospects for the sector are strong. With sufficient cohesive policy support, the private sector can be the driver of success.

¹⁴ Review Energy, ‘Europe's wind and power groups make urgent call for more investment in power grids’, published 6 September 2023.

¹⁵ European Commission, ‘Digitalising the energy system – EU action plan’, published 18 October 2022.

^{16, 18} EY, ‘How transmission investment could unlock global growth in renewables’, published 12 October 2021.

¹⁷ S&P Global Market Intelligence, ‘Curtailment, congestion costs rise as transmission upgrades lag renewable growth’, published 2 November 2023.



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