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Powering Change: Funding net zero

Ashurst's third edition of global insights into the current energy market, the pace of change and areas of future opportunity.

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A NOTE ON METHODOLOGY

We surveyed a total of 1,999 senior managers from 22 June to 7 July in 2022 and C-Suite executives who are involved in energy decision making at businesses across the G20. These included state-owned enterprises, as well as publicly-listed and private companies. The average annual global turnover of the companies whose executives we surveyed was \$16.4bn.

WHAT WE MEAN BY THE ENERGY TRANSITION

For the purposes of this research, we define the *energy transition* in the following way: the transition of the global energy sector from fossil-based to net zero carbon emissions from energy and industrial systems.

This comes through a combination of improvements in energy efficiency and digitisation of electricity grids (such as smart grids and meters), decarbonising the energy mix through lower carbon fuels (including gas) and higher levels of renewable energy sources, integration of batteries and other storage technologies, as well as electrification of other economic sectors, including through hydrogen (for example transport, heavy industries, manufacturing, agriculture and buildings).



Foreword

The accelerating pace and scale of the global transition to cleaner energy has never been more evident. The economic recovery from the Covid-19 pandemic coupled with the conflict in Ukraine has had a dramatic impact on the energy market: natural gas prices have surged, while oil prices have proved highly volatile as supply constraints vie with global recession fears to drive the market's direction. Greater energy security – and with it, a greater reliance on renewable power – has become more vital than ever.

The good news is that the price of renewable energy compared to fossil fuels continues to fall. Investor appetite for the sector remains strong. Meanwhile newer technology in critical fields such as battery storage is becoming more and more prevalent, increasingly complementing the rapidly maturing markets in areas such as solar power.

However, many challenges remain. Governments, corporates, investors and others between them, acting as the market, will have to decide which technologies are likely to be most successful in supporting the energy transition. The right regulatory frameworks need to be in place, and funds allocated to where they can have the biggest impact.

Now in its third year, this edition of *Powering Change* looks at what participants in the energy industry think of the transition as we emerge from a Covid-disrupted two years. We asked just under 2,000 executives from businesses across the G20 economies how important the transition was to their strategic goals, where and in which technologies they were investing, and what they expected from the future. We asked them about both the conventional renewable power sector, which is relatively well established but only growing, and about technologies which are less mature low carbon solutions such as green hydrogen and long-term energy storage. We asked them about the challenges they face, the pressures that are placed on them, and how they propose to fund their commitments.

The results highlight just how much momentum the energy transition has. They show that many expect the centre of gravity of the renewable energy world to shift east, from the Americas and Western Europe to the faster growing markets of Asia. And while solar remains the most popular source of renewable energy, interest is growing quickly in what have been to date less-invested technologies, such as biofuels.

The results also show how the market is maturing. In some areas there is increasingly less emphasis on external support: government subsidies and availability of incentives are becoming less important as drivers of investment. As in other sectors of the economy, access to a skilled workforce is becoming a growing concern. The Ukraine conflict may also be reinforcing some of these trends: a significant majority felt it would speed up, not slow down, the energy transition.

As global leaders advising clients across the energy transition, we witness many of these trends at first hand. We understand that no two challenges are alike: that while there is an overwhelming commitment by business to the energy transition, each company has different problems to overcome.

The energy transition is also firmly embedded in the thinking of investors, corporates, governments and others. And while they face challenges, there are significant opportunities for them too. We hope you enjoy reading this report, and if you have any questions, or want to know more about how we can support you, please get in touch with your local Ashurst team.








Executive summary

The survey demonstrates just how important the energy transition has become to businesses. It also highlights how the market is maturing, as well as how widespread the interest is in utilising and investing in a broad range of technologies.



The main findings are as follows:

-  Businesses are fully committed to the energy transition. Nearly 90% said their investment strategy had adapted in response to the transition over the last 12 months, a figure that has remained roughly consistent throughout all our surveys. Indeed, more than 80% said their organisation viewed investments in renewable energy, the energy transition and decarbonisation as essential to their strategic growth.
-  Two thirds of the businesses we surveyed are committed to a net zero target. Reducing their own emissions remains the most significant way corporates are planning to reach this goal, with directly investing in renewables second. Putting pressure on supply chains is third. Meanwhile, setting science-based targets has seen a surge in interest, with the number of businesses pursuing the idea more than doubling since our last survey.
-  By contrast, acquiring carbon offsets or removals is becoming less popular, as corporates move to take more direct action themselves to reduce emissions.
-  Their increasing commitment to renewable power may reflect its increasing attractiveness in a world where its costs are falling in relation to fossil fuels. Just over a fifth of corporates' energy bills are currently being spent on renewables, a figure expected to rise by 38% in 5 years' time.
-  When it comes to renewable power generation, solar energy retains its number one ranking from our previous surveys in both 2020 and 2021 as something respondents were using or investing in. However, the technological emphasis may be shifting: interest in energy from waste has increased sharply in the last 12 months, making it now the second most significant renewable. Last year it only ranked fifth. Meanwhile energy from biomass and energy from hydro now rank equal third, with onshore wind fifth.
-  Looking ahead, solar is expected to remain in first place. However, usage of, and investment in, offshore wind is expected to become significantly more important in the renewable energy mix. While currently only ranking seventh, it is expected to jump to joint second place over the next 5 years.
-  Turning from renewable power sources to power-related and grid-related technologies, battery storage was in first place, the same as last year. Interest in electric vehicles meanwhile continues to grow, remaining the second most popular, with smart meters third.



Staying with these technologies, over the next 5 years battery storage is expected to remain the most significant technology. The biggest change however is the expected increase in the importance of decentralised energy. While currently ranking as only the seventh most important technology to utilise or invest in, it is expected to rise to second place over the next 5 years.



While the dominant markets today remain North America and Western Europe, over the next 5 years Central Asia, South-East Asia and North Asia will become ever more attractive.



Investment is being driven less by state support or subsidies, and more by the kinds of issues that tend to dominate other, more mature, sectors. Government support, availability of incentives and lack of information all scored lower this year as being barriers to investment than they did last year. By contrast, the top 3 factors were transaction costs, lack of infrastructure and excessive regulation.



Access to skilled workers is becoming an issue for businesses, as it is in other parts of the global economy. A total of 38% now think access to a skilled workforce would significantly help drive their investment approach, a big increase from our pre-Covid survey in 2020, when it was only mentioned by 27%. It is now the fourth most important factor in supporting investment in renewables, after proven technology, prioritisation of environmental, social and corporate governance (ESG) within corporate strategies, and availability of incentives and subsidies.



Where is the funding coming from? When it comes to renewable power, corporates and banks are currently seen as the biggest investors. Funds are expected to become the biggest new source of investment, rising to first from fifth at the moment, with transport and mobility companies rising to second. Public funding is expected to tail off, as governments' Covid support programmes become less significant over time.



When it comes to power-related and grid-related technologies by contrast, the biggest investors are surprisingly viewed as private equity firms, with renewable funds and developers themselves equal second. Investment by traditional utilities has also grown significantly over the last 3 years, albeit from a relatively low base.



Better energy storage systems such as improved batteries were seen as being vital to the energy transition. A total of 92% agreed that investment opportunities in more sophisticated energy storage systems would increase the uptake of other forms of renewable energy.



Finally, the conflict in Ukraine is expected to speed up the energy transition. More than 75% expect the pace to increase in their country as a result of the conflict. Only 1 in 8 thought it would slow it down. Meanwhile 96% felt the conflict had had an impact to some degree at least on their organisation, with supply chain issues being the main cause for concern. Just under a third had had to divest assets or exit businesses due to a previous presence in Russia.

The global energy market in 2022

Our survey suggests the global energy industry is embracing the transition to cleaner energy. A total of 88% of respondents agreed their organisation had changed its investment strategy over the past 12 months in response to the energy transition. And many of them will continue to change: three quarters said not only had their strategies adapted, but that they would continue to adapt in the future. Our two previous surveys have pointed to a similar trend.

Looking at individual countries: Brazil, China, India and Indonesia were the top-ranking nations where respondents were planning to continue to adapt. However, close behind them were two European countries, France and Italy, where 86% and 85% respectively said they were planning to continue to adapt their investment strategies in response to the transition.

One reason for this is that the transition is viewed as essential for business success. More than 8 in 10 told us their organisation viewed investment in renewable energy, the energy transition and decarbonisation technology as essential to their strategic growth. A further 18% said they were keeping a close eye on developments, but not looking to invest at the moment. Just 1% said it was not important to them. Once again, these findings echo those from our previous surveys. Looking closer at the individual results, Indonesia and China were the countries where respondents were most likely to stress how important it was; in both countries, 91% described investments in renewables or decarbonisation as essential. By contrast, and perhaps unsurprisingly given the continued dominance of fossil fuels in their economies, Russia and South Africa ranked bottom.

It's no surprise that globally more companies are looking to source the capital for their energy transition from equity rather than debt. Execution risk and pricing uncertainty in an environment of rising interest rates would add an additional layer of complexity to the already complex analysis around energy transition investments. For some companies, shareholder interest in their transition pathways also facilitates equity investments over debt given the alignment of strategic objectives and longer timelines than the debt markets.

Another factor that may be behind this corporate appetite to invest in clean energy is that as the technology matures, the economics for businesses to use it become increasingly supportive. The cost of renewables relative to fossil fuels continues to decline, according to research published earlier this year by the International Renewable Energy Agency (IRENA)⁽¹⁾ *IRENA, Renewable Power Generation Costs in 2021, July 2022*. The global weighted average levelized cost of electricity of new onshore wind projects added last year fell by 15% year on year, while new utility-scale solar PV dropped by 13% over the same period, and offshore wind fell by 13%.

This growing cost advantage may explain why corporates expect to spend a greater percentage of their total energy bills on renewables in the coming years. While the mean share of overall energy bills spent on clean energy and decarbonisation technologies currently stands at just over 20%, the figure is expected to rise by 38% over the next 5 years.

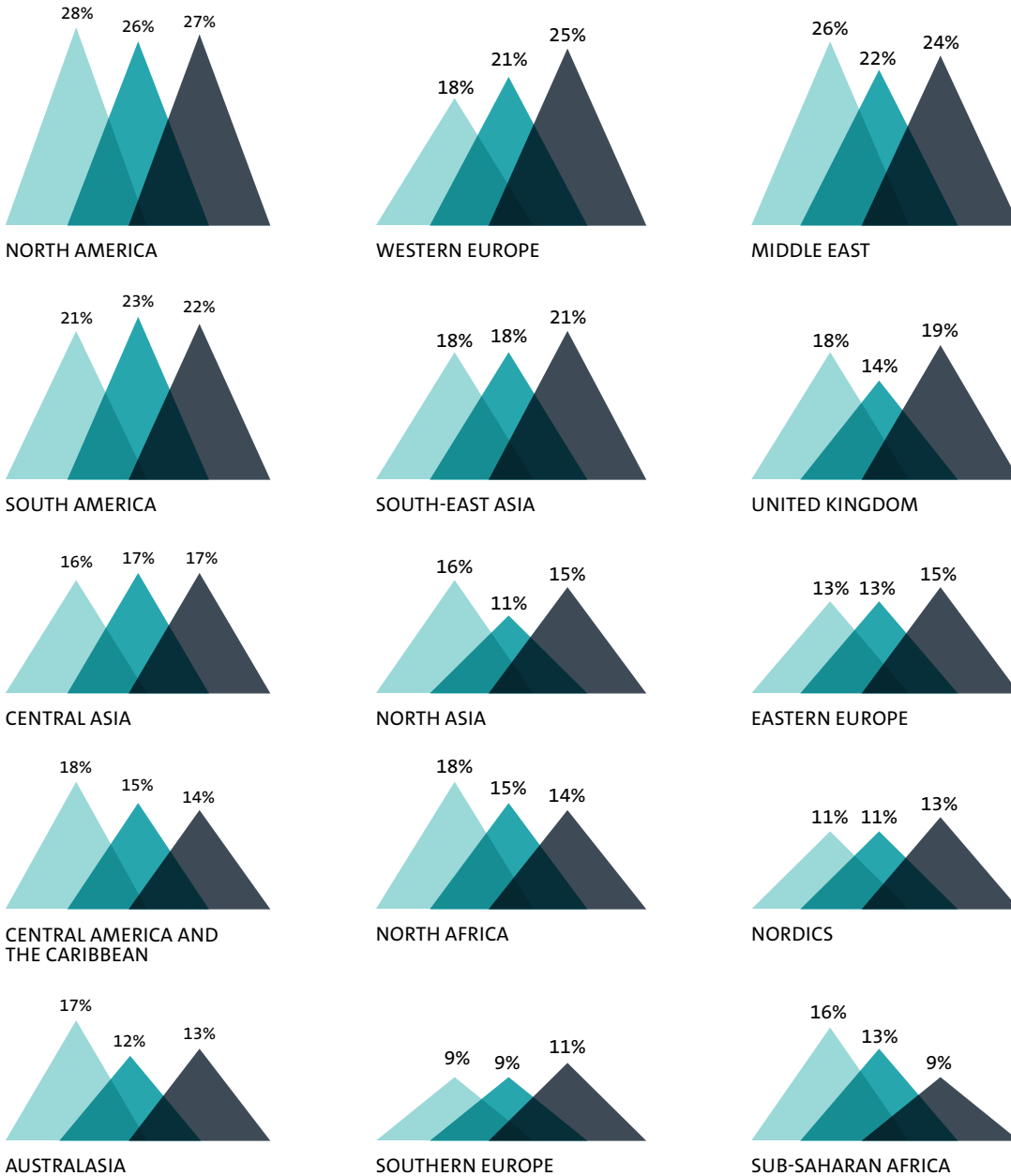
A shift to cheaper power would help alleviate some of the worsening energy burden businesses are facing. Energy costs continue to represent a material proportion of global turnover for many respondents. Across the G20 countries, an average of 21% of turnover was spent on energy bills, a proportion that has been rising consistently throughout our surveys.

Markets where the percentage was higher than the mean included a number of rapidly growing economies such as China, Indonesia and South Africa, as well as those significantly impacted by the European energy crisis arising from the invasion of Ukraine, notably Germany. By contrast, energy costs came down as a percentage of turnover in the markets more isolated from the conflict, such as Australia (an energy exporter) India, Japan and South Korea. Given the rapid fluctuation of energy prices however, these figures may change rapidly in the coming months. Rising energy prices have coincided with higher turnover in the energy and mining sectors but are likely to have a negative impact on turnover in other parts of the economy.

The more supportive economics of renewable energy and its increasing uptake may be driving one of the trends we have seen consistently over the years: the switch in corporate investment from traditional energy to renewables. Just as they have in our previous surveys, more than 60% told us they expected their organisation's investment flow from traditional energy to renewable energy and decarbonisation to speed up in the next 12 months.

CURRENT & FUTURE HOTSPOTS FOR RENEWABLE TECHNOLOGIES – TRENDED

Which markets do you currently or have you decided to utilise or invest in renewable energy, energy transition and decarbonisation technologies?



Base Size: n=1999 (2022), n=992 (2021), n=2090 (2020) senior management in corporates across the G20 and involved in energy investment decision making



Where in the world is this investment activity taking place, and where are the future hotspots likely to be? Our survey pointed to a notable shift eastwards in the location for corporate energy investment or utilisation in the coming years. The current hotspots are the United States, where 27% of our respondents have commitments, followed by Western Europe, with 25%, and the Middle East, at 24%. However, although places including Western Europe and the UK remain key destinations for current investment, respondents were more conservative about their growth potential than in 2021.

Instead, new destinations are likely to become more attractive. Although currently ranking as only the seventh most popular location, Central Asia – which includes countries such as Uzbekistan – is set to become increasingly of interest over the next 5 years. A total of 21% said they were considering investing in renewable energy, the energy transition or decarbonisation technologies there over the period. South-East Asia moves up from fifth to second, while North Asia, such as China and Japan, jumps from eighth to third. Central Asia, South Asia and South-East Asia are buoyant markets for renewable energy projects. However some jurisdictions are more viable than others given land availability and appetite for renewable energy compared to conventional fuel sources, in particular gas. North-East Asian markets are set to dominate destination offtake for hydrogen and ammonia originated from renewable energy projects in the APAC region including Australia. This could reflect the expectation that Asia is finally about to realise its potential as a destination for clean energy investment.



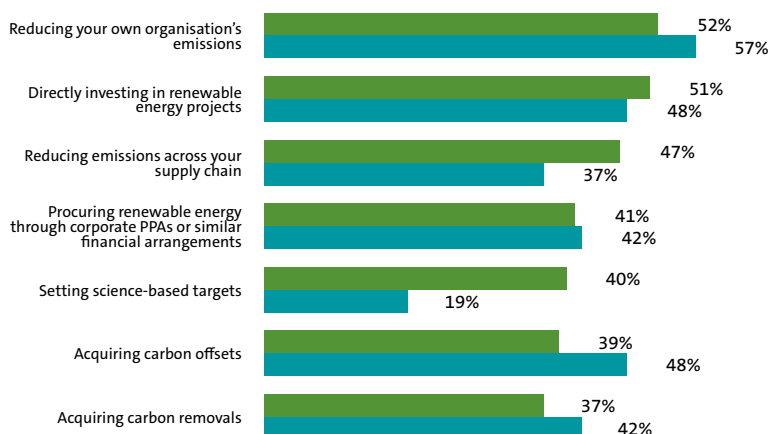
The drive to net zero

More and more countries around the world are committed to speeding up their efforts to reach net zero carbon emissions. Our survey shows businesses are showing the same determination too: two thirds say they are committed to a net zero target. A further 29% said it was under development. Perhaps unsurprisingly, given the attention focused on the subject by governments and the public in general across the region, businesses in western Europe led the field in this regard – 85% of those who replied in France had committed to the target, for example.

There has been a noticeable shift in the types of steps corporates are taking to meet these commitments. There has been a sharp fall in the last 12 months for example in those using indirect, arguably easier methods such as buying carbon offsets or acquiring carbon renewables. Instead, companies are taking more direct steps, as the cost of renewables fall and technology becomes more widely adopted. The number one measure being taken was reducing their own organisation's emissions, followed closely by direct investment in renewable energy products. In both cases, more than half of respondents said they were pursuing such steps in the short term to meet their commitments.

NET ZERO COMMITMENTS

Which of the following is your organisation currently pursuing or proposing to pursue in the short term to meet its net zero commitments?



Base Size n=1931 (2022), n=962 (2021) senior management in corporates across the G20 and involved in energy investment decision making whose organisation currently has, or has under development, a commitment to a net zero target



Significantly, businesses are also putting more pressure on their suppliers to help them achieve their net zero goals: 47%, a jump of 10 percentage points on last year, said they were reducing emissions across their supply chains. The biggest single change however has been the increased adoption of science-based targets, more than doubling from 19% in 2021 to 40% this year. Taken together, these point to just how quickly corporate attitudes have shifted when it comes to net zero, and how they are now increasingly prepared to invest to meet the challenge.

How are corporates in the energy sector funding their net zero commitments? Our survey suggests equity dominates the methods likely to be used to raise the capital required for these commitments. 7 in 10 respondents said they would use equity funding over the next decade, while just under half said they would use corporate debt. With both equity and bond markets currently suffering uncertainty thanks to the impact of the conflict and fears of an impending economic slowdown, it remains to be seen how feasible substantial fundraising will be over the next few years. The challenge to project financing energy transition projects is the need for long-term stable revenue streams. In battery storage deals for example, contracted revenue streams are often short term, or of a merchant nature, which gives rise to lower leverage and higher margins, which in turn makes project finance less attractive. We need to have a better understanding of the long-term risks associated with these revenue streams, and clear and certain regulatory regimes for other areas such as green hydrogen and Carbon Capture, Utilisation and Storage (CCUS), in order for project finance lenders to fully engage in this space.

When it comes to renewable power however, at the moment corporates continue to invest strongly: they rank first as the biggest current investors in the sector, with banks second. In the future however, funds and transport mobility companies look set to overtake corporates and banks at the top. Looking at other decarbonisation technologies though presents a different picture. Surprisingly, private equity firms rank top, with renewable funds second. We explore more about the funding trends behind both in Market Trends chapter.



Drivers of growth, pressures for change, barriers to overcome

The picture our survey paints is one of increased confidence within the energy industry about the future of renewable technology. Corporates are being driven less by government financial help, or by legislative measures that support the industry, and more by a realisation that clean energy is increasingly important as a source of power, makes financial sense, and is vital for them if they are to meet their own goals.

Indeed, 46% named the existence of proven technology as a significant driver of growth of renewable energy, the energy transition, decarbonisation and net zero within their organisation. The importance of using proven technology has

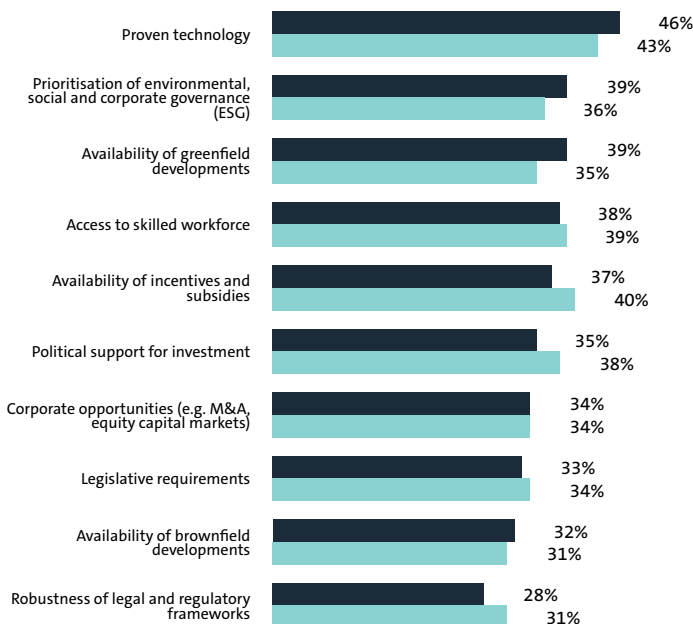
risen each time we have conducted the survey, suggesting many increasingly believe the technology is now real and mature enough for them to utilise or invest in.

Behind technology as the second most important driver of change for corporates was the prioritisation of ESG within their business. Access to a skilled workforce is however also rising up business agendas. A total of 38% named it as an important driver of the growth of renewables and decarbonisation in their business. The situation was particularly acute in the BRICS nations, where 47% said it was now significant.

DRIVING THE GROWTH OF RENEWABLE TECHNOLOGIES

Which of the following is SIGNIFICANTLY driving the growth of renewable energy, energy transition, decarbonisation technologies and net zero commitments for your organisation?

Which of the following do you believe would SIGNIFICANTLY help drive your organisation's investment approach towards renewable energy, energy transition, decarbonisation technologies and net zero commitments?



Base Size (2022): n=1999, senior management in corporates across the G20 and involved in energy investment decision making

Driving growth in renewables
 Would help drive growth

Meanwhile, issues such as political support for investment, legislative requirements and robust legal and regulatory frameworks rank lower down the drivers of growth within organisations this year. These findings perhaps suggest renewable technology is an increasingly known quantity, and there is less need to rely on political support to drive investment since the market is now better understood by its participants.

As well as these internal drivers of change, corporates also face external pressures to adapt. Governments remain the leading source of pressure, as they have been in our previous two surveys. However, the growing centrality of the transition to business strategies may be behind an increase in pressure from competitors. This jumped from fifth place last year to second place this time as a source of extreme pressure. A competitor's commitment to renewables is now a powerful incentive for other businesses to change themselves.

The vast majority of those we surveyed felt it was inevitable that the pressures they faced would lead to disputes for their organisation. Just under 6 out of 10 felt their organisation's current approach to the transition was likely to lead to disputes with individuals or pressure groups, while just under half felt it would lead to disputes with governments. In both cases, this was felt most keenly in China. However, some of these fears may be abating: both these numbers were lower than in our last survey, suggesting corporates may be adopting a more consensual approach to the issues they face with some of their stakeholders.

By contrast, the number expecting disputes with other companies rose, from 33% last time to 38% this year. Green energy disputes can take many forms, and even impact players who are not directly involved in the production of green energy or the infrastructure supporting it. Heading off disputes with individuals or pressure groups requires companies and their directors to closely assess the risks that climate change poses to their business and the legal requirements to manage and disclose such risks. Any statements made must align with a company's existing data, value drivers, strategies, objectives and timeframes. Failure to do so increases the risk of allegations of failure to comply with duties or of engaging in greenwashing.

Companies must also pre-emptively protect themselves against disputes relating to government decision-making, especially for overseas investments. As well as pushing for contractual stabilisation clauses in contracts with states or state-owned entities, this means proper investment treaty planning before any investment is made. As a minimum, investors should consider



establishing a chain of ownership to an entity or individual with the nationality of a jurisdiction that is a signatory to a treaty that provides adequate protection and dispute resolution options. Treaty protection will be increasingly important as governments around the world look to deal with the current energy crisis.

Finally, as with any emerging industry that is reliant on new technologies, disputes often arise because of poorly understood, and poorly allocated, commercial and legal risk. This often results in solvency issues and disputes where significant delays have occurred in achieving generation, and in some cases the financial collapse and withdrawal of contractors from the market. Effective dispute avoidance is as much about the decisions that are made before contracts are signed as it is about what happens next.

So there are commercial pressures on businesses to adapt to the energy transition, and pressure from outsiders on them to change. However, they still face a number of barriers that need to be overcome. High transaction costs were named by the greatest number of respondents as a barrier to investment in this year's survey, the same result as last time. The problem was most keenly felt in Brazil, where 58% named it as a barrier, while it was less of an issue in the more developed markets of Europe and North America. Meanwhile regulation has also been growing as an issue through all our surveys, and ranks joint second this year, alongside a lack of infrastructure.

By contrast, issues such as insufficient government support, availability of incentives and lack of information all rank lower in terms of being a barrier. Indeed, availability of incentives and subsidies dropped sharply as an issue compared to last year's survey, which was conducted at the height of the Covid-19 pandemic when government support was at its highest. A lack of government help was felt most keenly in less mature regions such as the BRICS nations and in Latin America, while those in the more mature markets of North America and Western Europe had the least concerns about the reduction in state funding. Taken as a whole, results like these again suggest a growing maturity of the

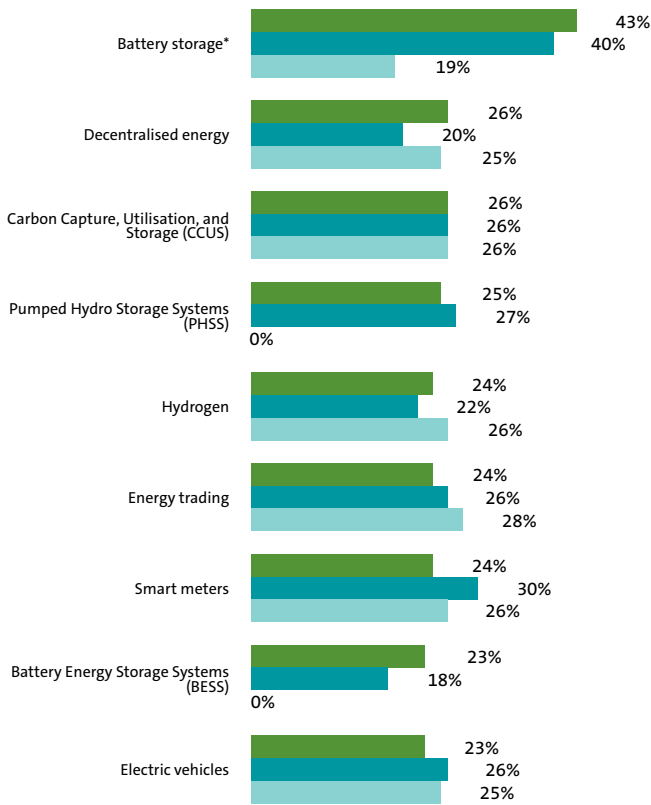
sector: renewable power and decarbonisation in many parts of the world are becoming less reliant on government help, are coming closer to the market, and are now facing many of the same issues – such as the drive to keep costs down – as the broader infrastructure industry.

How, then, to make the market more attractive so corporates invest further? It's clear from our survey that market participants feel that governments have a role to play – if not in providing direct support, then in creating the right framework for the industry to thrive. A total of 94% agreed that investment treaty protections would be a means of mitigating risk when investing outside their home market, while only slightly fewer felt carbon pricing mechanisms would create a stronger incentive for industry to cut emissions.

Respondents also felt strongly however that there was a need for more advanced decarbonisation technologies. There was an overwhelming call for greater investment in ways of ensuring renewable energy can better meet the baseload energy need of the world's economies. More than 90% of respondents felt that investment opportunities in more sophisticated energy storage systems would increase the uptake of other forms of renewable energy.



Which NEW non-power generation technologies is your organisation considering to utilise or invest in over the next 5 years? (Please select all that apply)



Base Size: n=1999 (2022), n=992 (2021), n=2090 (2020) senior management in corporates across the G20 and involved in energy investment decision making



THE CONFLICT IN UKRAINE

The conflict in Ukraine has made the global energy market in 2022 even more volatile. Energy security has become an increasingly important topic, as supplies of gas and oil become constrained and uncertainty lingers about the future flow of fossil fuels, most notably into Europe. In many countries, there have been moves to reopen previously closed-down fossil fuel plants to make up for the shortfall from Russia. Meanwhile in Japan, there have been calls to restart up to 9 nuclear reactors to help mitigate the winter energy shortfall, although the determination by the government there to reach net zero means the role for renewables will remain important.

The impact on business from the conflict has been significant. A total of 96% told us their organisation had suffered some degree of impact, with supply chain issues and energy or commodity price volatility being the main problems they had faced. Just under a third told us they had had a presence in Russia, and needed to divest assets or exit business activities within the country.

But the need to ensure greater energy security made evident by the crisis is likely to lead to a quicker energy transition, not a slowdown. Three quarters of those we surveyed said they expected its pace to speed up as a result of the conflict. Indeed 29% felt it would speed the transition up significantly. Only 12% felt the conflict would slow it down.



Market trends

For a more in-depth look at the trends driving the industry, we examined at the two different sections of the market. We asked those surveyed for their thoughts on renewable power, and also about their attitudes to other power-related and grid-related technologies including batteries, carbon capture and electric vehicles.

RENEWABLE POWER

Solar energy remains the dominant renewable energy generation technology around the world today: more than two thirds named it as a power source they were currently utilising or investing in. Indeed, solar has consistently been the top form of renewable energy named by corporates throughout all our previous surveys.

However, this year has seen a dramatic increase in interest in energy from waste. More than half of those surveyed named it as an area they were currently investing in or using, up by more than a half since a year ago. Three years ago, it only ranked seventh. This may reflect the global focus on recycling and the circular economy, which in turn means greater consumer support for technologies that allow energy to be created from waste packaging or recycled goods. China was the leading nation exploring the technology, while countries in Latin America and North America tended to be slower in adoption. Given the ongoing public scrutiny on the environment and reducing waste, this probably means these regions will simply be slower to adopt the technology, rather than ignore it altogether.

When looking ahead, there was a greater focus on offshore wind, which ranks second behind solar in terms of new renewable power generation sources corporates expect to utilise or invest in over the next 5 years. Australia, Indonesia, and the BRICS nations led the field in terms of future interest in the technology, perhaps reflecting how the industry in parts of Asia is starting to play catch-up with Europe. Respondent data however suggests that barriers to entry may still exist: offshore wind has consistently ranked highly as the renewable energy source corporates expect to become more popular in the future, yet normally ranks lower when it comes to actual investment or usage.

Where will the investment required to fund the rise in renewable energy come from? The survey suggests corporates themselves are the biggest current investors, with banks slightly behind. Corporates are particularly active in the emerging markets such as the BRICS, Latin America and the Middle East.

By contrast, government spending or public funding, which ranked top last year during a period when the Covid-19 pandemic was a major issue, has slipped to fourth. Although sentiment towards government investment into generation in Latin America remains relatively high, around the rest of the world government was seen as one of the least-active investors. This may be another sign that the renewable energy market is maturing, and that the sources of funding traditionally seen in the wider infrastructure market are coming to dominate the sector. Meanwhile transport companies were increasingly visible in the market compared to previous years, although they started from a low base.

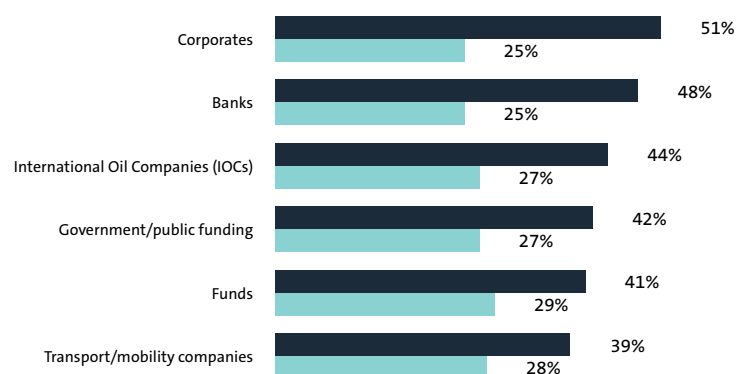
Looking ahead, it appears likely that different sources of funding will become dominant. Our survey respondents expect the leading new investors in renewable power

generation in their country within the next 5 years to be not corporates, but funds. This may reflect institutional investors' growing appetite for renewables as assets which offer better, more stable long-term yields than traditional fixed income. Expectations about funds were highest in the Asia Pacific region and the BRICS – notably China – while they were lowest in Mexico and – perhaps unsurprisingly given the current political climate – Russia. Meanwhile, transport and mobility companies were in second place as likely new investors in renewable power generation, suggesting a more intensive greening of the road, rail and air sector may be about to take off. Expectations for transport were highest in South Africa, Brazil and the United Kingdom, and lowest in China and Russia. Taken together, in many markets this suggests a new depth to the renewable power sector, as more sources of capital come onstream and overtake corporates and banks as sources of investment.

CURRENT AND FUTURE INVESTORS IN RENEWABLE POWER GENERATION

To the best of your knowledge, who is currently investing in, whether by debt or equity, renewable power generation sources in your country? (Please select all that apply)

Which NEW investors in renewable power generation sources do you expect there to be in your country over the next 5 years? (Please select all that apply)



Base Size (2022): n=1,999 senior management in corporates across the G20 and involved in energy investment decision making

Presently invest
 Considering

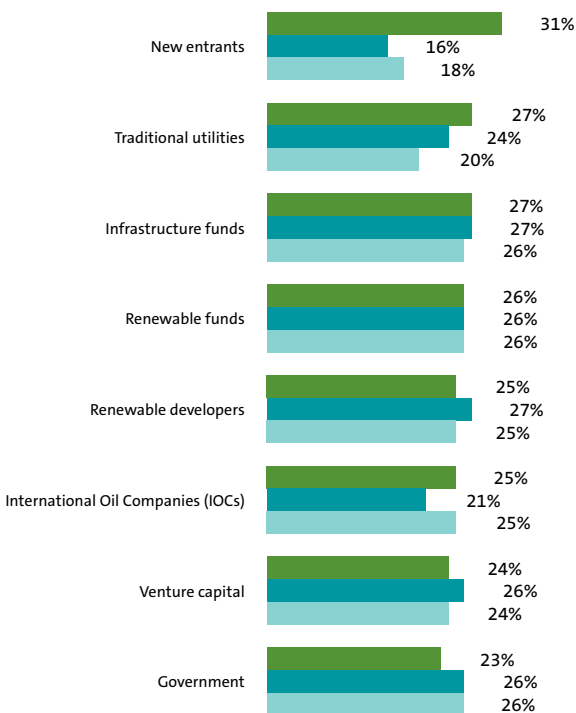
POWER-RELATED AND GRID-RELATED TECHNOLOGIES

Compared with renewable energy, these technologies are often at an earlier stage of development. Yet more and more people now believe investment in this field is vital. A report last year by the International Energy Agency (IEA) on reaching net zero by 2050, for example, noted that while reaching that target required even quicker deployment of available technologies, a more widespread use of technologies not yet on the market was needed as well.⁽²⁾ *IEA: Net Zero by 2050: A Roadmap for the Global Energy Sector, May 2021.* The biggest opportunities were in advanced batteries, hydrogen electrolyzers, and in direct air capture and storage, the organisation suggested.

Our survey respondents agree about the need for a focus on these technologies as well as renewable power. We have already noted how the vast majority of them felt investment opportunities in more sophisticated energy storage systems would increase the uptake of other forms of renewable energy (see page 5). This may now be on the way. Nearly two thirds of our respondents named battery storage – defined as either battery energy storage systems or pumped hydro storage systems (PHSS) – as a technology they were investing in or utilising. Electric vehicles were second, at 50%. In fact, these two have remained in first and second position throughout the course of our surveys.

Appetite for battery-storage technology was strongest in the BRICS countries, noticeably China, where nearly three quarters named it as a technology that was of interest. Other, more

Which NEW investors in non-power generation technologies do you expect there to be in your country over the next 5 years?
(Please select all that apply)



Base Size: n=1,999 (2022), n=992 (2021), n=2,090 (2020) senior management in corporates across the G20 and involved in energy investment decision making



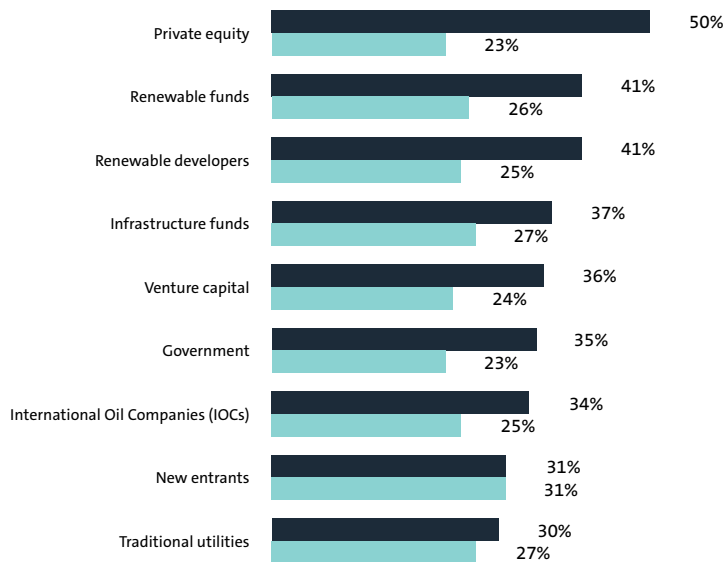
mature markets of the world also have a continuing appetite for battery-storage, if not to the same degree as the fastest-growing regions.

Looking ahead, even newer technologies are expected to become more prominent. Carbon Capture, Utilisation and Storage (CCUS) and decentralised energy were named joint second behind batteries as the power-related or grid-related technologies organisations expected to utilise or invest in over the next 5 years. When it came to Carbon Capture, Utilisation and Storage (CCUS), this time it was respondents from the UK that showed the most interest, with one-third naming it as a technology under consideration, narrowly ahead of Japan and Russia. Meanwhile in terms of decentralised energy, Germany ranked top, with the UK and the United States in joint second place.

Whether the expectations for these frontier technologies will actually turn to reality remains to be seen. More than half felt their organisation was fully prepared to adopt or invest in smart meters, and 47% felt they were ready to embrace electric vehicles. But while 41% felt they were fully prepared for battery energy storage systems, that number has declined significantly, down from 49% in our last survey. The scores for Carbon Capture, Utilisation and Storage (CCUS), decentralised energy and PHSS were slightly lower, at just 37%, 35% and 33% respectively. If these technologies are finally to move towards centre stage in the energy transition, there will need to be concerted attempts by investors, governments, corporates and others to ensure the full fruits of their potential are achieved.

CURRENT AND FUTURE INVESTORS IN NON-POWER GENERATION TECHNOLOGIES

To the best of your knowledge, who is currently investing, whether by debt or equity, in non-power generation technologies in your country? (Please select all that apply)

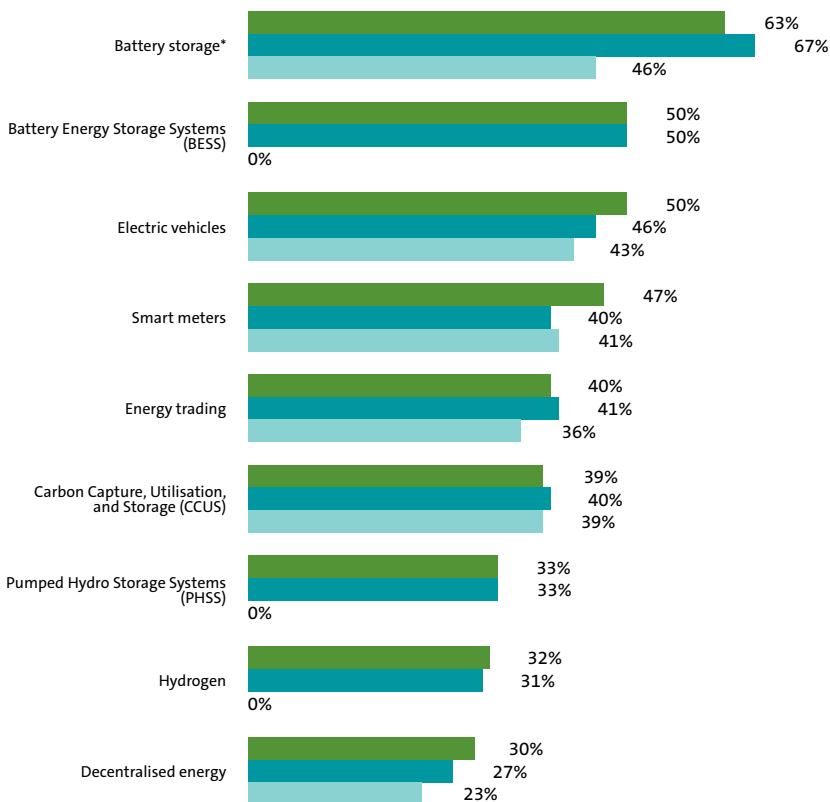


Base Size: n=1,999 (2022), n=992 (2021), n=2,090 (2020) senior management in corporates across the G20 and involved in energy investment decision making

Presently invest
 Considering

CURRENT AND FUTURE INVESTMENT IN NON-POWER GENERATION TECHNOLOGIES – TRENDED

Which of the following non-power generation technologies are you currently or have you decided to utilise or invest in? (Please select all that apply)



*'Battery storage' for 2022 and 2021 is a combination of respondents who selected 'Battery Energy Storage Systems' OR 'Pumped Hydro Storage Systems'



This need to invest more in the newest technologies means sources of funding will be critical. Unlike with renewable power, where corporates and banks came top, when it comes to power-related or grid-related technologies, private equity dominates. This may be because private equity firms are more comfortable than banks are in investing in the kinds of frontier opportunities that are typified by these technologies. Meanwhile other funds appear already to be significant players, with 41% saying renewable funds were a current investor. Indeed, the funds sector as a whole is highly visible: while renewable developers ranked third, infrastructure funds and venture capital ranked fourth and fifth respectively. Governments were sixth.

Looking ahead, the survey suggested new investors were likely to move into the sector over the next 5 years, perhaps reflecting these technologies' relative immaturity compared to renewable power, where existing players are expected to continue to take the lead. However, 27% cited traditional utilities as expected new investors, a figure that has consistently and significantly risen throughout our surveys. Countries where there are already large established utility providers stood out in this regard, with South Africa, Saudi Arabia, China, and Russia occupying the highest rankings. Infrastructure funds joined utilities in second place, with renewable funds next.



Conclusion: Energy transition is becoming fundamental to all sectors

Our survey shows the extent to which businesses as a whole – wherever they are, in whichever sector they work – are committed to the energy transition. It gives an insight into the technologies they are using, the places they are investing, and their sources of funding.

It also paints a picture of a market engaged in its own transition. New regions are set to take the place of traditional hotspots. There is a commitment not just to invest in the more established sources of clean energy such as solar or wind, but in newer technologies such as energy from waste or battery storage. New investors look set to enter the market too, and in many cases replace the current dominant sources of funding.

Overall, we feel it is a picture of a market becoming more mainstream and growing in maturity. There is a growing inevitability about the transition. Some of the more obvious, initial activities – proving the technology works, prioritising ESG, building out the greenfield project pipeline – have already happened. There is an expanded understanding of what the energy transition means, and how fundamental it is. Meanwhile businesses are increasingly comfortable about investing in renewable energy not because of government subsidies or supportive legislation, but because they have faith in the future for a technology which is growing in capability.

Just like their peers in other industries, they are increasingly being driven by competitive pressure. As with technological advancements in other sectors, costs are coming down over time. And while there is relentless scrutiny from outside organisations, the energy industry's increased confidence means many are seeking more opportunities to invest in renewable power and other technologies, and in different markets too.

Importantly, there seems to be no lack of funding. Institutional investors and others are all keen to allocate funds to the renewables sector, driven by its increasing maturity as an asset class and long-term yields. This is in sharp contrast to a decade ago, when financing was much harder to come by. It is now less of an issue of whether the funding is available, and more about how you deploy it quickly enough to make the most of the opportunities.

We do have concerns, however. There must be worries that the newest, frontier technologies may not come to fruition soon enough, nor at sufficient scale, to meet the challenges. More broadly, it is vital that the right landscape is nurtured for the new technologies to thrive. Corporates cannot do all the heavy lifting. Governments and regulators will need to be alive to the requirement to create frameworks which support the industry. They will need to be nimble to ensure that regulation remains supportive. And this cannot simply be a matter of individual countries forging their own paths. There needs to be a global commitment to the measures required.

Renewable energy now sits at the heart of business strategies. It is growing in size and in maturity as a sector. New sources of funding are emerging. More technologies are being introduced.

Our research demonstrates just how fundamental the energy transition has become to all sectors of industry, and how many are seeking out further opportunities around the world. Renewable power and other technologies are critical for the world to meet its climate goals. They are critical too for businesses, as they face their own demands of the future.

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