Towards net zero

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Climate summit delegates gathered for COP26 in November, making pledges to limit global temperature increases and changes to the climate. A shift towards renewable energy plays a large and important role, with the onus on wind, solar and hydrogen to help pave the way to a net zero future.

As world leaders gathered in Scotland for COP26, the race towards carbon neutrality gathered pace. And with record temperatures, wildfires, flooding and other extreme weather events becoming more the norm rather than an exception, this Climate Change conference in particular, and the pledges made there, seem particularly poignant.

With addresses to delegates at the United Nations conference including calls to act 'for our children and our children's children' and to 'turn tragedy into triumph', these seemed more than simply powerful soundbites and more like a final plea for collective action.

The Paris Agreement six years ago aimed to limit the average global temperature rise to 1.5 degrees, but unless more is done, the planet is already on track to warm by more than 2 degrees by the end of this century. COP26 is now seen by many as the world's last hope for meeting those goals. With the aim of reaching net-zero by 2050, COP26 is all about making plans to reduce carbon emissions, and with under 30 years left in the race, many of these plans are likely to be ambitious.

Renewable energy leading the way

Energy use is responsible for around 73% of the world's greenhouse gas emissions, so reducing energy demand by making energy systems more efficient and switching away from fossil fuels to renewable energy are effective ways to reduce emissions.

Nature-based solutions can absorb emissions to some extent, but planetary limits prevent them from being reliable ways to eliminate emissions altogether. Technologies that remove carbon from the atmosphere exist too, but these are not yet commercially viable, and there are currently no technologies that can remove other greenhouse gases from the atmosphere in a similar way. So, renewable energy, including wind, solar and hydrogen, are currently the most direct, feasible and effective path to net zero.

Wind farm growth

The wind industry, along with solar, will be one of the driving forces, no doubt, with governments investing in and embracing new technologies to help realise its full potential. Rewind the clock 30 years, the world's first offshore wind farm was born, capable of powering a couple of thousand homes at best.

Today, the number and size of turbines in a wind farm has increased substantially, with the latest farms capable of powering millions of homes. Thirty years from now, in 2050, if carbon neutrality is to be achieved, these wind farms will be more substantial still, as the industry plays a vital role in decarbonising the future.

To deliver this, there needs to be a significant scaling up of an industry that is still, despite this remarkable growth, still in its infancy. If the Paris Climate Accord targets are to be met, it is estimated that there needs to be an installed global capacity of 2,000 GW by 2050. This is unprecedented growth, not to mention at a time when other forms of low-carbon energy, like solar and hydrogen also need to be increasing in capacity. The

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International Energy Agency (IEA) predicts that solar power will increase 20 times and wind power 11 times by 2050, with electricity also growing.

In the UK, a substantial acceleration of wind farms will be required over the next decade or so, to achieve what amounts to a near quadrupling of current installed generation from renewable sources. In some territories, such as the UK and Germany, capacity is likely to be the biggest challenge, with off-shore wind already making up a big part of energy generation.

With coal-fired power plants and nuclear power stations set to be closed within the next 15 years in the UK, there will be an increased reliance on renewable generation to meet energy demand way ahead of 2050. And in emerging markets there needs to be strong encouragement for the offshore wind market to ensure that the world can collectively manage these targets. However, when you consider just how far the wind industry has come in just a few decades, it’s clear that it has the capabilities to rise to the challenge and even to outperform expectations.

Opportunities and challenges

There is no doubt that the stronger focus on net zero goals is driving a huge surge for wind power and, while wind power is not the only element needed to fuel the transition, it’s role within the movement is huge.

For wind energy providers, the opportunities are clear, but with them comes great pressure. Operations will need to be scaled up, business models reconfigured, systems streamlines and advanced technologies implemented.

The path to net zero

So what does the road to net zero look like for the wind industry in particular? As an untravelled path, the route may still be a little unclear but it is likely to involve bigger wind farms, in deeper waters when offshore and operating more efficiently. Larger turbines will be located further from shore, with higher wind conditions, using state of the art O&M technologies.

All of this requires investment, of course. Wind and solar energy may be among the cheapest forms of electricity production in Europe, but it’s the installation of wind farms and solar fields where the real costs lie. Initial setup is no small task and does not come with a small price tag, and may even escalate further as the sites and the demand for clean energy grows. And there is the far from small matter of maintenance to calculate too.

The best solution calls for innovative thinking when it comes to construction, operation and maintenance, something that we know the industry excels at. Robotics, satellite applications and autonomous system solutions are likely to play a key role in performance management of wind farms, while new technologies in the manufacturing process of turbines will also help.

The challenge will be for the technology to keep up with the pace in growth of the turbines, solar fields and wind farms themselves, and to not let cost outweigh the benefits on our journey to net zero. Just as the world leaders have come together to share ideas and make pledges at COP26, collaborative thinking within the renewable energy sector, among manufacturers, service providers and end users, may well be our smoothest path forwards.

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