Modern onshore turbines and battery storage are helping power us towards net zero

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The onshore wind industry has been on quite a journey over the last few decades but never has its evolution been more important than now.

The UK's first commercial wind farms comprised 400kW machines with tip heights of 30m or so. A 10-turbine site could generate enough electricity for around 3,000 homes.

Technology has advanced considerably since the early 1990s, in part thanks to Andrew Garrad CBE and Henrik Stiesdal who have been awarded the prestigious Queen Elizabeth Prize for Engineering this year. Over the last four decades, Garrad and Stiesdal have made ground-breaking engineering inputs, developing the early technology and maintaining their presence in leading positions as the industry has grown, enabling some of the world's biggest rotating machines, which help drive progress towards a net-zero energy economy.

We now benefit from in-depth understanding of wind regimes and modern turbines with installed capacities of 6MW or more. These modern turbines are taller, 200m high or more, and now very much the norm for proposed new sites.

Another technology that's been through a similar journey, albeit in a shorter space of time, is Battery Energy Storage Systems (BESS). Output capacities have advanced considerably over the years from 5-10MW to 100MW or more today, and BESS are now part of the core infrastructure for most new onshore wind farms.

A BESS not only helps to maximise the efficiency of an onshore wind farm and therefore contribute towards net zero, but also improves energy security and plays an important role in creating a more flexible grid network.

RES' Hill of Fare Wind Farm proposal, near Banchory, is an example of the new phase of onshore wind farms that include both technological advances. If consented, the 105.6MW 16-turbine scheme will utilise modern 180m and 200m turbines and a BESS with a power output capacity of 100MW and storage energy capacity of 200MWh. To find out more visit **www.hilloffare-windfarm.co.uk**.

Scotland's renewable energy industry and its supply chain supported more than 42,000 jobs in 2021, with onshore wind accounting for more than 12,000 of these, and generated over £10.1billion of output. In Scotland alone we have approximately 9GW of installed onshore wind capacity and this is targeted to more than double to 20GW by 2030. The commercial burning of coal for energy in the UK has been almost phased out completely by renewable electricity, including onshore wind.

Earlier this year, the EU's Climate Service reported that the critical 1.5°C global warming limit had been breached for an entire year for the first time. As the world warms and we see more intense weather events such as storms, flooding, heatwaves and wildfires affecting people worldwide – the need to decarbonise, fast, becomes ever more apparent.

Each new onshore wind farm built is a step closer to achieving this and to reaching net zero.