

UK renewables – limitless energy or a precious resource?

Today's decisions delivering tomorrow's sustainable future.

In 2019 the UK's Climate Change Act was amended to commit to net zero emissions by 2050 and followed by plans published in 2021 to decarbonise the electricity system by 2035. Whilst the concept of net zero is readily discussed, reaching this goal for the energy system is a real challenge.



Fortunately, we have numerous sustainable resources available to us, but these have not yet been exploited at scale. We also have important deployment choices to make, many of which will require changes to personal lifestyles, so needing societal engagement alongside technological and commercial innovation.

Electricity has a vital role to play in the decarbonisation of modern UK society; not only in creating a net zero energy

supply for existing electricity needs, but also providing a viable pathway to many other energy services such as space and water heating, and transport. However, as with all transition pathways, decarbonisation of the power sector is not a simple matter. A large amount of generation infrastructure using sustainable sources will be required to provide the energy needs of society.

What energy resources do we have?



Wind: The UK is a leader in innovation for offshore application. Whilst costs are competitive, the intermittency of supply means that the associated costs of essential back up, power system management and storage also need to be fully considered.



Biofuels: They are extremely valuable, though the debate on their future uses is a complex one. There are limited onshore resources and concerns about global habitat damage, the potential for conflicts with food production and the carbon cost of the supply chain.



Solar: Solar photo-voltaic energy provides a useful input, though with some limitations given the UK's latitude. Solar power installations offer the opportunity for individuals and communities to invest in their own power production.



Geothermal: Naturally occurring thermal heat can be exploited using ground source, marine source, open water source or mine water source heat pumps where these resources are available, and can be combined with other sources for networked heat.



Marine: In the UK we potentially possess some great tidal and wave power resources, making this a good prospect in the renewables mix. The technical, environmental, and political challenges tend to make these sources look expensive compared to wind, but the predictability of their output adds greatly to their future value.

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Recommendations

The UK has significant renewable energy development opportunities, yet even for the most modest demands considered, the new sustainable resources required for heat, transport and industry are significant multiples of current capacity. Critically, today's system choices and decisions could substantially increase those multiples. Almost all our existing sustainable power plants are scheduled to retire before 2050, and the renewable assets we are using today will need re-powering before then. Below are our recommendations to help ensure that renewable resources are treated as finite and precious, rather than abundant and disposable.



1 Strategic direction is vital

Markets and businesses can respond to this opportunity, but the system choices made have a large impact on the outcomes achieved. The transition must be driven by an effective strategic planning process to ensure efficient and timely delivery, with consistent direction, clear investment signals, appropriate incentives, and active skills development. This highlights the fundamental need for new whole-system coordination and accountability mechanisms that are not currently a feature of the energy sector.

2 The scale of the challenge is huge

All net zero transition routes involve substantial, costly, and potentially intrusive infrastructure. We are not facing an organic process requiring incremental movements, but a real step change in planning, investment, engagement, and action.

3 Technology exists for an energy efficient and low carbon future

This includes options for decarbonising heat, transport and industry, where the most appropriate solution can be selected for each application, along with smarter energy management and control. Technology choices must properly integrate the human dimensions and provide the services that both today's and future customers will value.

4 There must be a real focus on energy efficiency

Whatever the source, whatever the application, reducing the need for energy and hence the scale of delivery assets must be a real priority. This is particularly important for the existing building stock where significant savings can be made. Retrofitted improvements are costly, but the societal benefits go beyond energy efficiency and are enduring.

5 Decarbonisation can help energy independence

The UK's energy system already faces some significant challenges, particularly with its reliance on imported fuels and volatile world markets. The drive to decarbonise our energy system by 2050 offers the nation an opportunity to move from fuel-based solutions and become more energy independent.

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