

# Achieving net zero: is it time to discuss nuclear?

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The world is facing an energy ‘trilemma’, which refers to the three criteria which must be satisfied when assessing energy solutions for the future.

We want access to energy that is firstly secure/ reliable, secondly affordable and thirdly environmentally sustainable. This will be the biggest global challenge of the 21st century.

Solving two elements of the trilemma is relatively straightforward, for example, fossil fuels are reliable and affordable but they fail the environmental sustainability test.

Admittedly, we need to contend with higher prices during periods of global uncertainty, but in general fossil fuels are sufficiently affordable that governments use them as a source of significant tax revenue. By way of example, over half the price of a litre of petrol at the pump goes to the government in tax and duty. In contrast, renewable energy is environmentally sustainable but is not always reliable and less affordable than fossil fuels.

Nevertheless, the global consensus is to shift our economies to net-zero energies as a central goal in the fight against climate change. That does not mean zero greenhouse gas emissions, but a state where the amount of greenhouse gases released into the atmosphere is offset by an equivalent amount removed.

The 2016 Paris Agreement aims to limit global warming to well below 2°C compared to pre-industrial levels and many nations are committed to reach the net-zero target by 2050.

Zero carbon energy technologies are therefore essential in this transition, not only for their ability to produce clean energy but also recognising that fossil fuels will run out at some point.

Fortunately, there are several technology options available. Solar energy has become one of the most widely adopted renewable energy sources globally and as the technology develops manufacturing costs will continue to fall, operational efficiency will improve further and a greater proportion of older panels will be recycled.

Wind energy is also central to the renewable energy revolution, and given the weather on these islands, is scheduled to provide the largest share of our renewable energy mix. Issues have been raised on land use and the recyclability of wind turbines, particularly the composite materials used in the blades, but innovation should also provide solutions here too, as new materials are developed to allow for easier recycling.

Many of the challenges associated with green energy technologies will be overcome with human ingenuity, but some problems are less easily addressed. Most notably, the sun does not always shine and the wind does not always blow. Therefore, matching the time when people want energy (demand) with the time when the energy is generated (supply) presents another difficulty.

This leads to the storage piece of the jigsaw, needed to balance supply and demand in renewable energy systems. Battery storage has seen significant growth but concerns continue to be raised about the environmental impact of battery production, although improvements are being made to the processes involved in recycling the component materials in batteries.

These technologies all require access to the grid, and NIE Networks have plans to invest billions over the next 10 years to prepare the country for a net zero world where electricity usage is going to significantly

increase as we transition away from fossil fuels.

It must also be recognised that we cannot rely entirely on electricity as our future source of energy. Some areas of transport, such as air, haulage and public transport alongside heavy industry need other sources of efficient energy and one serious avenue being developed in this regard is hydrogen.

'Green' hydrogen, so-called because it is produced from renewable energy, is currently expensive but in many respects is a neat fix because it can be produced on an intermittent basis and transported to the end user. It is also clean because the process merely extracts hydrogen from water leaving oxygen as a by-product and the process is then reversed in a fuel cell when the energy is released, with water as the by-product.

However, even with the technological advances in renewable energy generation and storage, there remains a need for a source of electricity that can be controlled and adjusted to meet demand, referred to as dispatchable energy generation. In the short term that role will be filled by fossil fuels, as we manage the transition, but in the longer term the compelling zero carbon dispatchable option is nuclear.

As a technology it has many advantages, it is dependable, it is very energy dense so does not need significant tracts of land and it does not contribute to climate change. There are also clear challenges, not least dealing with waste, the cost and public perceptions about safety.

But the industry has made significant strides to enhance safety, increase waste recycling and new small modular reactor (SMR) innovations are aimed at reducing costs.

Undoubtedly, these solutions all require years of investment and further development before the energy trilemma is solved, but the point is that they will all be needed to meet our energy needs in the mid and late 21st century, including nuclear.

Now to suggest that nuclear is controversial and divisive on this island is a gross understatement, but with current and proposed inter-connectors with GB and France, nuclear power will play an important role in our future energy mix in any case.

Therefore, is it unreasonable to suggest a greater level of public debate on the issue of nuclear generation on the island?

Article first published in the Irish News on 2nd September 2024

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### About UUEPC

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