



SMR

BENEFITS OF INTEGRATING
ROLLS-ROYCE SMRs INTO
THE UK'S ENERGY MIX





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Benefits of integrating Rolls-Royce SMRs into the UK's energy mix

New research has shown the wide-ranging benefits that a fleet of Rolls-Royce SMR power plants will deliver as part of the UK's efforts to build energy security, lower household bills and reach net-zero targets through the 2030s.

The UK's first domestic nuclear technology in more than 20 years, Rolls-Royce SMR factory-built power plants will produce enough clean energy to power a million homes for 60 years. Each of the small modular reactors (SMR) will produce 470MW of low-carbon electricity.

The research was carried out by Aurora Energy Research on behalf of Rolls-Royce SMR and the report looked at two scenarios for deploying Rolls-Royce SMRs – either 7.5GW (lower scenario) or 14GW (higher scenario) of power by 2040.

The report evidenced the technology's ability to perform against three UK energy priorities:

Security of supply Decarbonisation Minimising costs

In the UK, there has been no nuclear reactors built to completion since 1995 and 85% (7.2GW) of the existing fleet is set to retire by 2028. In response, the UK Government has set a target to reach 24GW of nuclear capacity by 2050.

The report concludes that a pipeline of Rolls-Royce SMRs – each unit of which has a shorter construction period compared to large scale nuclear plants – could enable the UK to ramp up its civil nuclear fleet at a faster rate in order to meet both the Government's target of reaching 24GW of new nuclear by 2050 and Net Zero.

Rolls-Royce SMRs will lower wholesale prices substantially

Adding Rolls-Royce SMRs to the UK grid will **remove the need for new build gas**, helping to stabilise electricity prices

Gas demand is lowered by up to 12% in 2035 with the presence of a Rolls-Royce SMR pipeline

Minimising costs

Deploying a fleet of Rolls-Royce SMRs will reduce wholesale prices by up to 13% and lower price volatility.

The integration of the lower scenario of Rolls-Royce SMRs into the power mix reduces wholesale prices by 4% in 2035 and 13% in 2040. This would increase substantially to 13% in 2035 and 28% in 2040 in the higher pipeline scenario.

By adding SMR generation, we can push new build gas out of the system and, therefore, reduce the number of hours in which the price is set by gas.

Gas leaves consumer bills vulnerable to price volatility, so by adding publicly funded SMRs to the UK grid and removing the need for new build gas, we can stabilise electricity prices and reduce consumer bills.

The integration of Rolls-Royce SMRs into the power mix **lowers wholesale prices substantially**



Security of supply

A fleet of Rolls-Royce SMRs will dramatically cut the UK's need to build new gas capacity.

Researchers say that in the 2030s, the UK is on course to need an additional 7.5GW of new, unabated gas peaking capacity, which will only operate for a fraction of the year when the system is tight.

However, deploying a fleet of Rolls-Royce SMRs, alongside existing large-scale nuclear projects, would reduce the required new build of unabated gas peaking capacity to just 1.1GW if the lower scenario of Rolls-Royce SMRs were built. Under the higher SMR scenario, it would remove the need for any new gas peaking capacity entirely, increasing energy security and reducing carbon emissions.

With the addition of Rolls-Royce SMRs to the UK grid, gas generation is 15% lower and gas demand is 12% lower in the lower SMR scenario.

Lower gas generation and demand is the result of SMRs displacing the need for gas to provide firm power to the UK grid, alongside intermittent renewables. Rolls-Royce SMRs not only provide consistent output, but its power is low carbon, clean and not exposed to the volatility or of imported gas prices.

In the 2030s, the UK is on course to need an additional **7.5GW of new, unabated gas peaking capacity**

The larger Rolls-Royce SMR pipeline completely removes the need for any new gas peaking capacity in the UK in the 2030s - which will increase energy security with clean power

Gas demand is lowered by up to 12% in 2035 with the presence of a Rolls-Royce SMR pipeline



Decarbonisation

A fleet of Rolls-Royce SMRs would reduce power sector emissions and fill a critical gap in the UK reaching Net Zero.

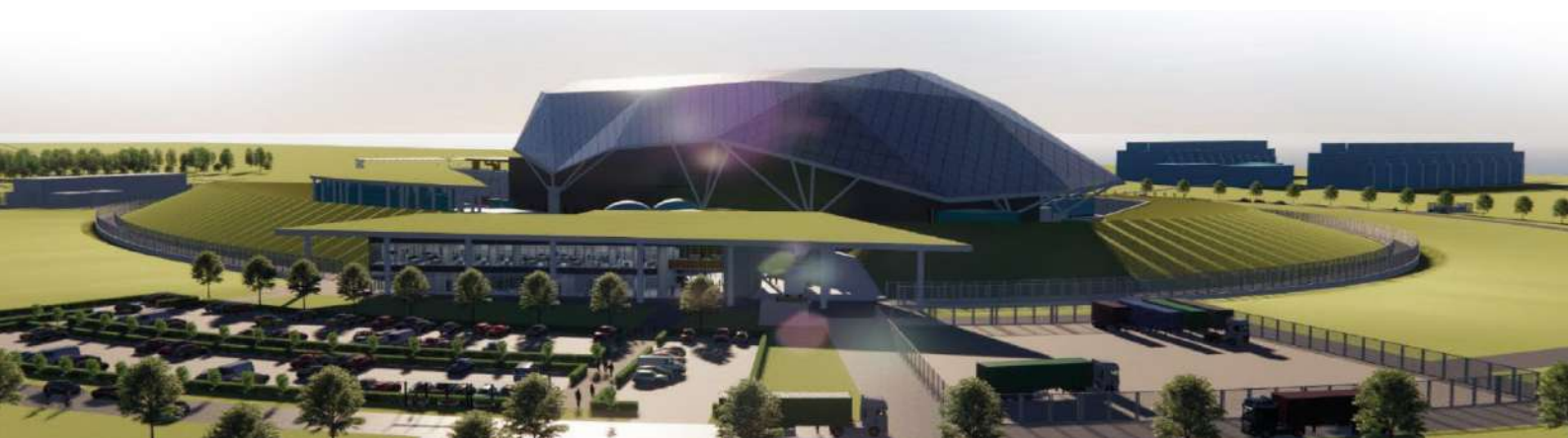
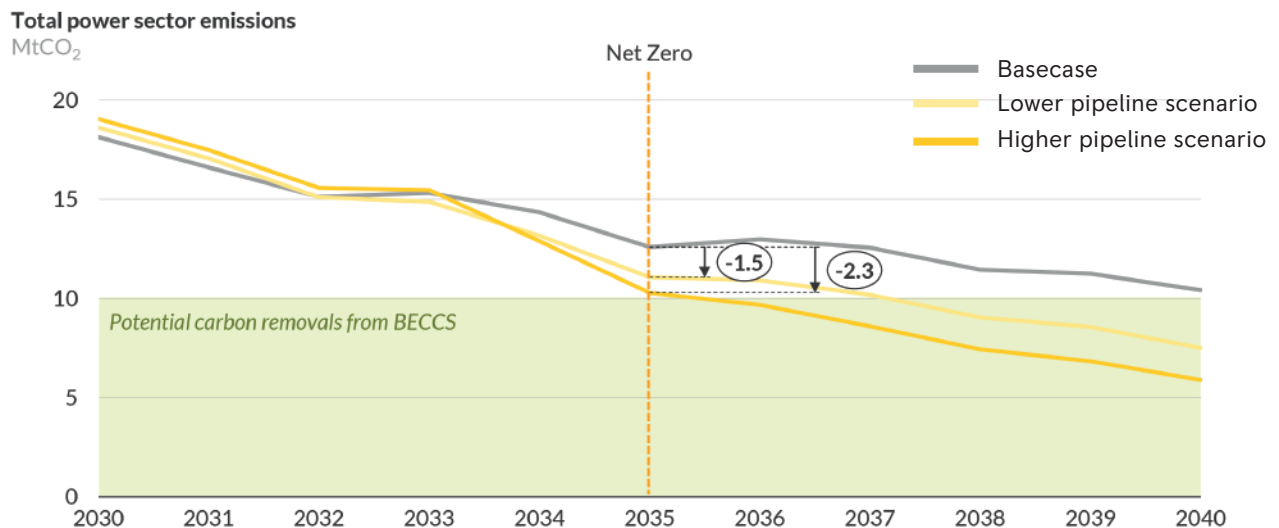
The UK Government has a target to make the power sector Net Zero by 2035. However, on the current trajectory of progress, the UK will miss this by some way.

This gap would be closed significantly by the roll-out of Rolls-Royce SMRs throughout the 2030s.

Coupled with renewables, the lower pipeline would reduce this critical gap to the Government's 2035 target and the higher pipeline would completely eradicate carbon emissions from the power sector, meaning Net Zero could be achieved.

The lower scenario of new nuclear power using Rolls-Royce SMRs, across the 2030s, **would significantly reduce power sector emissions by 2035 and help the UK reach its net zero targets**

Power sector emissions are reduced by 1.5MtCO₂ – **the equivalent to approximately a third of the UK's total shipping emissions**





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