"The Strategy increases our Plans for Deployment of Civil Nuclear, to up to 24 GW by 2050, three times more than the Current Provision and Representing up to 25 % of our Projected Electricity Demand"

Interview with Greg Hands I Minister of State at the UK Department for Business, Energy and Industrial Strategy

Greg Hands

Greg Hands was appointed Minister of State at the Department for Business, Energy & Industrial Strategy in September 2021.

He was previously Minister of State for Trade Policy in the Department for International Trade (DIT) from February 2020 to September 2021 and Minister of State in the Department for International Trade from 2016 to 2018. He was elected the Conservative MP for Hammersmith and Fulham in 2005, and for Chelsea and Fulham in 2010.

In April the UK government published the British Energy Security Strategy in response particularly, but not only, to the major energy policy challenges imposed by the Russian war on Ukraine. What are the major goals of this strategy?

The overarching goal of the energy security strategy is to ensure that the UK's energy system is clean, affordable and above all secure.

The near-term goal of the Strategy is to improve energy efficiency, reducing the amount of energy that households and businesses need. We are investing in decarbonising the UK's homes and buildings through measures such as cavity wall insulation, improved product standards for energy-using products, and expanding the use of heat pumps as opposed to gas boilers.

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The long-term solution set out by the Strategy is to address underlying vulnerability to international oil and gas prices by reducing dependence on imported oil and gas, while ensuring a smooth transition to net-zero. The Strategy details increasing renewable sources while building a British energy system that is more self-sufficient. This means ensuring we have power that can be relied on when the sun is not shining or the wind is not blowing, hence the huge investment and ambitious goals set out for nuclear power.

As mentioned, these steps will also accelerate progress towards net zero, which is fundamental to energy security. By 2035 we will decarbonise our electricity system, subject to security of supply. This transition will reduce our dependence on imported oil and gas and deliver a radical long-term shift in our energy system. We will have cleaner, cheaper power, lower energy bills and thousands of high-wage, high-skilled jobs.

The Energy Security Strategy builds on the Prime Minister's 'Ten point plan for a green industrial revolution', and the 'Net zero strategy'. Could you briefly recap for our readers the cornerstones of these policies?

The ten-point plan was published in November 2020, and set out the approach government will take to build back better from the coronavirus pandemic, support green jobs, accelerate the UK's path to net zero and invest in making the UK a global leader in green technologies. The plan focussed on increasing ambition in the following areas:

- Advancing offshore wind
- Delivering the growth of low carbon hydrogen
- Delivering new and advanced nuclear power
- Accelerating the shift to zero emission vehicles
- Green public transport, cycling and walking
- 'Jet zero' and green ships
- Greener buildings
- Investing in carbon capture, usage and storage
- Protecting our natural environment
- Green finance and innovation

The ten-point plan mobilised £12 billion of government

investment and will potentially generate three times as much from the private sector, to create and support up to 250,000 green jobs.

The Net Zero Strategy was published in October 2021 and built on the foundations laid out by the 10-point plan. The Strategy sets out a delivery pathway showing indicative emissions reductions across sectors to meet our targets, based on our current understanding of each sector's potential and a whole system view. This sits alongside clear policies and proposals on how we will deliver these reductions, including cross-cutting action to support the transition. Furthermore, the Strategy sets out how any remaining emissions will be hoovered up with greenhouse gas removals, whether natural (for example trees) or technological, using carbon capture.

Compared to the above, what are the differences and the enhancements of the Energy Security Strategy to adapt to the new energy reality, which the UK and all of Europe have to face?

The Energy Security Strategy raises the ambitions set out in previous strategies. It recognises that the transition to net zero is fundamental to energy security.

The Strategy seeks to accelerate the transition away from oil and gas, and thus go further in removing the red tape that holds back new clean energy developments and renewable technologies. One significant example of this was the significant commitment to new nuclear in the UK, reversing decades of underinvestment in a technology the UK used to lead on. The strategy increases our plans for deployment of civil nuclear, to up to 24 GW by 2050, three times more than the current provision and representing up to 25 % of our projected electricity demand.

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Having already committed to funding for one nuclear project to Final Investment Decision (FID) this parliament, the Energy Security Strategy commits to also bringing two projects to FID in the next parliament. Depending on the pipeline of projects, these ambitions could see us delivering the equivalent of one reactor a year, rather than one a decade as we have done previously.

There are many other ambitious enhancements in the strategy, from ramping up deployment of solar and wind power to boosting our commitment to hydrogen and accelerating energy efficiency measures to help reduce our dependence on fossil fuels.

The most obvious difference between UK and German energy policy is the assessment of nuclear power. What are the reasons to include a major share of nuclear in the long-term UK energy mix?

The UK sees a strategic case for including nuclear in future energy mix, with advantages for both energy security and combatting climate change, alongside the economic benefits of nuclear.

Modelling by the UK Government in 2020 concluded that most of the UK's future electricity needs should be met by renewables and flexible technologies including energy storage. But it also showed that to achieve a stable, low-cost electricity system to meet net-zero, we need more low-carbon power to complement the intermittency of technologies such as wind and solar, and the uncertainties of storage technologies. We can only secure a big enough baseload of reliable power for the UK by drawing on nuclear, both through large-scale plant options and advanced nuclear technologies such as Small Modular Reactors and Advanced Modular Reactors.

Nuclear is a low-carbon technology and has one of the lowest life-cycle emissions rates among generating technologies. It is also a proven technology and can help us fight against climate change today while we invest in future technologies; time is critical, and we cannot simply wait for these to be developed. Nuclear is also energy dense, providing a significant amount of energy from a relatively very small land area – Hinkley Point C will power the equivalent of around 6 million homes from just a quarter of a square mile. This is particularly important when balancing the needs of growing populations with demands for resources. Finally, nuclear is 'always on,' providing continuous power and stability to the grid, providing a solid foundation for power generation on which renewable technologies can build.

Nuclear also brings a host of economic benefits, with each large-scale nuclear power plant potentially supporting up to around 10,000 jobs at peak construction, and around 900 permanent jobs once in operation, a period expected to last at least 60 years. The sector also has a strong track record in apprenticeships, with over 2,000 recorded in 2019. The UK nuclear industry covers the life cycle of fuel production, generation, decommissioning, waste management and research, underpinning a broad economic footprint across the country. Currently the sector is estimated to contribute £6.4bn annually to the UK economy, which each civil nuclear employee contributing an estimated average over £96k, significantly higher than the UK average of around £56k.

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What is the starting point of this renewed nuclear initiative and what does the government plan to do to really pull it through this time given the urgency in terms of both security of supply and climate policy?

The UK Government has set out an ambitious new nuclear initiative, backed up by expertise to deliver projects. By the end of 2022, we will have scoped and be setting up the Great British Nuclear vehicle, while the Future Nuclear Enabling Fund funding will have been awarded. In 2023, the selection process for further nuclear projects will be initiated, with a final investment decision on one new nuclear project by the end of this parliament (2024) and two further decisions taken in the following parliament. By 2030, we aim to have up to eight new reactors progressed, with up to 24 GW of new nuclear installed by 2050, supplying up to 25 % of total demand.

The UK Government will be working with skills bodies and industry to develop the skills required to meet these targets. This includes ongoing work with the Nuclear Skills Strategy Group to bring together major employers, government, regulators and trades unions and work with other industries to address this challenge and ensure we can meet demand, while building a more diverse workforce, leading innovation in new technology, and attracting more young people into the nuclear sector.

With several new nuclear programmes announced in recent months – some of which quite ambitious – the issues of the capacities of the supply chain and of a qualified work force are raised. Should these issues be addressed in a joint effort by the different nuclear industries in the European nations?

Development of further nuclear new build, regardless of technology, is likely to bring further supply chain companies to market. It will encourage increases in productivity and further innovation (such as advanced construction techniques, digital design, robotics, etc.) as companies bid more competitively for work, resulting in overall cost reductions. It will also help stimulate further investment in capability by signalling the opportunity for sustainable growth.

We continue to welcome opportunities to collaborate to ensure that the UK can deliver its net zero ambitions. Of course, the increase in the number of nuclear projects in Europe and across the world means that the UK will need to increase the size of our workforce and ensure the capacity of the supply chain. We are also focussing on diversifying our nuclear workforce – in the UK, we are aiming for 40 % women in nuclear by 2030. This is something we're already working with our international partners on and it's a priority for the nuclear sector.

Development and future deployment of SMRs is included in the strategy. What role do you think SMR-Technology will play in the UK and global nuclear industries and when?

Advanced Nuclear Technologies have the potential to work alongside other low-carbon energy sources to support a secure, affordable decarbonised energy system. Small Modular Reactors (SMRs) could offer an exciting way to cut costs and build new nuclear quickly. SMRs are potentially less expensive to build than traditional nuclear power plants because of their smaller size, factory based modular build and more flexible deployability.

The Advanced Nuclear Fund, announced in 2020, will support research and development of domestic SMRs. As I'm sure you know, the UK Government has invested £210m to develop SMRs with Rolls Royce, and of course there are many SMR designs in development globally and the Government will continue to engage with other developers on their proposals for future projects.

We are also focussing on diversifying our nuclear workforce – in the UK, we are aiming for 40 % women in nuclear by 2030

The Government's ambition is to increase our plans for the deployment of civil nuclear power up to 24 GW by 2050, around 25 % of our projected 2050 electricity demand. My Department intends to take one project to Final Investment Decision (FID) this Parliament and two projects to FID in the next Parliament, including Small Modular Reactors. The Ten Point Plan for a Green Industrial Revolution set a target milestone to deploy SMRs in the UK by the early 2030s.

The strategy also mentions hydrogen and includes its production by nuclear power as an option as does the EU, which otherwise has been very reluctant concerning the inclusion of nuclear in its energy and climate strategy. Are there any pilot projects in planning, like in the US?

The UK recognises the potential for high efficiency hydrogen production by utilising both the heat and electricity from nuclear power plants. This applies to both conventional Pressurised Water Reactor (PWR) technology and to advanced reactors with high outlet temperatures that could work with high temperature electrolysis or thermochemical processes. We are cognisant of the safety and regulatory issues that need to be addressed before a new nuclear plant could be connected to a hydrogen production and distribution system, and we recently completed a study on this with support from National Nuclear Laboratory and DNV, a Norwegian assurance and risk management provider. We are planning to deploy a High Temperature Gas Reactor (HTGR) demonstrator by the early 2030s with the aim of demonstrating functionality with end users of high temperature heat, which could include hydrogen production.

The issue of hydrogen could bring up a rather surprising technological aspect: has anyone thought of reviving and modernizing the AGR architecture for the purpose of efficient hydrogen production?

The UK knowledge and skills gained through the operation of the current AGR fleet are a factor that influenced the decision to select High Temperature Gas Reactor (HTGR) technology for the UK programme to build a demonstration reactor by the early 2030s. The AGR fleet has provided several decades of safe low carbon electricity for the UK, and produces temperatures that are attractive for hydrogen production. However, there are now technologies available that can offer significant safety benefits, such as coated particle fuels, and it would be difficult to incorporate these technologies into a gas reactor with an oxidising coolant such as the AGRs. The Advanced Modular Reactor (AMR) Research, Development and Demonstration Programme that the UK government is currently running aims to let the market present options for achieving a HTGR demonstrator, which may include aspects of the AGR architecture, but we will have to wait until early 2023 to find out.

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Nicolas Wendler has been Head of Press and Politics at KernD since August 2013 (Nuclear Technology Germany e. V. / German Atomic Forum e. V.) and started his career in March 2010 as Policy officer. Previously he was an international consultant for the international relations of the Young Union (Junge Union) of Germany among other topics of energy, climate and economic policy for the organization. Since January 2022 he is also the editor in chief at atw. Wendler studied in Munich and Bordeaux political science and economics and (North) American cultural history.