

Written evidence submitted by the Nuclear Institute

Summary

The Nuclear Institute (NI) is the professional body and learned society for the nuclear industry. Representing over 3,000 professionals at all levels across the industry, from new build and operations to decommissioning, the NI sets the standards for nuclear professionalism.

The nuclear industry in Wales is well established having hosted two Magnox power stations over a 50 year period from 1965. According to the Nuclear Industry Association (NIA)¹, the civil nuclear industry directly employed almost 1,500 in Wales in 2015, roughly 2.4% of the 63,000 people employed across the UK. Wales' involvement with the civil nuclear electricity sector started with the opening of the Trawsfynydd station in 1965 and was followed by Wylfa in 1971. Since Trawsfynydd was powered down in 1993, much expertise has been developed locally to deal with some of the more challenging issues faced within the decommissioning process. The Nuclear Decommissioning Authority (NDA), through Magnox and their contactors, have been spending many millions of pounds per annum within the Welsh economy for several years and the direct and indirect impact of this spend has been positive for the communities around the sites, across North West Wales and North Wales as a whole.

The Wylfa Newydd site on Anglesey is owned by Hitachi who have declared that they do not wish to continue with new nuclear development at the site. Several other consortia are interested in acquiring the site which is recognised as one of the best new nuclear build sites in Europe. There is no entity currently in place having rights to the land which is acting as site developer for Wylfa Newydd.

Welsh Government has established Cwmni Eginio in 2021 to deliver a site development plan for Trawsfynydd, focused on socio-economic growth. Since then, there is increased policy focus on new nuclear power generation as a means of delivering net zero and increasing energy security. Cwmni Eginio has defined its vision to achieve both aims:

'By 2027, Trawsfynydd will be the site of the first SMR/AMR under construction in the UK; North Wales will be recognised as a centre of excellence for low carbon energy; and people's quality of life will be improved'

Despite the increased focus on new nuclear, delivery remains challenging and uncertain. Therefore, Cwmni Eginio plans to follow a staged approach to development, matching investment with increased certainty.

¹ Nuclear Industry Association, (2015) Jobs Map - https://issuu.com/nuclear_industry_association/docs/nia_jobs_map_uk15/1

What role can, or should, nuclear power play in achieving net zero and UK energy security?

Several studies have identified the importance of nuclear as a low carbon source of energy to help the UK Government achieve its net zero 2050 target. Nuclear power has a key role to play, not only in the production of clean, cheap electricity but also in the production of hydrogen and synthetic fuel to help the UK decarbonise the aviation and transport sectors. Nuclear power is also one of the key zero carbon producers of heat which can be used to decarbonise heating and industry. Recent targets established by the UK Government of 24 GW by 20250 are challenging but achievable provided the right enablers are in place. Nuclear is a key part of the low carbon energy mix going forward providing a firm and reliable source of electricity and heat at a predictable price and not dependent on the vagaries of the weather.

Fuel manufacturing at Springfields near Preston and fuel enrichment at Urenco's Capenhurst plant on the Wales border are key for future energy security – not just in UK but world-wide – affording an alternative source of fuel to countries that in the past were dependent on Russia for their nuclear fuel. Making use of fuel imports from countries such as Canada and Australia offers significant security of fuel supply for future nuclear reactors.

Such developments support not only net zero and energy security but also offer major opportunities for economic growth in left behind areas of the UK and significant economic opportunities for the UK manufacturing sector. This provides major opportunity for jobs, skills and supply chain development opportunities for local and national economies

What are the main challenges to delivering the UK Government's commitment to bring at least one large-scale nuclear project to final investment decision by the end of this Parliament?

Sizewell C is the only option for final investment decision by the end of this Parliament. The Secretary of State for BEIS has just recently signed off on the planning for this project.

The planning consent process is an expensive process with an uncertain outcome – this is a major risk for any new build project in its development phase. Nuclear regulation is a 'no surprises' approach; ensuring issues are raised early in the process. Were the planning process to emulate more closely a 'no surprises' approach, this would significantly reduce risk in the planning process.

There are currently only two entities which have declared they wish to develop new nuclear at specific sites in the UK – namely EDF Energy at Hinkley and Sizewell and Cwmni Eginio at Trawsfynydd. EDF Energy is a site licence organisation in its own right whilst Cwmni Eginio has recently engaged with the wider market to identify wider support in putting together a site development model and operating model.

Other than EDF Energy and Magnox, there are no other site licence entities currently in the UK which have had any experience of operating nuclear power stations. Such an entity is essential under the UK regulatory regime; it has a key part to play at all stages of the

development of a new power station – from acting as the Design Authority for a new power station (understanding the plant’s design intent) to acting as an ‘intelligent customer’ for all contracted site development work (and checking and verifying the quality of all the build work done). This entity needs to be in place at an early stage of any new nuclear development. In order to make effective use of scarce resource in the UK, a limited number of site licence organisations should be in place to cover all new power stations in the early years of development. Previous attempts to introduce competition into the nuclear industry in the 1960s and 1970s with a number of developers, whilst well meaning, failed. The number of consortia was drastically reduced as insufficient orders were placed, leaving in the end only one developer and constructor of nuclear plants (now largely integrated into Jacobs; the US engineering firm).

Before a Final Investment Decision (FID) to build and operate a new power station can be taken, many factors need to be considered including:

- A site secured
- Regulatory approvals
- Planning permission
- Environmental permits
- Fully funded decommissioning plan in place
- A site licence entity in place
- Grid connection agreement in place
- Funding

Successful conclusion of these discussions is the key measure of success of the overall nuclear programme and the Regulated Asset Base (RAB) financing model.

Action needs to be taken now, during the current Parliament, to identify nuclear projects for the next Parliament, including Small Modular Reactor (SMR) projects. A clear ambition is for Trawsfynydd to be first site SMR and therefore one of the projects to be contracted to the next Parliament. Wylfa Newydd should also be ready for a decision either this or the next Parliament.

How important is the finance model to ensuring a successful nuclear project, and is the regulated asset base (RAB) model the best one to deliver this?

A significant investment of some £200bn will be required to deliver the Government’s ambition of 24 GW by 2050. Private sector investment is a key part of funding and for that funding to occur, investors will need to fully understand risk – including construction risk.

The RAB model is likely to be appropriate for designs that have already being built – giving greater certainty in construction costs. However, it is not obvious that the RAB model as currently envisaged would work for a first of a kind where, by definition, there will be some uncertainty in new build cost. This needs to be addressed by Government – especially for a First Of A Kind (FOAK) SMR. Once these unique risks are understood and addressed, the risk and costs of deployment lower with the fleet effect.

Consideration needs to be given to covering the development phase of a new project using a RAB approach. As currently envisaged, the RAB approach is only likely to kick in after Final Investment decision (Hitachi had reportedly spent some £2bn getting its Horizon project to FID and then decided not to take the project forward). This is not likely to happen again. Government should urgently consider how the initial phase up to FID can be funded as well as the post FID phase.

What practical steps can the UK Government take to support the nuclear industry in developing a range of nuclear technologies, including small modular reactors?

The UK Government has already set up Great British Nuclear (GBN) and is providing support for Advanced Modular Reactor (AMR) & SMR technology development, e.g. Rolls-Royce SMR. Government should also provide support for specific projects at an early phase (eg Cwmni Eginog and development at Trawsfynydd). The Future Nuclear Enabling Fund (FNEF) is a helpful step forward but is unlikely to be sufficient for the required pipeline of projects.

It is vital that there is a long-term programme for the deployment of nuclear, including small scale projects, so that the industry has greater certainty in the future programme and required investment. We hope this will be a key part of GBN's role.

What would the likely cost be to the taxpayer of the UK Government supporting the development of a new nuclear power station at Wylfa?

Today, there is no one leading development at Wylfa so it is unclear what the intended programme is likely to be. GBN will need to take a leadership role for this project to succeed. Industry and Government should focus on cost drivers rather than price. Treasury assessment of the cost - benefit of a new nuclear development should take account of the wider economic benefit coming from a new development associated with new work opportunities and the growth of new manufacturing and other supply chain opportunities etc. Any analysis should also include the whole system costs of generating technologies to ensure they are compared on a level playing field. Where contributions to the energy supply from intermittent renewable sources such as offshore wind are considered within the energy mix, their capacity factor should be taken into account to consider the costs and carbon emissions of generation required to backup these technologies when the wind doesn't blow and the sun doesn't shine. Nowhere is this currently more evident than Germany where intermittent renewables are backed with gas fired generation, which dramatically increases the system price and increases carbon emissions whilst reducing energy security. Nuclear power with its higher capacity factor is much less impacted by these factors.

What is the potential economic impact for Wales of a new nuclear power station at Wylfa?

Research undertaken on the impact of the UK's most recent nuclear power station project (the construction of Sizewell B² in Suffolk between 1988 and 1995), provides valuable pointers on the impacts that may well arise with the Wylfa Newydd project. The research demonstrated wide ranging impacts including evidence of a substantial boost to local employment during the civil engineering phase of construction, a boost to the local economy (reflected in very low unemployment rates and indirect positive impacts on retail activity and provision),

Horizon Nuclear identified that the building of a three gigawatt power station at Wylfa would have led to the creation of up to 900 jobs at peak with an ongoing employment base at Wylfa during the operational phase of 800-1000 jobs for up to 60 years as well as significant work opportunities in the wider supply chain in North Wales.

For Trawsfynydd, studies by Arup for the Welsh Government's Snowdonia Enterprise Zone have indicated that SMR deployment could create over 400 long-term jobs in the local area and around £611m GVA for North West Wales and £1.34bn GVA pan-Wales during over an operational life of an SMR.

As well as yielding benefits for the local, regional and national economies over several generations, SMR development at Trawsfynydd could also address wider socio-economic challenges such as reversing outward migration, creating sustainable communities, and enhancing the Welsh language and culture.

Rolls Royce SMR estimate 40,000 regional jobs created and £52bn in economic impact across the UK by 2050 from a fleet approach to developing, manufacturing and building SMRs in the UK. International studies (3) on operating power stations demonstrate the economic value they have on communities in their vicinity. For example the Indian Point Station demonstrated an increase per annum of local GVA and local economic impact of some \$700M.

Development at Wylfa and Trawsfynydd would further connect the Welsh and UK nuclear supply chains, especially through the North West Nuclear Arc – which extends from Anglesey to Cumbria. It could also be accompanied by additional academic or industrial research facilities and further research reactors, which would provide opportunities to build on current R&D capabilities and increase the export potential of the Welsh nuclear sector and its supply chain.

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²Glasson, J (2005), *Better monitoring for better impact management: the local socio-economic impacts of constructing Sizewell B nuclear power station*, Impact Assessment and Project Appraisal (Online Journal)

³Nuclear Energy Institute(2004) Economic Benefits of Indian Point Energy Center