

Written evidence submitted by the Nuclear Industry Association

1. The Nuclear Industry Association (NIA) welcomes the opportunity to respond to the Nuclear energy in Wales inquiry by the Welsh Affairs Committee.
2. The NIA is the trade association and representative body for the civil nuclear industry in the UK. We represent around 250 companies operating across all aspects of the nuclear fuel cycle, including the current and prospective operators of nuclear power stations, international designers, and vendors of nuclear power stations, and those engaged in decommissioning, waste management and nuclear liabilities management. Members also include nuclear equipment suppliers, engineering and construction firms, nuclear research organisations, and legal, financial and consultancy companies.
3. Our members may choose to make their own, detailed response to this consultation. The focus of this submission is therefore on high-level, industry-wide matters.

Summary

4. New nuclear power is essential to meeting the Government's decarbonisation targets and increasing the UK's energy security by providing firm, domestic, clean power. This was recently recognised in the British Energy Security Strategy through the increase of ambitions for new nuclear power in the UK. Now, the Government is aiming for 24GW of new nuclear by 2050, with eight new reactors by 2030. Wylfa on Anglesey in Wales is one of the sites of interest for a nuclear power station.
5. New nuclear at Wylfa could produce enough low-carbon electricity for 4m homes, cut the UK's gas imports by 3.7bn cubic metres, provide 10,000 jobs during construction and 900 long-term jobs during operation – both highly skilled and highly paid – to one of the most deprived areas of the UK, and add £5bn in opportunities to the UK supply chain.
6. There are several areas of policy that need to be addressed to enable progress at Wylfa, and other Welsh sites such as Trawsfynydd, including:
 - The use of the Regulated Asset Base (RAB) model to help fund new nuclear power and the designation of Sizewell C
 - Inclusion of nuclear power as a sustainable activity in the UK's upcoming Taxonomy
 - The establishment of Great British Nuclear (GBN) as a vehicle to progress new nuclear power
 - Increasing the efficiency of current regulatory processes needed to build new nuclear at the required rate to meet Government targets

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

7. The Climate Change Committee (CCC) has estimated that the UK needs to double its electricity supply by 2050, leaving a significant gap which needs to be wholly filled by clean, reliable power. This means more than quadrupling the UK's current clean generating capacity to get us to Net Zero. The CCC has also stated that 38% of electricity in 2050 should come from 'firm' sources, of which nuclear is the only proven low-carbon option at scale.
8. Nuclear is essential to the UK's decarbonised electricity mix and currently generates nearly half of our low-carbon electricity. The current fleet has saved more than 1bn tonnes of carbon emissions over its lifetime. During the challenging circumstances caused by the events of the Covid-19 pandemic and recent energy crisis, nuclear has proven its consistency in keeping the lights on even during adverse events and has showcased its ability to be flexible when necessary.
9. However, all but one of the five current nuclear power stations will cease operating by 2028. In the last year alone, we have seen three stations ceasing generation; Hinkley Point B, which was the UK's most productive nuclear power station, stopped operations this month, Hunterston B closed in January 2022 after 46 years of operation, and Dungeness, which closed in 2021. We will lose more than 5.2GW of clean capacity from the grid in total.
10. Planned closures of nuclear reactors were reflected in the most recent DUKES (Digest of UK Energy Statistics) from BEIS, which showed nuclear generation was down to 16.1% from around 20% seen in recent years. While it will rebound slightly next year, in the medium-term, we are losing capacity as old stations retire, and losing it fast.
11. With more nuclear power stations coming offline in this decade – likely to be replaced by gas as the only at-scale baseload alternative – these issues will continue to persist in the UK. The continued use of gas will keep adding to the aggressive volatility of energy prices in the coming years.
12. The NIA analysed data from the National Grid Electricity Systems Operator (ESO) and found that the cost of balancing the UK power grid rose by 48% year-on-year in 2021 to £2.65bn, making it the most expensive year on record. The costs are equivalent to every UK household paying an extra £95, as the ESO says that they “are ultimately borne by consumers.”
13. The energy crisis beginning in September 2021 meant balancing costs spiralled to £1.43bn over just the final four months of the year. This is the consequence of the UK relying on gas to fill the gaps in electricity generation when output from other sources is lower. Spot prices for gas-fired electricity hit £5,000/MWh during the crisis.

14. Nuclear generation will drop away swiftly and will stay low unless we invest urgently in new capacity. Of the UK's nine generating reactors, six more will retire by March 2024 at Hinkley Point B, Hartlepool and Heysham 1. These stations have been the most productive low-carbon assets in British history. They were built decades ago yet are still some of the UK's leading sources of clean power. In short, these reactors provide clean, always-on power for which we simply have no replacement.
15. We don't just need the power to decarbonise the grid: we need it for new fleets of electric vehicles, clean hydrogen production, synthetic fuels, and clean home heating solutions. Clean electricity is the essential foundation of our decarbonisation. Beyond electricity, clean power will be required to decarbonise energy-intensive industrial processes such as steel smelting, manufacturing ceramics, and cement production.
16. In the long-term, building a new fleet of nuclear reactors will help mitigate similar events such as the recent energy crises caused by the rising cost of gas and the fallout from the invasion of Ukraine, making the UK less reliant on imported energy from foreign sources and keeping the lights on during periods of system stress.
17. Our own analysis found that if the UK committed to building two large scale nuclear stations at Wylfa and Sizewell, along with a fleet of Small Modular Reactors (SMRs), it could replace more than 10bn cubic metres of gas imports.
18. In the Nuclear Industry Association's *Forty by 50* report – published in 2020 – we stated our belief that the nuclear sector could contribute 40GW of power by 2050, which includes 240TWh of electricity, 75TWh of hydrogen and 100TWh of district heat. Meeting this target would, on average, avoid 186.75m tonnes of CO₂ a year (equivalent to the annual emissions of 48 coalfired power plants), create an additional 300,000 jobs, and contribute £33bn annual GVA – greater than the entire electricity and gas industry today.
19. The CCC is very clear that one more large-scale station after Hinkley Point C – most likely Sizewell C – is not enough to meet their Sixth Carbon Budget projections. The CCC have written in black and white that meeting the Sixth Carbon Budget assumes at least two additional large-scale projects after Hinkley Point C to be operational by 2035.
20. This is now reflected in the Government's recently announced ambition for eight new reactors to be in some form of development by 2030, and at least 24GW of new nuclear power by 2050. The targets were published in the British Energy Security Strategy, which highlighted Wylfa as a specific site of interest.

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

21. As the UK's trade association, we are not able to provide the Committee with specific costs associated with each of the proposed new nuclear projects of Wylfa. However, if the developer decides to utilise the RAB model, then costs to the taxpayer will be similar to those outlined in our answer to the RAB model's use below [75-79].
22. The biggest cost to taxpayers will of course be the cost of doing nothing, the repercussions of which we are already seeing today, both in increased global temperatures, a significant increase in consumer energy bills and the Government having to bail out failed energy companies.
23. More firm power, like nuclear, on the grid will stabilise the system and level out costs to both the taxpayer and consumer. The Committee should therefore recommend to the Government that building new nuclear power at sites like Wylfa will, in the long run, reduce costs to the consumer.
24. The Committee should also consider the role of a new nuclear at Trawsfynydd in Snowdonia. The development company *Cwmni Eginio*, which is wholly owned by the Welsh Government, has announced its intentions to use the site to build the UK's first SMR.

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

25. The potential for new nuclear power at Wylfa is huge, and the site is often referred to as the best site for new nuclear in Europe. It was identified as a suitable site in the 2008 siting review and listed as one of the eight sites across England and Wales in the National Policy Statement (NPS) for Nuclear Power Generation that could host reactor(s) that generate 1GW of power or more.
26. Due to the size of the site, we believe Wylfa can host at least two large-scale reactors, with the potential for additional SMRs permitting, and therefore the figures we will lay out in this answer will only consider two large-scale reactors at Wylfa.
27. Two large-scale reactors at Wylfa would produce enough low-carbon electricity for 4m homes, save 7m tonnes of CO₂ emissions per year, and provide secure, British power to cut the UK's gas imports by 3.7bn cubic metres, which is enough to fill 1m Olympics swimming pools.
28. In terms of the economic benefit to Wales, in the stated scenario, a new nuclear power station would create 10,000 jobs during construction and 900 long-term jobs during

operation to one of the most deprived areas of the UK. A project at Wylfa could also add £5bn in opportunities to the UK supply chain.

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?

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

29. Given the Government's new target of eight new reactors by 2030, the announced intention to establish GBN vehicle to delivery new nuclear in the UK was welcomed by industry. The NIA believes it will play a pivotal role in providing the key milestones and indications of progress in achieving these ambitions.
30. Key to this will be the first 100 days of GBN, leading to a projected preliminary report to be published in September 2022. We believe that workstreams have been established through consultation with industry that will have their own targets, although these have not been made public yet as they are still in development. The NIA will remain in close communication with GBN and BEIS throughout this process.
31. Due to this, in this submission we will therefore only be touching on what the NIA believes the priorities for this vehicle should be and wait with anticipation on the official details of the GBN in due course. These priorities are:

Finance

32. Trust and confidence in nuclear power is lacking throughout the finance community, despite growing interest from a number of key stakeholders. Progress on establishing the RAB model as a mechanism to finance new nuclear has certainly added to this confidence, both nationally and internationally.
33. As we go greener and the world moves towards Net Zero, the finance sector is looking to Governments for assurance on which low-carbon technologies are a safe investment for them. Therefore, the inclusion of nuclear power in the UK Taxonomy, and Green Financing Framework, would be a significant indication that nuclear power was a good investment, as without investment, these projects cannot be built, and the UK will not hit its decarbonisation goals.
34. GBN should also consult with financial institutions on how to enable the effective sale of green bonds including nuclear, which happened last year in Canada, so that the Government can announce that the next issue of green bond will include nuclear within that 100-days timeframe.

35. It is also important to note that projects financed under green bonds can be done so at a slightly lower yield than standard debt. While this may not seem significant, for nuclear projects a 1% reduction in the weighted average cost of capital (WACC) can equate to £8-9/MWh off the strike price.

Accelerating delivery of projects

36. Working on the projected speed and delivery of projects will require extensive consultation with companies looking to build both GW-scale and advanced nuclear technologies – SMRs and Advanced Modular Reactors (AMRs) – in the UK within the next decade. In these conversations, GBN needs to identify how delivery through to full operation could be accelerated.

37. It should assemble a list of comparator project delivery models and key individuals who understand what worked, and why, to each draw on how delivery timescales of nuclear can be improved. Comparator projects could include high speed rail, submarines, and aircraft carriers, to name a few, and their lead personnel should be sought out.

Permitting and Regulation

38. Regulation and safety are at the heart of the nuclear sector. However, the current system cannot work efficiently or quickly enough to deliver on Government targets. Therefore, without compromising on current standards, the current permitting regime should look for ways to accelerate the timeframes of decisions need to approve nuclear projects.

39. This should be an early priority for GBN to commission and is particularly important to the deployment of advanced nuclear technologies, as previously discussed in this submission.

40. As part of this process, it is of critical importance to identify all the pre-Final Investment Decision (FID) steps and assess how many of them could be run in parallel rather than in series and the capacity requirements in agencies and bodies to facilitate that greater urgency of approach. We understand resource will be a significant issue for the Government and therefore should be rectified as soon as possible.

41. In line with current work of global harmonisation of regulation practices, the UK should incorporate the work that has been done by the ONR with equivalent regulators in Canada and the US and draw on the progress of initiatives being led by the IAEA to avoid duplication of regulatory processes for a particular reactor design. This is a further area where the UK has a chance to take the lead internationally.

42. This work should also look at how the benefits of nuclear power can be shared with local communities and sites – as was previously done by the Government during the 2008 siting process – and in line with approaches under discussion for renewable developments.

Siting

43. GBN should undertake a rapid high-spot study on potential GW-scale and SMR sites in England and Wales, involving those who had been part of the previous siting process. We know this can be done, following the successful process run by the UKAEA in their bid to find a home for its Spherical Tokamak for Energy Production (STEP).
44. The need for more sites should guide that quick review and subsequently help identify sites suitable for large- or small-scale development, or potentially both co-developed alongside each other.
45. We understand that a new NPS for nuclear electricity generation infrastructure deployable after 2025 will be developed to reflect the changing technology landscape for nuclear and that the Government envisages consulting on a siting approach for new nuclear developments.
46. This new NPS for nuclear power should be published to include Advanced Nuclear Technologies and beyond. The NPS should tackle a new siting process for SMRs – either through authorising more nuclear licensed sites or approval of unused brownfield sites to hold SMRs without special categorisation.
47. Furthermore, the Government should look to release existing nuclear sites as a matter of urgency, such as those under the Nuclear Decommissioning Authority's (NDA) stewardship, for the development of Advanced Nuclear Technologies. This can be done in two ways: through negotiations with a current nuclear site owner or with the NDA to obtain an appropriate site for deployment.
48. In relation to ownership of the land around the Wylfa A site, which was designated for new nuclear in the 2008 NPS, the Committee should look to question owners Hitachi on their requirements and plans to sell the land to a new developer, to enable progress at the site.

Supply chain and skills

49. There has been a lot of work previously undertaken in this area – both in mapping current skills capacity and demand, and in identifying areas throughout the fuel cycle where the supply chain is able to make a meaningful contribution. This includes the NIA's 2012 Capability Report.

50. It is important that this exercise does not exclude the significant fuel capability the UK currently has, which is an important aspect of energy security. Utilising readily available information will assist in GBN producing a rapid assessment of where capability and capacity shortcomings can be addressed, and with intervention, can maximise domestic content on the accelerated scale of deployment that is being sought. Repurposing of the work that is co-ordinated by various cross-sector bodies, and actions undertaken by the previous Nuclear Sector Deal Project Management Office (PMO), to support GBN will provide a coherence and consistency currently often lacking.
51. The export potential of UK technology, and UK supply chain capability, should be an integral part of GBN's remit, as it was when the Nuclear Sector Deal was published in 2018. Exports are a key driver for innovation in our sector and signal to investors major opportunities in the UK economy.

Governance and Industry engagement

52. There are a number of cross-industry groupings and initiatives in place – all of which should be tasked with providing support to, and a route of interaction between GBN and industry, and as appropriate with government more widely.
53. To execute its work effectively in its first 100 days, GBN should look to at these initiatives to make sure that its work is not duplicated, and time is wasted. For example, the Nuclear Sector Deal has a PMO in place, which should also be repurposed to help drive industry co-ordination of activity in support of GBN's mission. There are other groups, including on skills for example, where similar rationalisation could provide a greater degree of clarity and coherence across the sector.
54. For the successful deployment of new nuclear beyond Sizewell C, there are funding programmes for the nuclear industry that need to be progressed, including the Future Nuclear Enabling Fund (FNEF), Nuclear Fuel Fund (NFF) and the Advanced Modular Reactor Research, Development & Demonstration (AMR RD&D) programme.
55. Applications for the £120m FNEF, which aims to help mature potential nuclear projects ahead of Government selection, must be opened the industry – large-scale and SMR bids – as soon as possible, and following assessment from Government, successful projects must receive funding by the end of 2022 or, at the very latest, Q1 2023 to have the desired impact.
56. There are similar time pressures involved in the progress of the £75m NFF, which aims to preserve the UK front-end nuclear fuel cycle capability and stimulate the commercialisation of new fuels needed for AMRs. A Request for Information was only launched last month despite the fund being announced in the 2021 Comprehensive Spending Review.

57. Finally, the £2.5m AMR RD&D programme to support the development and demonstration a High Temperature Gas Reactor (HTGR) – the UK Government’s preferred type of AMR – has closed Phase A of its competition. To meet the Government’s target of building an AMR in the early 2030s, timely decisions in regards of this programme are essential to the success of this aim.
58. More broadly, we also hope the UK’s upcoming Taxonomy will help provide a level playing field for investment for low carbon technologies.
59. The NIA welcomes the Government’s intention to consult on the criteria for nuclear power to be included in the UK Taxonomy, and the formation of the Energy Working Group to look at the role of nuclear power. We believe it is clear that nuclear technologies can make a substantial contribution to the Taxonomy’s objective of climate change mitigation, and these actions are a move in the right direction.
60. We should note that significant research on nuclear’s characteristics has already been undertaken by the EU in the drafting of its own Taxonomy. The EU commissioned an exhaustive Joint Research Centre (JRC) report which found there was no scientific basis to treat nuclear differently from other sustainable technologies.
61. It has since been announced that the EU will include nuclear in its Taxonomy on a series of conditions, such as plans for the disposal of nuclear waste and the use of accident-tolerant fuel. The UK must avoid the mistakes of the EU, which wasted years, money, and resource in a political effort to deny nuclear a sustainable classification, despite the science.
62. As a world-leader in climate change mitigation and environmental finance, the UK can make decisions that have international ramifications. If nuclear were to be excluded from the UK Taxonomy, it would make it incredibly challenging to mobilise the required investment and make our path to Net Zero by 2050 far more uncertain.
63. In 2021, the Treasury published the Green Financing Framework which set out how the UK Government will finance expenditures related to tackling climate change through the issuance of green gilts and Green Savings Bonds via NS&I. The Framework is intended to be aligned to the upcoming UK Taxonomy.
64. Nuclear power was specifically excluded from the Framework, with the Treasury stating that in consideration of the “many sustainable investors [that] have exclusionary criteria in place around nuclear energy, the UK Government will not finance any nuclear energy-related expenditures under the Framework”.

65. This is in direct contrast to the position taken by several investment banks, including the Bank of Montreal, which supported the successful issuance of CAD\$500m in green bonds for the refurbishment of nuclear reactors in Ontario. The issuance was six-times oversubscribed.
66. In consequent answers to numerous Parliamentary Questions, former Economic Secretary John Glen said that the Framework followed current international market standards for sovereign green bonds and does not wholly represent what the Government considers to be 'green'. Government has reiterated its stance that nuclear power has an important part to play in Net Zero by 2050 and financing for the technology will be considered as part of its development of the UK Taxonomy.
67. The Framework will be reviewed on a regular basis, so there may be a time when nuclear is included in the future. While the Framework will not prevent private investors from investing in nuclear, its exclusion has sent a signal to the finance community that the Government does not see nuclear power as 'green' enough
68. This must be rectified through nuclear's inclusion in the UK Taxonomy if Government want to show they are confident in nuclear power's role in getting to net zero. The positive recognition of nuclear in the Taxonomy would attract investors to nuclear.
69. To stimulate investment in nuclear, the Government should therefore:
- Pursue a level playing field for all low-carbon technologies in the drafting of its UK Taxonomy
 - Urgently review the exclusion of nuclear from the Green Financing Framework
70. The key to securing investment in reliable and affordable low-carbon energy ultimately depends on clear Government direction and publicly communicated confidence in a technology and/or sector to deliver.
71. Earlier this year, French President Emmanuel Macron announced that France would build fourteen new reactors by 2050 as part of its bid to hit Net Zero. He also committed €1bn to France's SMR project. Together, the programme will deliver 25GW of new nuclear capacity. In a clear commitment to nuclear, he said: "What our country needs [...] is the rebirth of France's nuclear industry."
72. South Korea has openly admitted that its turnaround on nuclear power – having previously wanted to reduce its nuclear output from 25% to 10% in favour of importing energy from China and Russia – was heavily influenced by France's confidence in nuclear power through its new nuclear construction programme and target.
73. The UK Government should aim to replicate France's strong communication to the world that the UK is also open and ready for investment into our sector through a strong commitment to multiple projects, such as Sizewell C, Wylfa, Rolls-Royce SMR, and

beyond. Taking a one-by-one approach is not enough to provide the security the UK needs.

74. This message can then be underpinned by the recommendations on funding regulation that we have outlined in this response to enable investment.

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?

75. The successful progression of the Nuclear Energy (Financing) Act through Parliament was essential to establish the RAB model, which could enable the low-cost financing of projects such as Sizewell C, and beyond. RAB financing would save consumers around £30bn on bills over the lifetime of each project, around £10 per year off the typical bill, according to official BEIS estimates. This is compared to the Contract for Difference (CfD) mechanism used for Hinkley Point C.
76. A large-scale nuclear project financed using RAB would add a small levy to bills of no more than a few pounds during the early phase of construction and less than £1 per month over the course of a project.
77. This is compared to the equivalent of £125 per year added to household bills as a result of balancing costs over the last 12 months. Having more firm power on the grid, like nuclear, would reduce balancing costs and avoid these excessive additional costs in a future system.
78. The income generated from this small levy to bills during construction will allow project developers to finance the project at cheaper rates, which would substantially cut the ultimate cost to consumers of the electricity it produces.
79. While recent progress is incredibly welcome, timing remains critical, and Government must remain focused if Sizewell C is to reach FID by the end of 2022 and contribute to the Government's ambition of eight new nuclear reactors by 2030. Concluding this legislation will also allow for more resource to be allocated within Government to open negotiations for the use of the RAB model for new nuclear projects like at Wylfa.
80. For next generation reactors, costs will be reduced due to their modularity and ability to be built on construction lines in factories. Their designs have simpler, shorter construction programmes, and combined with opportunities for co-location with other facilities, will be lower in both cost and risk.
81. As a result, SMR and AMR developers are looking at both the RAB and CfD to finance their projects. The Government should continue to work with industry on developing its approach to financing advanced reactors, including providing clarity on the steps developers need to take to qualify for the commence CfD negotiations with

Government. This action should be done alongside the work on siting and GDA requirements for the deployment of SMRs.

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