Written evidence submitted by Ms Fiona Reilly

Introduction to me:

I am Managing Director of FiRe Energy Limited – a consulting company providing strategic, corporate and project structuring, regulatory and general advice to the energy sector (renewables, nuclear and fusion). I am also a Non-Executive Director of Ansaldo Nuclear and a Member of the Strategy Board of the Nuclear Industry Association. Previously, I was a Partner and Head of Nuclear Services at international law firm Norton Rose Fulbright before becoming Global Nuclear Lead for Capital Projects and Infrastructure at PwC.

In 2018, I was appointed by BEIS to Chair the Expert Finance Working Group on Small Reactors – producing the ***Market Framework for Financing Small Nuclear*** report. In January 2020 I was appointed by BEIS to be a senior UK representative to the Generation IV International Forum (GIF) and shortly thereafter I became Co-Chair of the Economic Modelling Working Group. In 2021, through the GIF and with the support of a taskforce made up of members of the financing community, we produced the report: ***Nuclear Energy – An ESG Investable Asset Class***.

Based on my experience of both the nuclear and renewable industries it was suggested that I should respond to the call for evidence.

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

As stated in our GIF report on ***Nuclear Energy – An ESG Investable Asset Class***, nuclear combined with renewables in the only way to meet climate change commitments and achieve net zero. This was highlighted in a 2019 report by the International Energy Agency. As noted in the report: "*Nuclear power and hydropower form the backbone of low-carbon electricity generation. Together, they provide three-quarters of global low-carbon generation. Over the past 50 years, the use of nuclear power has reduced CO^2 emissions by over 60 gigatonnes – nearly two years' worth of global energy-related emissions.*"

Nuclear power is required to provide firm power to the grid, provide stability to the network and to complement the generation from intermittent sources of energy (such as wind and solar). Other facilities, such as batteries, can then be used to store energy and to despatch reserves as a short term solution, especially at peak times.

Going forward, nuclear will also be required to produce significant quantities of heat and thereby hydrogen and in turn synthetics fuels which will be required to decarbonise transport and other industries. The nuclear industry also is important for the production of medical isotopes (either generated in reactors or recovered from nuclear waste).

Every energy project has its own considerations and has an impact on its environment. However, nuclear projects compare well against other low carbon energy projects. Examples of areas of concern to consider include:

- All energy projects will involve some loss to nature and the environment. The interrelationship between land use and energy is a complex balance. The UK is an island with limited land resources. Therefore it is vital that we utilise the land well. All energy projects use significant natural resources whether at land or sea. However in terms of each square km of land (or sea) used, per kWh of power, nuclear energy reports better than solar, which in turn reports better than wind - average wind farms produce 0.77MWh; average solar farms produce 1MWh and average small nuclear reactors produce 14.5MWh.
- All energy projects produce greenhouse gas emissions and create pollution to air, land and water. In terms of greenhouse gas emissions it is estimated that nuclear plant on average produce 4gCO_2e/kWh which is similar to wind projects and less than solar projects. Turning to pollutants to land and air such as particulates matter, nitrogen oxide (NOx), sulfur oxide (SOx) lead and mercury, nuclear and onshore wind are similar whereas for water pollution, nuclear projects often perform better than renewables.
- All energy projects produce waste. The nuclear industry has developed the gold standard for managing, and mitigating and pre-funding waste management and decommissioning costs. The renewables industry needs to adopt similar standards. The solar industry has already begun successfully to do this, but the wind industry and batteries are some way behind.

For the UK to thrive (across multiple industries) UK energy security is vital. However, security is not always equated with domestic production and in considering energy security the Government needs to also take into considerations our limitations as an island and also our ambitions to contribute to the global energy market. Energy security is likely to be best achieved through a mix of domestic low carbon projects (nuclear and renewables) together with more and more remote off-shore projects dedicated to UK supply. Building capacity in the market to cover all scenarios could be a costly option if there is no option to sell excess capacity. Therefore, interconnectors are needed to allow the sale of energy to other markets thereby ensuring that the cost per MWh remains competitive for UK consumers, and provides for the ability to import power in exceptional circumstances.

- **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?**

The main challenges are:

- finding the best project that can deliver to time and to budget;
- ensuring that the technology providers, EPC contractors and developers are committing to make sure their "A" team are available to deliver the project;
- making sure that the project can report well against a broad range of non-financial reporting (ESG) metrics (see WEF suggestions); and
- developing a robust Government support package to allow the Government to step-in to the project and/or to provide other support should the project start to fail.

Without all of the above the project will struggle to access financing for the project. The RAB model helps with the costs of capital but does not help with accessing finance. Access to finance requires projects to be well established and the companies involved (including the supply chain) to operate to the highest standards. It is suggested that HMG does its own assessment of the project's ESG metrics, contracting strategy, budgets and programmes to avoid supporting the wrong projects.

- **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?**

The financing support model is important for providing confidence in the project for investors, bringing down the costs of capital and providing value for money for consumers. While both the RAB and the CfD provide confidence in the project for investors, the RAB is significantly better in bringing down the cost of capital – both through its risk sharing arrangements and the RAB mechanism itself allowing interest to be paid on debt and shareholder loans during the construction period – and thereby providing better value for money to consumers.

One of the challenges with the RAB model, is how to reduce the CapEx/costs of projects and ensure that projects are delivered to time and budget. The contracting structure needs to limit the opportunities for parties to claim cost overruns and delays through the RAB in order to protect consumers from increases to the CapEx. This needs to be balanced with the risks that can be assumed by the contractors on the project.

Also, the RAB needs to cover the costs of negotiating the RAB and also the costs of the economic regulator and its advisers. These costs again need to be managed to ensure that the costs to consumers of these elements are minimised.

Without a financing support mechanism, such as a RAB, projects will not be able to raise the large amounts of capital (debt and equity) required to finance them. Corporate financing (as we saw on HPC) is simply not an option for most. Without the private financing the only conceivable means of financing nuclear projects would be for them to be fully public financed.

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

Assuming the question relates to the constructing a number of technologies to sell power to the grid (plus other services such as heat, hydrogen, synthetic fuels and medical isotopes) rather than providing support to the technology companies themselves, the following is required from Government to provide trust and confidence to the market:

- strong cross-party support for nuclear to ensure that nuclear is not used as a political football and to provide the long-term stability required for projects that can last over 100 years;
- clear direction on how many different technologies will be developed across large, small, Gen III and Gen IV and how many projects will be supported;

- identification of a number of sites that could be developed. This could be done through a national policy statement. However, any national policy statement needs to develop and adapt over time to take into consideration the siting requirements for those technologies best developed for off-grid applications
- increasing the resources available to, and upskilling the regulators to be able to support multiple license applications and projects from multiple technologies at one time;
- provide for sufficient resources (civil servants plus specialist contracted resources) in BEIS, Treasury and other key departments to enable multiple projects to be assessed at one time and to make sure Whitehall is an enabler rather than a bottleneck. Also consideration should be given to Whitehall's processes and procedures to allow for quicker decisions to be made, while observing due process;
- make funding support mechanisms available to the market such as RAB and CfD with clear risk sharing mechanisms and direction as to how they will be competed/ negotiated;
- have clear and well defined socio-economic, localisation and levelling up requirements to create a clear environment for development; and
- The Government should undertake its own ESG assessment for each project it intends to support, to ensure that projects are well established and able to report well to financiers and other stakeholders against non-financial reporting metrics, thereby ensuring each project is viable.

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

This question is not easily answered. It will depend on how the project is established and the scope and scale of Government's involvement in the project. There are so many different aspects to this question that a short and hypothetical answer is simply not possible.

There has a been a market failure in recent years in assessing projects' costs to consumers (rather than taxpayers) by reference to CfDs. CfDs distort the market price of different technologies. The costs of delivering the technology (CapEx plus the costs of financing) are spread across the term of the CfD rather than the life of the project. CfDs also fail to take into consideration the different system costs for different technologies. Further nuclear projects have included the costs of decommissioning and waste management into the CfD costs which is not always the case for other technologies.

With the RAB model the CapEx and financing costs should be spread over the design life of the project thereby reducing the costs to the consumers in the early years compared to costs that would arise under a CfD. Over the life of the project the cost to consumers is likely to be low (recovered from consumers through energy bills); the costs per MWh are likely to be similar to those being seen for renewables projects.

In addition to the costs to consumers (through energy bills) the costs to taxpayers would need to take into consideration any investments or other financial support provided by Government. If Government were to make an equity investment and/or shareholder loan into a project such investment should in time be returned to Government (with a return) however if money is injected into projects in the form of grants then the money is a gift and is a cost to taxpayers

with no financial return to the money – although grants should result in lower costs to consumers.

If the question is focused purely on the development phase of building a new power station at Wylfa, Government support during this risky phase of the project would be welcomed, and would enhance the ability to raise private financing for the construction phase. To determine how Government could do this, consideration would need to be given to a number of different areas including: equity v grants, where money would flow from (direct from HMG or through another entity such as a catapult or UKIB), the impact on the development entity having to manage public funds, the subsequent costs to consumers and the freedoms the entity can be given regardless of the public investment. Creating a well established precedent at Wylfa could also then be used on other projects. The costs to the taxpayer of such a structure would need to be assessed on a project by project basis. Equally the costs to the taxpayer need to be balanced with the costs to consumers.

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

There should be significant socio economic benefit of building a new nuclear power station at Wylfa: Any project should:

- create quality jobs in the region and the wider Wales/North West economy both during construction and through-out the life of the project. These jobs will include both direct and indirect jobs. A full GVA assessment should be undertaken for any project;
- develop and retain a local skilled workforce to support future generations of sustainable quality local employment;
- support the long-term ambitions on UK nuclear fuels being manufactured at Springfields;
- encourage the development of intellectual property and manufacturing capabilities to support the Site;
- develop STEM and nuclear schools and university courses to support the wider low carbon economy;
- build on the research, development and innovation capability of higher education establishments in the region;
- improve transportation infrastructure to facilitate the movement of components to the Site and in time to facilitate the movement of components from the manufacturing centre to other sites and to ports for transport overseas, with minimum effect on the local communities;
- develop other supporting infrastructure for the region including accommodation, retail and hospitality;
- help Wales and the UK as a whole meet its climate change targets, to meet net zero by 2050 and to deliver the UN's Sustainable Development Goals.

In addition, the Government should consider the export opportunities that could arise from the project including whether the UK could be used as an export hub for technology, fuel and/or components for other projects.

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