

Unite response to the Environmental Audit Committee Inquiry into Small Modular Reactors (SMR's) in the Transition from Fossil Fuels.



1. Introduction

- 1.1. This submission is made by Unite, the UK's largest trade union with over one million members across all sectors of the economy, including manufacturing, financial services, transport, food and agriculture, construction, energy and utilities, information technology, service industries, health, local government and the not-for-profit sector. Unite also organises in the community, enabling those who are not in employment to be part of our union.
- 1.2. Of particular relevance to this submission, Unite represents workers in the nuclear industry, those in conventional fossil fueled power generation plants, working in the manufacturing and construction of fuel rods, wind turbines, solar panels and their deployment to generate renewable energy.

2. Response

- 2.1. Unite is fully aware of the need to transform our energy generation methodologies and the potential additional strain that will be placed on the generation and transmission of energy from supplies of raw materials to the delivery of power to where it is needed and to do so with the a future minimum carbon footprint. The challenge from Unit's perspective is to also ensure that there is a just transition¹ of workers from the fossil fuel facilities to new roles in the new power generation options. Unite would add that to ensure a worker wishes to move from a polluting industry the worker's salary terms and conditions need to be protected, if not they will resist the change.
- 2.2. Unite supports the deployment of SMR technology especially to provide power to remote communities that are a long way from power stations resulting in large losses in transmission over the distances required to keep their lights on. Unite feels that cogeneration facilities that produce hydrogen from nuclear and renewables from unutilized generation to provide a reserve when the wind is not blowing at the correct speed or at night, provides a degree of security of energy supply which Unite has difficulty in believing current plans will provide. Green/Pink Hydrogen production from nuclear and renewables not only provides a security of supply but also the conversion back to electricity, when needed using fuel cells, has additional benefits in fire suppression².
- 2.3. Unite is aware of over 40 designs for SMR technology that are being assessed globally but we would stress that whichever designs are chosen, that the fuel rods are manufactured at the Springfield facility has been safely making nuclear fuel since 1946. This facility is currently facing an uncertain future due to the decline of nuclear generation in the UK and the delays in delivery of any new projects.

¹ The UN's International Labour Organisation define Just Transition as "greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind". https://www.ilo.org/global/topics/green-jobs/WCMS_824102/lang--en/index.htm

² The fuel cell takes the oxygen from the air to combine it with the hydrogen to create electricity, the unused gasses are therefore an ideal replacement for CO₂ or halon fire extinguishers.

- 2.4. Under current planning, licensing and delivery rules, it will take at least 10 years to build any new nuclear facility in the UK. At best therefore any new SMR would not be able to come onstream until 2035 if the project was announced tomorrow. Each submission needs to undergo public inquiries and address legitimate concerns over each deployment. It is for this reason that preexisting sites of ex-Magnox reactors are reused for new generation in the first instance.
- 2.5. Delays in obtaining grid delivery are already hampering the connection of all new generation projects. These delays will impact the connection of additional generation from SMR, conventional nuclear or renewable generation, unless the grid is already there and they may only need enhancing. When the existing fleet of nuclear power stations were taken offline it did not result in the removal of the pylons and underground cables that connected these plants to the grid. It would therefore make logical sense to reuse these sites for any future generation as the communities are often receptive to the benefits of having nuclear generation sites while others may be resistant. Locating SMR's without a new or any connection to the national grid should make the deployment time for new builds far quicker, but equally there are locations that would not be appropriate due to safety and security concerns.
- 2.6. The additional demands on the grid, to provide power to vehicles, heating systems, the demands from cooking and the development of manufacturing processes, will all require a reliable supply of electricity. The grid has not currently got the capacity, however, to accept and to deliver this power where it is needed. As a result, the challenge to effectively create a new network, on the foundations of the existing, without disruptions in supply, will give rise to massive challenges. Not least of which will be the recruitment and training of new engineers. The provision of local SMR's in remote communities could ensure a local supply for industry for example that in turn will help secure the future of investments in that industry.
- 2.7. Government plans to transform the steel industry for example to one dependent on imported steel and heat provided for rolling facilities from electric arc furnaces at Port Talbot will eliminate the potential of the facility to create steel as steel is by its basic nature iron plus carbon. The plans will also eliminate the development of the carbon capture and utilization facility³ that the government supported with a £24,960,843 award. Such technology could secure, not only Welsh steel manufacturing, but also helped the UK aviation industry decarbonize⁴. Unite would highlight that a supply of carbon for steel manufacturing, does not need to come from coal, but could be extracted from waste or biomass to make the process more sustainable.
- 2.8. In Transport plans to move to more electric vehicles, transition plans are being hampered by the speed of delivery and maintenance of public charging points, the supply of energy to households and industries which will enable homes to recharge at any reasonable speed. As highlighted earlier, to ensure that the network of recharging points is delivered and maintained the grid needs to be updated first. Similarly, the move away from natural gas, fuel oil and coal in home heating will equally require an upgrade of the grid and heating systems in over 90% of homes in the England, Scotland Wales and Northern Ireland. The size of the future workforce opportunities will be sizeable and could quickly exceed the supply of available workers. If there are plans to deliver new SMR's, there also needs to be plans to develop future nuclear engineers as soon as possible.

³ See the Lanzatech UK Ltd (DRAGON) project <https://www.gov.uk/government/publications/advanced-fuels-fund-competition-winners/advanced-fuels-fund-aff-competition-winners> & <https://www.lanzadragon.wales/>

⁴ See the list of benefits of Sustainable Aviation Fuel over traditional kerosene https://matthey.com/products-and-markets/energy/sustainable-aviation-fuels?gclid=EAlaIQobChMlxLD7kp6WggMVYolQBh2njAKGEAAAYiAAEgl-CvD_BwE

- 2.9. The Committee on Climate Change (CCC) highlighted in their most recent report⁵ that there will be a shortage of hydrogen generation in the UK and that Green hydrogen production will be dwarfed by the extraction of hydrogen from natural gas, hopefully built with total greenhouse gas emission capture and storage⁶. Unite is concerned that any Blue hydrogen generation facilities remove all greenhouse gasses from the flues, or it will hardly be a sustainable option. In the report the CCC reports that *“The Government has committed to take strategic decisions by 2026 on the roles of electrification and hydrogen in providing low-carbon heat. However, the lack of a strategic direction is creating systemic uncertainty.”* Systemic uncertainty is far from what any industry or homeowner will want to hear exists if they are about to spend a few thousand or millions on something greener to replace existing technology. Until this uncertainty is resolved, why should a homeowner go for the more expensive and time-consuming option even if it will only work for a few more years and cost more in the long run. There are many alternative ways of obtaining hydrogen which are carbon neutral, but these have yet to take off in any great scale commercially despite their clear benefits⁷.
- 2.10. Within the Unite response to the Department of Energy Security and Net Zero, (DESNZ) Boiler Upgrade Scheme Regulations Consultation, the union highlighted that there are just 5,789 working days from the end of that consultation till 01/01/2050, that it takes a team of 3 engineers, 3 days to install an air source heat pump into a property and that there would be around 29 million installs that needed to be completed of either a heat pump or a hydrogen ready boiler if we are to remove all fossil fuel heating systems. It also stressed that currently there is no guarantee of a hydrogen supply to all 29 million homes especially in rural locations and in Northern Ireland where over 55% of homes are heated using fuel oil or coal due to the lack of a natural gas supply. Finally, it stressed the need for more heating engineers to fill the shoes of the very limited number whose average age is in the late 50’s so the availability of one-on-one apprentice mentors will be a major issue.
- 2.11. Unite would stress that supplying heat and power can be achieved using SMR technology and it can also solve the security of supply issues for transport solutions. The UK is not alone in having concerns over the delivery of enough hydrogen and many countries have already signed agreements with suppliers - Germany has signed an agreement to import hydrogen from Australia⁸ for example. Therefore, supplies from overseas will be at a premium.

⁵ <https://www.theccc.org.uk/wp-content/uploads/2023/06/Progress-in-reducing-UK-emissions-2023-Report-to-Parliament-1.pdf>

⁶ See the paper by Robert W Howarth and Mark Z Jacobson that found *“For our default assumptions (3.5% emission rate of methane from natural gas and a 20-year global warming potential), total carbon dioxide equivalent emissions for blue hydrogen are only 9%-12% less than for gray hydrogen”*. <https://onlinelibrary.wiley.com/doi/full/10.1002/ese3.956>

⁷ Hydrogen makes up a very high proportion of the gasses found in waste water pipes but usually this combines with the sulphur in the waste to and atmospheric oxygen to create Sulphuric Acid, that in turn corrodes pipes and becomes a hazard for waste water workers. <https://www.anglianwater.co.uk/news/fuelling-uk-road-transport-hydrogen-production-at-wastewater-treatment-centre-given-green-light/> Equally, it is possible to use Pyrolysis of biomass to extract hydrogen while creating drop in alternative fuels. <https://www.altenergymag.com/article/2009/02/biomass-pyrolysis/502/> Pyrolysis can also turn methane to black carbon powder and hydrogen. The carbon can then be used in the creation of industrial diamonds, graphene, nanotubes etc. or stored as a solid. <https://www.third-derivative.org/blog/hydrogen-produced-from-methane-pyrolysis-key-considerations-for-investors#:~:text=Methane%20pyrolysis%20is%20the%20process,depending%20on%20the%20reactor%27s%20efficiency>.

⁸ See the EU assessment of hydrogen delivery Options https://joint-research-centre.ec.europa.eu/system/files/2021-06/jrc124206_assessment_of_hydrogen_delivery_options.pdf

- 2.12. From 2035 Airbus will start to produce a hydrogen fueled passenger aircraft suitable for the delivery of passengers to European destinations⁹ from the UK. Such plans to eliminate the need for kerosene on these flights will not be possible if there is not enough hydrogen available and doubts over the delivery of hydrogen in the UK could result in a lack of investment into such technology. This is but a single example of the potential of hydrogen in combating carbon emissions with other examples in shipping road transport and public transport solutions.
- 2.13. Facilities producing drop in sustainable fuels for aviation and maritime applications also require a steady supply of hydrogen for the chemical process to work, transforming municipal bin waste, agricultural waste, non-recyclable plastics and even rubber tyres, into fuels, community heating and power, with no associated ash or waste products to dispose of.
- 2.14. Industry too is turning to either hydrogen or electricity to provide an alternative form of heating, especially in energy intensive industries like ceramics, glass, paper and metal production. Investments into these technologies needs some certainty of supply. SMR's can offer that security and provide a steady base load supply of power and or hydrogen to where it is needed.

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⁹ The maximum range of such an aircraft would be 1,000 nautical miles in hydrogen electric mode or 2,000 nautical miles using hybrid hydrogen jet power. <https://www.airbus.com/en/innovation/low-carbon-aviation/hydrogen/zeroe>