Unite response to the Department for Energy Security and Net Zero Nuclear Regulated Asset Base (RAB): industry code and licence modifications.

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 almost 31,000 engineers and technicians in the Energy and Utilities sector carrying out every task from the most menial to the most highly skilled engineers and scientists in the country in the nuclear energy industry. Unite members are those who create fuel rods at Springfield, dismantle them ready for either reprocessing or storage, run virtually every aspect of every nuclear facility, and even stand guard over their security. Unite members are involved in both the construction and decommissioning of nuclear facilities and the majority of the suppliers of materials. Unite members are in virtually every sector of the economy too, from shop workers to transportation who will feel the impacts if decisions made create openings or cause closures of facilities.

1.3. Whilst it is realized that this consultation's target audience, does not include trade unions, the decisions made and to a degree the responses received, will impact Unite members directly.

2. General observations

2.1. Under the RAB model introduced by the Act, the Secretary of State is able to 'designate' & modify an eligible nuclear company's electricity generation license to incorporate RAB license conditions and terms which would allow that company to receive regulated revenues in respect of the design, construction, commissioning, and operations of a nuclear project[1]. Any Revenues placed on this RAB have to comply with various tests including the assurance that the payments are proportionate and targeted offering value for money. One of the categories of costs includes the development and retention of suitably qualified, engaged, inclusive and diverse workforce and culture which is where the trade unions come in.

2.2. Alongside the construction of the nuclear project, companies may invest in the development of "wider benefits". This includes development costs associated with the establishment of cogeneration facilities, including hydrogen or Direct Air Capture (DAC)[1]. But if the facility is not part of the cogeneration, then it falls outside the RAB unless agreed upon separately.

2.3. Unite recognizes that we have sadly gone beyond the point where, cutting back on the emission of greenhouse gasses will be enough to keep global warming below 1.5 degrees and that we now need to focus on industrial solutions to the removal of greenhouse gasses. Unite would highlight that sea water has dissolved in it more carbon dioxide (CO_2) than the air[2], because the oceans are the Earth's main "carbon sink," sucking 30 to 40 percent of the greenhouse gas out of the atmosphere and as a result the carbon capture phase of a DAC has already been done for you by

[1] Text taken from the governments guide on the Nuclear Regulated Asset Base https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1120481/development-costs-nuclear-rab-model-guidance.pdf

[2] The density of greenhouse gasses in the oceans is more than 100 times that found in the air. https://www.iaea.org/sites/default/files/18/07/oa-chemistry-dickson-050916.pdf

mother nature. A process developed by the Massachusetts Institute of Technology (MIT)[3] initially the seawater is temporarily acidified by passing a current through it. This creates hydrogen of course but can also cause the release of chlorine, so great care must be taken. The second step removes the acidity and collects the CO_2 concentration than is in the air and warming this sea water will in of itself release some of these gasses. This second step can be achieved, according to a process developed at the California Institute of Technology (Cal Tech), by using membranes, with no additives or by-products[4].

2.4. Both processes of carbon capture and hydrogen extraction are assisted in their removal from sea water by warming the sea water first. Currently, all UK nuclear power stations use seawater to cool the reactor coolants, in such volumes that tunnel boring machines are needed to construct the supply tunnels. The opportunity to use excess heat from the reactors, preheated seawater, access to large volumes of electricity, proximity to depleted oil / gas wells and sub sea salt aquifers, makes the creation of such facilities, an opportunity too good to miss. If CO_2 is pumped into a salt aquifer, the naturally occurring basalt deposits will over time turn the CO_2 into limestone. This mineralization process is the basis of a method used by the ORCA project[5] in Iceland to permanently store its captured CO_2.

2.5. Additionally, any generated hydrogen from this process could be utilized to help balance the grid supplies from renewable generation, and if using banks of hydrogen fuel cells, could cogenerate a sustainable alternative to CO_2 and some chemical fire extinguishers from capture of the deoxygenated air.

2.6. All of the above technologies require qualified workers and the supply of these is slowly dwindling due to the closure of the existing nuclear facilities. Unite would argue that to reduce the cost of training of the workforce of any nuclear facility or the training of the staff and mentoring or any apprentices, needs the preexisting workforce to help them pass on their knowledge. Unite highlights that many of the skills needed in the generation of electricity are transferable from other methods of power generation. At the end of the day, whether the steam to turn a turbine is produced using coal, gas, nuclear fission or fusion, it is still huge volumes of electrical power that need to be transformed and transmitted into the national grid, at the correct frequency and voltage.

2.7. Unite would urge the government to seriously consider the just transition of workers[6] from closing power plants rather than allowing all that acquired knowledge to go to waste in the social security offices around the country. Rather than allowing these skills to go to waste and rather than spending taxpayer resources supporting these workers while they hunt for alternative employment and see these workers ending up in roles that have no benefit in the battle to stay below 1.5 degrees, would it not be better to capture and use these skills and build on them before they are lost to the workers well-earned retirement. Unite would further argue that as a requirement of the RAB licence modifications, that the appointed company looks to capture as many current and ex workers of closing or closed power stations, as well as, other relevant industrial industries that will be forced to close, to meet the Net Zero obligation.

2.8. There are clear challenges ahead and Unite can see the value of including Green Hydrogen generation and carbon capture at all Nuclear powerplants to regulate the flow of power so it is not simply on or off grid and can more easily follow the demands of the consumer and better fill the gaps left by the unpredictable nature of some renewable forms of power generation, while reducing CO_2 concentrations.

2.9. There are two fringe benefits of passing hydrogen through a fuel cell. One, the fresh drinkable water that is produced, can be used in water poor areas like those found in Essex and Suffolk.

[3] https://www.scientificamerican.com/article/scientists-are-trying-to-pull-carbon-out-of-the-ocean-to-combat-climate-change/

[4] https://capturacorp.com/#:~:text=carbon%20removal,no%20additives%20or%20by%2Dproducts.

[5] https://climeworks.com/plant-orca

[6] See the UN's International Labour Organisation, Guidelines on a Just Transition https://www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/documents/publication/wcms_432859.pdf

These are in a rain shadow behind the Chilterns, making them the driest in terms of rainfall in the UK. This is also where the nation does a considerable volume of arable farming. The other product is deoxygenated air as mentioned earlier[7] which could help repay the cost of any initial investment into such a transition.

2.10. By blending hydrogen and captured carbon dioxide it is possible to create a drop in, net zero fossil fuel substitute for all kinds of transport not just aircraft by utilizing the Fischer Tropsch process, turning energy into liquids to power the existing fleet of vehicles. It is not reasonable to expect every form of transport to become electric or hydrogen overnight especially as the public and business cannot afford to upgrade and the supply chain needs time to get up to speed to produce in volume. Therefore, the use of power to fuel technology can bridge the gap. Consequently, even the waste from these additional activities has value in the battle verses Climate Change.

3. Conclusion

3.1. Unite would like to stress that currently highly skilled and trained workers are being lost to the wider economy as older nuclear facilities are closed down. This skills and knowledge base is invaluable and will take new workers years to achieve at a great expense to the plant operator, the industry and the consumer who will have to pay for this reskilling of workers through their energy bills. Even some of the skills learnt at coal fired power stations, oil and gas rig workers, and miners have some value but the same is happening there too, where skilled workers are simply being thrown on the scrap heap along with any businesses and communities that have built up around these locations. If we are to battle climate change, we cannot afford to waste assets as valuable as the years of knowledge and experience, these individuals possess, and it is why Unite is calling for a Just Transition of the workers.

3.2. Any transition, just or otherwise that does not involve the workforce with respect to the terms of the transition or new ways of working will need to have worker involvement in the design to best utilise these skills and knowledge. Any government or company that thinks it can simply impose terms and conditions without any worker involvement will not be supported by any trade union.

3.3. There are clear challenges ahead and Unite can see the value of including Green Hydrogen generation and carbon capture at all Nuclear powerplants to regulate the flow of power so it is not simply on or off grid and can more easily follow the demands of the consumer and at the same time producing a substance that could be in high demand around the country in the battle to tackle climate change. Unite would argue that these should always form part of the business model for New Nuclear going forward.

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[7] See 2.5