Memorandum submitted to the House of Commons Energy Security and Net-zero Select Committee for their inquiry on:

Workforce planning to deliver clean, secure energy

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Introduction

a) In the context of answering the questions posed, we suggest that understanding the term 'green jobs' is better described as a whole-economy issue because the supply chains for energy systems are spread throughout the economy. Only thinking in terms of 'green jobs' will miss opprtunities and hamper the effectiveness of the wide range of industries needed to contribute to energy policy targets.

b) The new OCEJ should undertake a thorough assessment of the whole-economy employment demands by exploiting the National Accounts [1] and other national datasets [2] to properly understand the ripple effects across manufacturing, construction, and services [3,4] for a wide variety of future energy scenarios.

c) All supply chains carry risk associated with the activities undertaken including the requirement for skills and education and are considered as a risk to UK energy security [5]. The energy sector is no exception with the lack of vocational skills observed as a key risk throughout the supply chain [6].

d) A study of the causes of risk to long-term (sustained) energy security [6] revealed that a changing the policy and regulatory landscape is considered as one of the two most important risks. The uncertainty created is one of the most important barriers to investment, and therefore the creation of jobs. The Climate Change Committee recognises the presence of risk [7] including: economic uncertainty, stagnation in the value of real-wages, job insecurity, skills mismatches, and the lack of investment in skills training by employers.

e) Our answers to the questions are primarily aimed at longer-term decarbonisation since modelling definitively demonstrates that the 2030 Clean Energy Mission is not physically possible to achieve [8]. Pursuing the Clean Energy Mission and later net-zero (rather than near-zero) may lead the UK into deploying technologies (and by implication trained personnel) that have no long-term future. The abandonment of technologies diminishes the confidence of investors.

Summary

The key to increasing jobs in the UK energy supply chain lies in removing barriers to investment and in assessing different types of future energy scenarios with a whole-economy philosophy. In this way, the interactions between industrial sectors can be properly understood. From understanding the emergent properties of this complex system, more robust and effective policy can be developed. At present, it appears that decisions are based on the output from energy systems models which have no capability to consider wider economic effects, including the impact on employment. Private companies create jobs by making investment decisions incorporating a risk assessment; governments should do likewise. To be able to remove barriers to desirable outcomes it is necessary to understand the risks in current and new markets. The frequently changing policy and regulatory landscape in the UK directly affects the willingness of companies to invest, and therefore create jobs.

Increasing construction directly effects UK jobs, and has the most to gain from delivering the Clean Energy Mission. Policies supporting the growth of construction need to take into account that this industry has the highest proportion of self-employed (approximately one third) compared to other industries. The UK should plan for no overall change in the number of manufacturing jobs, but their type will evolve to support the construction industry required by the energy sector. Tertiary education must be rebalanced to prioritise vocational skills and wider needs of the new industries.

For residential heating the Government must acknowledge the low rate of heat pump installations and develop better understanding of householder requirements and market dynamics. No matter what policy is followed, retrofitting heat pumps to existing dwellings will be incomplete by 2050, requiring hydrogen for heating as a transition fuel in 2050 and beyond.

The new OCEJ should look back at lessons from industrial policy of the North Sea. In addition to the jobs required for wind turbine manufacturing, the UK will need to construct new

additional port facilities as this is the principal constraint for future offshore development. The new OCEJ should consider mechanisms to incentivise investment in, and support of, floating offshore wind technology development and deployment.

Near-term targets are not compatible with concepts of sustainability or sustained (long-lived) activities. The 2030 Clean Energy Mission target is near-term. Colossal or intimidating targets that are very near-term are likely to encourage short-term behaviours which may have undesirable consequences such as price gouging and poor-quality work. The short-term target might be achievable only at the expense of the overall (longer-term) aim.

Responses

1. **Does the Government have an appropriate understanding of the skills needs to deliver the Clean Energy Mission by 2030 as well as decarbonise homes and businesses?**

   1.1 The required jobs in the energy systems supply chains are spread throughout the economy – construction, manufacturing, and services. Newly published work [8] suggests that the UK should plan for no overall change in the number of manufacturing jobs, but their type will evolve to support the construction industry required by the energy sector. Therefore, barriers to UK companies increasing investment and creating jobs, enabling them to be competitive should be removed.

   1.2 The more publicly visible infrastructure such as pylons for the transmission and distribution of power are not necessarily the main issue. Most attention needs to be focussed on lower profile jobs families within the manufacturing and construction industries.

   1.3 There will be increasing demand for hydrogen, including as a precursor to ammonia needed for transportation. Hydrogen production is expected to be using otherwise curtailed wind generation. Modelling to 2080 [8] shows that reduced dependence on non-renewable hydrogen would only be possible if all ammonia is imported. Therefore, training for handling ammonia also needs to be considered.

2. To what extent can the Clean Energy Mission and the retrofitting of homes and businesses be carried out by the existing workforce and to what extent will it require new entrants to the workforce?

2.1. For delivering the Clean Energy Mission it will be helpful to consider jobs as divided into the industry groupings of services, manufacturing, and construction. While increasing domestic manufacturing results in more jobs it has to compete with imports. In contrast, increasing construction directly effects UK jobs, and has the most to gain from delivering the Clean Energy Mission and for decarbonising homes and businesses. However, to understand the effects, care is needed to appreciate how construction jobs are categorised [9] because construction has the highest proportion of self-employed (approximately one third) compared to other industries (Figure A).

2.2. For building low energy homes and improving the existing stock the lack of high quality skills in the house-building sector is well-understood [10,11]. The volume housebuilders changed their business model some years ago to concentrate on design, land acquisition, and management, while outsourcing and subcontracting the physical construction. This has led to a substantial drop in training as new entrants are expected to acquire the skills prior to starting employment. The volume housebuilders price according to the local market conditions and not the cost of construction, resulting in significant profits [9]. It appears that there is headroom to afford energy efficiency measures and to contribute to training costs.

2.3. For heating dwellings, heat pumps are the UK Government's preferred retrofit option for existing homes [12], but the Government needs to acknowledge the low rate of heat pump installations and develop better understanding of householder requirements and market dynamics. The current net zero target requires 600,000 installations per year by 2028 [13,14], however, the installation rate is only 55,000 per year (4,600 per month) in 2023 [15]. Whilst the number of installations monthly has been increasing (Figure B), even a much reduced but still very ambitious retrofit rate of 300,000 per year (25,000 per month) will be insufficient to retrofit all existing dwellings by 2050 [8]. The National Audit Office reports that the Government's 2028 installation target – requiring an eleven-fold increase – uses optimistic assumptions [16].

2.4. From 2.1 – 2.3 it is clear that very large numbers of new entrants will be required. We counsel that a rapid surge in new entrants may lower standards of delivery resulting in

poor quality work. This has already been observed in heat pump installations [17] leading to dissatisfied customers, denting confidence of householders to follow suit.

2.5. The most plausible way forward for residential heating is replacing natural gas by hydrogen in the distribution system as a transition [18] whilst acknowledging the difficulties involved [19], but clarification of the Government's position is urgently required [16]. For this to be achieved and to avoid market confusion, training for handling hydrogen and manufacturing capability needs to be encouraged.

3. How might the Government ensure that the job market in clean energy roles is sustainable enough to incentivise private sector investment in training for 2030 and beyond?

3.1. Special pleading by some industry groups is a problem; companies need must accept responsibility for their own training needs and not rely on others to provide fully trained people or to expect to acquire such people from overseas.

3.2. The lack of internal training and the reliance of overseas recruitment are causes of risk. They can be mitigated by providing training as part of an employment package. The number of economically inactive residents aged 16 to 64 in the UK has increased by 9% corresponding to 772,000 since lockdown [20].

3.3. It is neither morally defensible, nor fair or just to take trained people from other countries where their skills are at least as necessary, purely because the UK can offer higher salaries.

3.4. Tertiary education must be rebalanced to prioritise vocational skills and wider needs of the new industries. University graduates, even in engineering disciplines, are not helpful for this 2030 target. Degree apprenticeships are not a useful concept for filling skills gaps in most sectors concentrating on installation or retrofit of products.

3.5. The Further Education sector is of key importance [21]. 'Traditional' work-based apprenticeships are useful as are the technical and vocational courses currently offered. However, schools and colleges are incentivised via league tables to push as many students to university as possible.

4. How can the new Office for Clean Energy Jobs (OCEJ) contribute to workforce planning in the energy sector?

We restrict our discussion here to the offshore wind industry.

4.1. The new OCEJ should look back at lessons from industrial policy of the North Sea [22,23]. For instance, the Offshore Supplies Office (OSO) which was created by the government in 1973 to help Britain take full advantage of the discovery of oil in the northern North Sea in the 1970s. The OSO enabled companies (UK and foreign) to become familiar with the UK supply chain and aided UK companies marketing at home and abroad. The OSO was considered more cost-effective than other trade-promotion mechanisms of the time.

4.2. The OSO, it is claimed, boosted high-value jobs and services based in the UK, but also increased the international offshore industry's procurement choices. However, the Government must be careful to ensure that these products and services are created in the UK, and that overseas companies do not simply set-up offices to only manage operations.

4.3. A cautionary note [22] is the late start to developing the UK offshore wind supply chain before the period of rapid growth. In part, this accounts for how low the employment has turned out to be for offshore wind. As Gasperin and Emden (IPPR) say, "*To succeed with its wind installation targets...., the UK needs a significant dose of making*" [24].

4.4. In addition to the jobs required for wind turbine manufacturing [24], the UK will need to construct new additional port facilities as this is the principal constraint for future offshore development. These will need to be in place by the mid 2040s, otherwise by the mid 2050s the UK will only be able to replace existing turbines in the North Sea with no capacity to deploy new generating capacity.

4.5. The new OCEJ should consider mechanisms to incentivise investment in, and support of, floating offshore wind technology development and deployment. Floating wind systems are being trialled but are in their infancy. With appropriate support, there is potential for the UK to become a world-leader in this technology.

5. What more can the Department for Energy Security and Net Zero do to ensure the workforce is in place to deliver the Clean Energy Mission and accelerate the retrofitting of homes and businesses?

No response.

Appendix

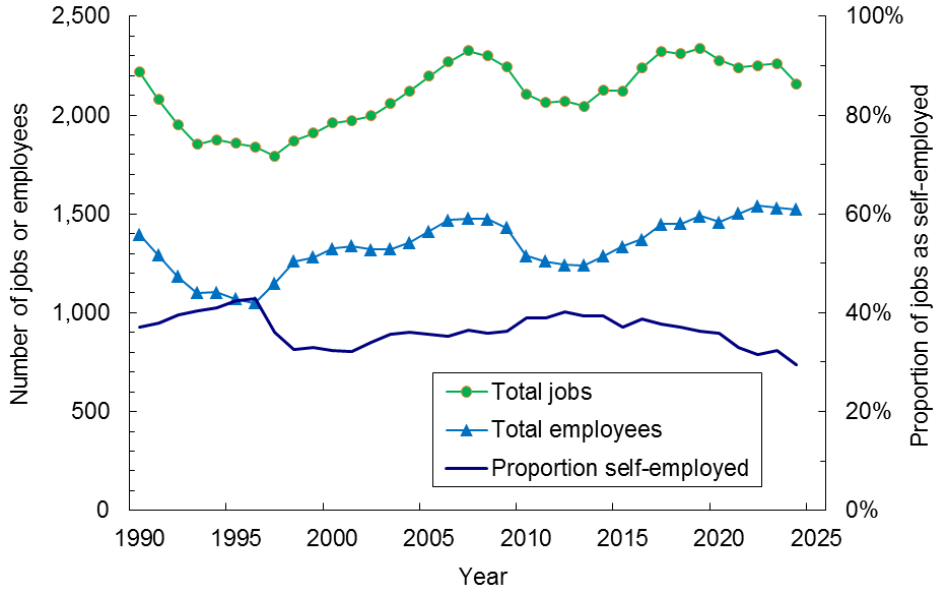

Figure A. Jobs and employees in construction where the difference between the two lines is the number of self-employed. Approximately one third of workers are self-employed in the construction industry. Source: [25,26].

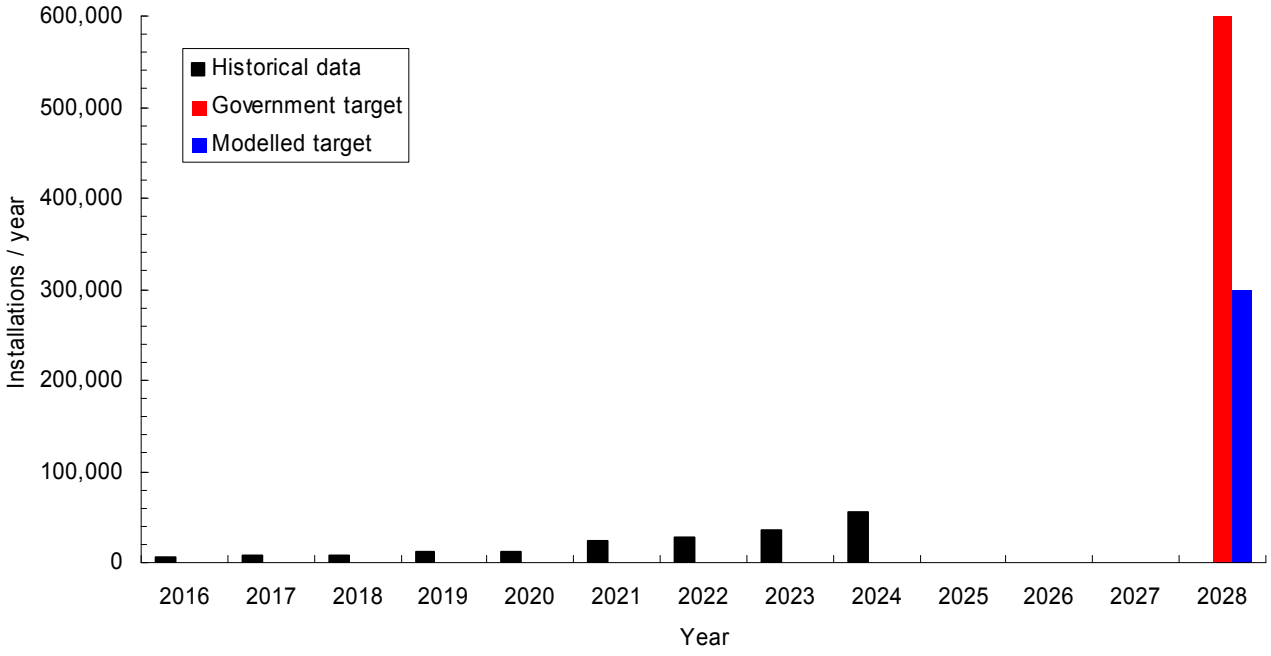

Figure B. Annual installations of residential air-source heat pumps in the UK and the Government target. Source: [27].

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