Climate Change and (In)Security Project Briefing Note

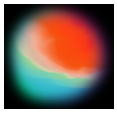
Decarbonising the Estate in Support of Net Zero 2050: The MOD in the Context of the UK Energy Transition

Currently Defence makes up 50% of UK government emissions (MoD 2021). As such, the size and range of the MOD's activities make its performance vital when considering how the government will meet its own legally binding targets (NAO 2020: 5). However, the MoD owns carbon-emitting capabilities that are tied to National Security objectives and a significant Defence deficit which constrains its options more than other departments. As such, the inaugural 4* Defence and Sustainability Review, in which Lieutenant General Nugee outlined the MOD Net Zero by 2050 (NZ50) ambition, made clear that the Defence Estate which constitutes 1% of the UK land mass was a critical asset that needed to be generating offset by 2035 (Nugee 2020: 45, 128). Currently, the built estate accounts for 32% of the Defence carbon baseline. Therefore, to meet NZ50, MOD must undergo a significant energy transition, moving away from reliance on cheap, centrally-procured fossil fuel-based utilities to decentralised renewable generation combined with storage.

The UK's energy transition to a 4D system (i.e., decentralised, digitised, democratised and decarbonised) that will procure and manage increased levels distribution level flexibility (Howard and Bengherbi 2016: 15) holds significant opportunities given the MOD's nationally-spread land assets. Another important aspect is the centralised way in which MOD and wider public sector utilities are procured, which puts the public sector in a unique position to enable internal trading of excess generation between all public sector sites within a distribution area without distorting the market. Given many public sector departments are land constrained and limited in their ability to host onsite generation, enabling renewable energy through a regional sleeving model could prove fundamental.

There is currently no centralised funding to support public sector decarbonisation to NZ50. Income generation from strategic investment is therefore essential to fund the transition, especially given the existing deficit. This approach is supported by the UK Cabinet Office (HMT 2021; MOD 2019: 115), but represents a significant step change in how departments, specifically the MOD, presently prioritise. Therefore, it is critical that the new markets for flexibility services that are opening to wider participation (ENA 2020) are incorporated into future strategic plans. As such, significantly more engagement is required with key system actors such as the District System Operator (DSO) who will co-ordinate regional whole system networks (Ofgem 2019: 14-15). All these aspects significantly challenge the current baseline assumption that MOD should simply 'buy green from the grid', and therefore warrant further exploration.

Additionally, despite the significant resource potential that exists, little attention has been paid to the public sector beyond the Modern Energy Partners Programme (MEP), whose bottom-up approach omits specific focus on inter-departmental level co-ordination (BEIS 2021). Ongoing departmental work therefore needs to build upon key



recommendations from the MEP programme whilst working within the confines of existing legislation by focussing on the unique opportunities presented from the way that public sector utilities are procured. As such, research should be focussed on how the public sector can increase use of renewables and storage using MOD strategic assets enabled by different investment mechanisms paired with distributional flexible services to decarbonise and income generate.

This area is multidisciplinary, bringing contributions from the social sciences (energy transitions, institutionalism); physical sciences (systems engineering and simulation) and the business schools (strategy and investment decisions). Ongoing research aims to contribute to gaps in overlapping areas. These are specifically: research on public sector energy management lower than national level estimates (Cardoso *et al* 2020); regional level co-ordination of multiple energy systems (Kleinschmidt *et al* 2020); and increased focus on energy systems modelling to include the impact of organisation behaviour, system feasibility and policy effectiveness (Pye *et al* 2021). Literature around the public sector is extremely limited, in part due to the restrictions on access to data, but also because, until now, there has been very little incentive to change institutional behaviours towards energy prior to NZ50 given they were well supported by the supplier hub model. It is hoped that future research will complement the increasing focus on Smart Local Energy Systems (SLES) which will be key actors within the decentralised energy transition (UKRI 2022).

Key Research Questions

1) **Where:** Where can the MOD enable Distributed Energy Resources (DER) to best enable the requirements of resilience, decarbonisation and income generation? Which of these locations are beneficial to the DSO and high public sector energy users?

2) **How:** What current mechanisms are available to participate in a decentralised flexible system within the existing regulation? Will these change in the near and long-term future? How does this impact investment decisions for MOD?

3) **What**: What are the potential benefits in terms of decarbonisation and income generation that can be achieved through participation in the mechanisms outlined in (2)? What must we change to optimise these benefits?

4) **Who:** Who are the key actors required to support the mechanisms outlined by (2)? Are there any blockers to participation?

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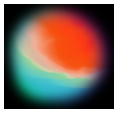
*This briefing note is written in the author's personal capacity and should not be taken as reflecting the opinions or policies of the CCI Project, Reuben College, or CHACR.



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