



Lessons for the organization of nuclear decommissioning from the UK and the US: risks, challenges, and opportunities

Alexander Wimmers^{1,2} and Christian von Hirschhausen^{1,2}

¹Workgroup for Infrastructure Policy, TU Berlin, Straße des 17. Juni 135, 10623 Berlin, Germany

²DIW Berlin, Mohrenstraße 58, 10117 Berlin, Germany

Correspondence: Alexander Wimmers (awi@wip.tu-berlin.de)

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Abstract. With more and more nuclear power plants (NPPs) reaching the end of their operational lifetimes, nuclear decommissioning is set to become a challenge of increasing significance for the nuclear industry and regulators alike (Laraia, 2018). Until today, only a handful of commercial NPPs have been fully decommissioned, while most decommissioning projects last several years to decades (Schneider et al., 2022). While technical expertise is being steadily increased as more and more projects enter the decommissioning phase, literature on the organization of nuclear decommissioning is limited. Previous research highlights the necessity of further insight into the various organizational models that have been implemented in different countries such as Germany, the UK, and the US, amongst others (Wimmers et al., 2023). In the present paper, we highlight the discrepancies between two market-based organizational models in the UK and the US. First, we investigate the implementation and failure of the UK's “parent body organization” model and the subsequent return to state-run decommissioning of the legacy fleet. By further analyzing the market-based approach in the US, especially focusing on emerging decommissioning specialists, we derive risks, challenges, and opportunities of market-based and state-run decommissioning approaches. Most notably, we find that market-based approaches carry the risk of information asymmetry and high transaction costs, although this strongly depends on the implementation (Williamson, 1975; Beckers et al., 2012). One major challenge is to secure financial liability from nuclear operators (Lordan-Perret et al., 2021). This issue is also complex regarding state-run decommissioning, but in that case the financial burden will ultimately lie with taxpayers. But market-based approaches, when compared to state-run organization, might bring advantages through economies of scale and learning effects that could lead to safer, faster, and more cost-efficient decommissioning of NPPs, unless supply chain bottle necks occur, although no evidence of this could be identified. Given the rising significance of nuclear decommissioning in the future, policy makers must focus their attention on implementing regulation that allows for efficient decommissioning, which, as our paper shows, depends on country-specific organization of industry, regulation, and governance.

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