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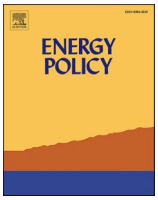

Trouble on the horizon: Securing the decommissioning of offshore renewable energy installations in UK waters

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ABSTRACT

This article elucidates the principal causes of risk to taxpayers created by the manner in which 'security requirements' are currently deployed by regulators in relation to the decommissioning of offshore renewable energy installations (OREIs) in English, Welsh and Scottish waters. It does so to inform policy development pertaining to their more efficacious utilization. In this context, security requirements are a regulatory tool which necessitate that developers/owners evidence their ability to finance decommissioning. Their deployment within the framework that governs the decommissioning of OREIs across the UK has not previously been 'stress tested' in the literature. Four causes are identified: excessive regulatory discretion; a flawed focus on financial strength; the dangers of gradual accrual; and uncertainty in decommissioning costing. A series of high-level policy recommendations are presented, several of which may be germane to other sectors and jurisdictions, as to how security requirements may be used more efficaciously to ensure decommissioning is performed.

1. Introduction

When an offshore renewable energy project, such as a wind farm or tidal energy scheme, reaches the end of its operational life, the developer/owner may be required under their license and/or lease to decommission the installation. This will likely comprise removal of the relevant infrastructure and restoration of the site to a condition similar to that which it was in prior to construction, in line with the approved decommissioning programme. The costs of doing so are potentially large and there may be logistical difficulties (e.g., weather and vessel availability) and environmental impacts associated with implementing that programme (Topham and McMillan, 2017; Marine Scotland, 2018).

As decommissioning obligations are to be completed in the future, sometimes decades after being imposed, society and the environment are exposed to the risk of developers/owners becoming insolvent in the interim or simply not having the financial capacity or inclination to undertake the works when required (Mackie and Besco, 2020). Should this occur, then the burden will fall on other stakeholders in the energy project, such as local communities, taxpayers, and the environment. This has transpired with alarming regularity in the energy sector, with the position in the United States presenting a deeply troubling picture. For instance, an extraordinary number of sites have been abandoned by bankrupt oil and gas producers in the U.S. As of 2014, there were an estimated 190,000 abandoned underground petroleum tanks and 57,000 "orphan" unplugged oil or gas wells (Dana and Wiseman, 2014). In the coal sector, four of the largest U.S. coal producers have used bankruptcy proceedings to avoid an estimated $1.9 billion in abandonment obligations since 2012 (Macey and Salovaara, 2019). And, in the nuclear sector, there is deemed to be a significant risk that sums set aside by plant licensees to fund the decommissioning of reactors in the U.S. will be insufficient, meaning that society will likely bear any shortfall in the event of their bankruptcy (Lordan-Perret et al., 2021). The completion of decommissioning obligations at private cost is thus not only vital for preserving public funds but essential for achieving more sustainable energy generation (Heffron, 2018).

It is not just the fossil fuel and nuclear sectors that are exposed to insolvency risk. A sharp drop in offshore wind prices – and an associated contraction of margins – has increased pressure on developers to control costs, resulting in insolvencies across different parts of the supply chain (Reuters Renewables, 2019). In April 2019, the German wind turbine maker, Senvion GmbH, filed for bankruptcy with more than a billion euros of debt (Hübner and Martin, 2019). It was previously one of Europe's largest offshore turbine suppliers in terms of capacity. In the United Kingdom, the jurisdiction of focus in this article due to its

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position as the global leader in offshore wind (GWEC, 2021) and recognized innovator for wave and tidal power, there have been numerous insolvencies in the renewable sector. In December 2020, Burntisland Fabrications Limited (BiFab), a manufacturer of structures for offshore wind projects, entered insolvency proceedings, with the Scottish government, a minority shareholder in it, standing to lose up to £54.2 million of investment (Williams, 2020). In February 2013, Neptune Renewable Energy Ltd, a tidal stream power generation specialist, entered insolvency proceedings leaving a disused, 150-tonne tidal power generator in the River Humber much to the dismay of local residents (BBC News, 2014). The novel technology utilized proved to be commercially unviable. In 2014, Pulse Tidal Ltd, a company that specialized in sourcing energy from shallow waters and sector leader, Pelamis Wave Power Ltd, were placed into insolvency proceedings (Weldon, 2014; KPMG, undated). And in October 2015, Aquamarine Power Ltd followed suit (BBC News, 2015).

Whilst not as extensive as the £38-£61 billion (central estimate of £48 billion) that it is expected to cost to decommission UK offshore oil and gas production, transportation, and processing infrastructure in the UK (OGA, 2021), decommissioning costs in the offshore renewable energy sector are still vast. Indeed, it is estimated that the total cost of decommissioning offshore wind farms alone in the UK until 2045 will be £1.28–3.64 billion (BEIS, 2018a), more on which will be said below.

A potentially powerful means of addressing insolvency risk is for the regulator to mandate that a developer/owner provide 'security' for their decommissioning obligations.[1] Such a power exists in many regulatory frameworks across the energy sector (Mackie and Besco, 2020). It is, for instance, provided for under the Energy Act 2004 which, inter alia, governs the decommissioning of offshore renewable energy installations and their related electric lines (collectively, OREIs) in English, Welsh and Scottish waters, the focus of this article. The Act empowers the Secretary of State for the Department for Business, Energy and Industrial Strategy (BEIS) and Scottish Ministers to require a developer/owner (or, where relevant, a company associated with them) to provide security in relation to the carrying out of an approved decommissioning programme (s 106(4)). As we shall see, there are different ways (e.g., cash reserving, letters of credit, guarantees, and bonds) in which, and timelines over which, it may be provided (BEIS, 2019; Scottish Government, 2019; Energy Act 2004, s 114).

Security requirements have a critical role to play in establishing precisely how and when decommissioning is funded, what should happen to those funds, who should have access to them, and when that access should be granted. They facilitate a form of external legal control over its financing. Without that control, developers/owners may not be motivated to set aside sufficient funds to ensure decommissioning takes place. In effect, security lessens the likelihood of the burden falling to society.

It is not sufficient that the power to require security merely exists under a regulatory framework. Security requirements must also be *efficacious*. They are, however, failing, or have failed, in many sectors in the UK and elsewhere (Lordan-Perret et al., 2021; Mackie and Besco, 2020; Macey and Salovaara, 2019). This is an ominous sign for their utilization in relation to the decommissioning of OREIs. Inefficacious (or entirely absent) security requirements pose serious implications for public funds and the environment and result in significant cost savings for industry. When this cost saving occurs, it artificially reduces the cost of generating the energy. This may be characterized as a form of indirect state subsidization of the obligations of developers/owners, masking the true social cost of the energy generated. As absent or inefficacious security requirements can mimic state subsidization of decommissioning obligations, this connects an issue that many classify as purely environmental to a larger political conversation around economic equity in energy generation.

The aim of this article is to elucidate the principal causes of risk to taxpayers created by the manner in which security requirements are currently deployed in relation to the decommissioning of OREIs in English, Welsh and Scottish waters. It does so to inform policy development pertaining to their improved utilization. The sections of the Energy Act 2004 that deal with decommissioning have been examined in the literature (Caine, 2020; Wawryk, 2018; Scott, 2006). However, those that relate to security and their elaboration in the associated guidance for industry have not been subject to sustained scrutiny. Whilst there is a small, emerging body of literature examining security requirements in the renewable energy sector (Invernizzi et al., 2020; Mackie and Besco, 2020; Conaway, 2017; Stripling, 2016; Kaiser and Snyder, 2012), this article is the first to 'stress test' their deployment within the framework that governs the decommissioning of OREIs across the UK. To be clear, this article does not seek to cast security requirements as unworkable or inherently flawed, quite the opposite. They are a powerful and effective tool, *when used appropriately*, to ensure that developers/owners bear their obligations. When they exist in compromised form – and this is, unfortunately, often the case – they represent a significant cause of regulatory failure.

It is argued that there are four key causes of significant risk to taxpayers. First, to facilitate the essential transition to greener, cleaner sources of energy generation – to install the requisite level of capacity – BEIS/Scottish Ministers may exercise their discretion generously to accept security that is amenable to developers/owners but which exposes taxpayers to what may objectively be considered an inadvisable level of risk. Second, the focus of BEIS/Scottish Ministers on the perceived financial strength of the developer/owner when evaluating the appropriateness of their proposed means of evidencing security and timing of security arrangements is dangerous given the well-known risk that its deterioration poses for their ability to perform their decommissioning programmes. Third, widespread acceptance of gradual accrual of decommissioning funds (predominantly across years 10–20 of the project) by BEIS/Scottish Ministers creates a risk of a security shortfall by providing scope for obligations under the programme to be avoided through entry into insolvency proceedings. Fourth, a conflict of interest is created by the fact that decommissioning costs are estimated by developers/owners. That estimate informs the security level that may be required by the appropriate Minister. In situations of uncertainty – and costing *is* currently inherently uncertain – developers/owners may be inclined to place their estimate at the lower end of the spectrum to alleviate the financial burden placed upon them, creating the likelihood of a security shortfall.

Whilst the scope of this article is limited to the framework governing the decommissioning of OREIs in English, Welsh and Scottish waters, much of our analysis and the policy recommendations that we make may also be germane to other sectors and other jurisdictions. For instance, those that currently lack security requirements for renewable energy projects (onshore and offshore) but which are seeking to implement them and those whose are weak and in need of reform may benefit from our findings.

The article is structured as follows. Section 2 will sketch the legislative provisions detailing the decommissioning responsibilities placed upon developers/owners in respect of OREIs under the Energy Act 2004. It will then examine how security requirements may be imposed to finance those responsibilities. Section 3 presents four prominent risks

[1] The terms "financial security", "financial assurance," "security deposit," "financial provision," "financial guarantee," "financial responsibility," and "bonding requirement" are also used in legal frameworks and the academic literature. While the term "security" is used throughout this article, these terms may be viewed as interchangeable.

created by the regulatory framework, each of which exhibits potential to dilute the protection afforded to taxpayers. Section 4 sets out a series of high-level recommendations as to how security requirements may be better utilized to ensure decommissioning programmes are performed at private cost. Section 5 draws conclusions and outlines key policy implications.

2. Decommissioning OREIs: the regulatory framework

This section examines how security requirements may be provided for under the regulatory framework governing the decommissioning of OREIs.[2] The focus is the territorial waters in or adjacent to Scotland, England, and Wales and to waters in a Renewable Energy Zone. The decommissioning scheme for these installations – wind farms, wave, and tidal energy devices – is set out in the Energy Act 2004. The Act is augmented by guidance provided by BEIS for England & Wales and draft guidance published by the Scottish Government for Scotland. The Scotland Act 2016 amended the Act, making Scottish Ministers responsible as the 'appropriate Minister' (instead of the Secretary of State for BEIS) for the administration of the scheme in Scottish waters from 1 April 2017 (Scotland Act 2016, s 62). Whilst the legislative framework is substantively the same for both Scotland and England & Wales, there are some subtle but important differences in the respective guidance. These are outlined when pertinent.

2.1. Decommissioning responsibilities under the Energy Act 2004

Prior to analyzing how the Act deals with security, the provisions that detail the key decommissioning responsibilities placed upon developers/owners will be sketched briefly for context. The Act does not prescribe technical requirements for decommissioning OREIs, the stated logic for this being that industry best practice will develop over time as experience grows (BEIS, 2019; Scottish Government, 2019). Under sections 105(1)–(2), where a person extends or constructs, operates, or uses an OREI in regulated waters, or proposes to do so, or has begun to decommission an OREI, then the appropriate Minister may, by notice, require them to submit a programme for its decommissioning. The notice may only be served where at least one of the requisite statutory consents has been given or has been applied for and is likely to be given (s 105(3)). The programme must, inter alia, set out measures to be taken for decommissioning the OREI and contain an estimate of the expenditure (i.e., costs) likely to be incurred in carrying out those measures (s 105(8)). BEIS/Scottish Ministers may require additional information, including how the developer/owner intends to finance their proposed approach to decommissioning (i.e., the type and timing of security provision) (BEIS, 2019; Scottish Government, 2019).

In Scotland, the programme may be sent to the Scottish Parliament's Finance and Constitution Committee for scrutiny given that it has the potential, should a developer/owner default on their obligations, to affect the expenditure of the Scottish Administration (Scottish Government, 2019). In the event of default, public funds may need to be drawn upon to undertake the works. If the programme is sent for scrutiny, it provides a further opportunity for close examination of the financial risks to which a particular project may pose to the state. There is no reference to the prospect for scrutiny of proposed decommissioning programmes by a parliamentary committee in the English and Welsh guidance.

The appropriate Minister may either approve or reject the programme (s 106(1)). If approved, this may be with or without modifications and it may be conferred subject to certain conditions (s 106(3)). This may comprise a condition that the developer/owner "provides such security in relation to the carrying out of the programme, and for his compliance with the conditions (if any) of its approval" and at "such time, and in accordance with such requirements" as "may be specified" by the appropriate Minister (s 106(4)).[3] Where the programme is approved, the developer/owner must carry it out "in every respect" and comply with any conditions attached to it (s 109(1)) or they commit an offence (s 109(2)). If the programme is rejected, the person that submitted it must be informed of the reasons by the appropriate minister and they may be required under section 105 to submit a new one (s 106(7)).

The power to approve the programme subject to a condition that security "as may be specified" may be contrasted with more prescriptive approaches taken in the frameworks of other jurisdictions. For example, in regulating the decommissioning of renewable energy infrastructure in U.S. federal waters, the Bureau of Ocean Energy Management (BOEM) requires a minimum level of financial security ($100k) for each commercial lease it issues for the purpose of guaranteeing compliance with its terms and conditions (30 CFR § 585.515).

Where developers/owners wish to sell all or part of their share in an OREI and transfer the decommissioning liability to a new owner then they must seek approval from BEIS/Scottish Ministers (BEIS, 2019; Scottish Government, 2019). There is no automatic transfer of liability following a change in ownership. The original developer/owner can be kept 'on the hook' for decommissioning "until the required securities have been fully accrued" (BEIS, 2019, p. 25; Scottish Government, 2019, p. 20). This does not mean that the securities must be fully accrued, merely that the *requisite* level must have accrued (e.g., equivalent to that already in place). In deciding whether to approve the transfer of liability, BEIS/Scottish Ministers will consider whether this may cause the risk of default on decommissioning liabilities to increase (BEIS, 2019; Scottish Government, 2019).

Under section 105(2)(b), the appropriate Minister may give notice to a body corporate "associated" with a developer/owner requiring a decommissioning programme to be submitted by them. And, utilizing the powers conferred under section 106(4), the appropriate Minister may require that they provide security in respect of the programme. One body corporate is "associated" with another if one of them controls the other or a third body corporate controls both of them (s 105A(3)). The former would encompass a parent company or other majority shareholder. The latter would encompass a situation where companies X and Y were subsidiaries of Z. X and Y would be "associated" for the purposes of section 105A(3). The notice may be served if the appropriate Minister is "not satisfied that adequate arrangements (including financial arrangements) have been made by the responsible person to ensure that a satisfactory decommissioning program will be carried out" (s 105A(1)(b)).

The intention behind this power to 'extend' liability to the associated company is to increase the likelihood that decommissioning will be financed at private cost by widening the range of responsible persons. This may prove useful where its *available* assets are sufficient to cover the requisite security. However, its utility may begin to fade when it is utilized post-construction as there can be no assurance that they will be any better financed than the developer/owner and they may, in fact, be facing similar financial pressures. Its assets may already be secured to other debts or may have been transferred strategically and pre-emptively at an earlier date to another company, a simple and entirely lawful evasion tactic. The likelihood of this outcome may be considered high given the potentially large liability lurking in the background. We

[2] An OREI is defined in s 104 of the Energy Act 2004.

[3] We see a similar level of discretion in Nova Scotia, Canada. While the Nova Scotia Department of Energy and Mines has a general discretionary power under the Marine Renewable-Energy Act, S.N.S. 2015, c 32, amended by S.N.S. 2017, c 12; 2019, c 34, to require that a license or permit holder of a marine renewable energy project provide financial or other security and/or carry insurance, there are no security requirements pertaining specifically to decommissioning, abandonment, and rehabilitation under that Act nor under the Marine Renewable-Energy General Regulations, N.S. Reg. 8/2018.

must, therefore, be pragmatic and realistic as regards the degree of comfort that we should take from the presence of such a power under the framework.

Nevertheless, when these powers are used diligently and timeously, they may prove useful in responding to the increasing complexity of the ownership structures of OREIs in the UK. Many projects are now no longer being taken forward by a single, independent developer who would then sell the consented project to a larger company. The large scale of recent UK offshore wind farms has led to growth in the utilization of joint ventures between developers, conducted through specifically created common service companies likely to have no trading history (ORE Catapult, 2020). And not only will developers often sell stakes in operational wind farms to release capital to develop further projects, it is becoming commonplace for offshore wind farms in the operational phase to be owned by institutional investors (ORE Catapult, 2020). Thus, fragmentation in the ownership of many OREIs is resulting in a growing number and range of organizations with whom BEIS/Scottish Ministers may be required to interact. The powers described above could ameliorate the risks associated with the fluidity in the ownership of an OREI by ensuring that sufficient security remains in place to fund decommissioning.

2.2. The rationale for ascribing responsibility for decommissioning

The Act's decommissioning provisions are professed to reflect the polluter-pays principle (BEIS, 2019; Scottish Government, 2019). Whilst there is no mention of the principle in the Act itself, it receives prominent placement in both sets of guidance. It is referred to explicitly in the first substantive paragraph of each and is repeated in the opening paragraph of their respective sections on security.

The principle, a "backbone" of environmental policy (Heine et al., 2020, p. 95), has evolved markedly over the last 50 years since its origination by the Organisation for Economic Co-operation and Development (OECD) in 1972. It transitioned from being a purely economic principle that sought to avoid distortions in international trade by prescribing that polluters, not domestic governments, were to bear the expenses of carrying out pollution prevention and control measures decided by public authorities, to become an established legal principle with a dominant focus upon the ascription of liability (Heine et al., 2020). An enduring theme, however, has been its grounding in the theory of cost internalization (Mamlyuk, 2009). When a 'polluter' is not required to bear the costs created by its activities (e.g., those associated with decommissioning obligations) then they do not need to be reflected in its costs of production (i.e., internalized) (Ogus, 2004). Not only can the polluter ignore them in deciding how much to produce and at what price to sell, the unpriced costs – negative externalities – are transferred to the environment and wider society (Ogus, 2004). This is a form of market failure. The principle seeks to make the polluter 'internalize' those costs, ensuring that they are made "part of the economic process rather than a forgotten after-effect of it" (Humphreys, 2001, p. 456).

BEIS presents the principle as meaning that "a person who constructs, extends, operates or uses an installation or related electric line should be responsible for ensuring that it is decommissioned at the end of its useful life, and should be responsible for meeting the costs of decommissioning" (BEIS, 2019, p. 7). The Scottish Government adopts a similar substantive meaning but in modified form, excising entirely reference to electric lines (Scottish Government, 2019), a point returned to shortly. Those parties are categorized as 'polluters' for the purposes of the principle as they are "responsible" for the installation and "best placed to manage and mitigate the costs and risks associated with decommissioning" (BEIS, 2019, p. 33; Scottish Government, 2019, p. 30). This differs to how the principle is understood in BEIS' guidance on the decommissioning of offshore oil and gas installations and pipelines. There, those who have "benefitted" from the exploitation or production of hydrocarbons in the UK Continental Shelf are expected to bear responsibility for decommissioning (BEIS, 2018c, p. 6). This will capture a far wider range of parties. It is, however, a slippery basis for ascribing responsibility as it could be interpreted as including parties that benefited *indirectly* from that activity. It could even be used to justify society bearing a portion of responsibility for the costs (Gaines, 1991). Thus, BEIS clearly intends for two very different conceptions of the principle to apply in each sector.

When distilled down to the requirement that developers/owners should be responsible for paying for the decommissioning of OREIs, this conception of the principle – much like environmental principles more broadly – may be understood as a mere statement of *policy* (Scotford, 2017), and a somewhat vague one at that. It is, however, the way that the principle is codified and implemented within legislation and expounded in guidance issued by the regulator that gives shape, structure, and meaning to it as a legal rule (Lee, 2002). It possesses limited normative value in the absence of this.

The regulatory framework governing the decommissioning of OREIs does provide shape and structure to the principle. For instance, the powers available to the appropriate Minister to require that decommissioning be undertaken and for security to be provided does evidence a capacity to give expression to it. However, the entirely *discretionary* nature of the need for, firstly, decommissioning to occur at all and, secondly, the provision of security for the associated costs, weakens this. Indeed, as we shall see in section 3, the degree of discretion possessed by BEIS/Scottish Ministers in relation to the latter impacts dramatically upon how seriously the principle is taken under the regulatory framework. And the deliberate omission of electric lines from the Scottish guidance is an important departure from the principle, the inference being that those who construct, extend, operate, or use the electric lines in Scotland need not decommission them. This will reduce their costs significantly (Marine Scotland, 2018). Indeed, in studies of publicly available decommissioning programmes for offshore wind projects across the breadth of the UK, Topham and McMillan (2017) and Jensen et al. (2020) observed that it was common for developers/owners to plan for buried cables to be left in situ, indicating an expectation within the sector that they need not be decommissioned at end-of-life.

The context is that under the United Nations Convention on the Law of the Sea (UNCLOS), the UK government bears ultimate responsibility for decommissioning abandoned or disused installations or structures in the exclusive economic zone and the continental shelf and, consequently, liability for the costs associated with discharging this duty (arts 60(3) and 80). And, as we have seen, the Scotland Act 2016 transferred responsibility to the Scottish Government for the decommissioning of OREIs in Scottish waters. The costs may be significant. The total cost of decommissioning offshore wind farms alone in the UK until 2045 was estimated at £1.28–3.64 billion, with BEIS' liability around £1.03–2.94 billion (BEIS, 2018a).[4] The Crown Estate, which issues leases and licenses for OREIs, and the Scottish government are potentially liable for the balance (£250–700 million). Of the 37 wind farms modeled, 25 were BEIS' responsibility. There is no publicly available information on the level or type of security held by BEIS and the Scottish Government for these costs, an omission returned to below.

However, estimates can be wrong and often wildly wrong at that. A previous estimate of an average decommissioning cost of £40,000 per MW installed (Climate Change Capital, 2010) which, based on the installed offshore wind capacity in the UK at the end of 2020 standing at 10,415 MW, would total to a decommissioning bill of only approximately £417 million – substantially lower than the more recent estimates discussed above. Authors, such as Freeman (2015), warned

[4] The total decommissioning liability in real (2017) terms was forecast to be £1.82 billion. This did not account for inflation. However, the figures were provided to reflect a range of uncertainty. The estimate was for the decommissioning costs associated with 37 offshore wind farms at various stages of development, with some in construction and others preconstruction (BEIS, 2018a).

against the risk of cost underestimates. In 2017, BEIS withdrew the Climate Change Capital report based on new information becoming available with significantly higher cost estimates.

2.3. Security requirements under the regulatory framework

It is for the person who submits the decommissioning programme to present details of the security that they propose to provide in respect of it (BEIS, 2019; Scottish Government 2019). The appropriate Minister has discretionary power under section 106(4) to approve that proposal or require alternative (or greater) provision. The "purpose" of providing security is to enable BEIS/Scottish Ministers to decommission the OREI where developers/owners have failed to and "where there are no other parties liable for decommissioning" (BEIS, 2019, p. 27; Scottish Government, 2019, p. 29).

Four important factors bear on the requisite level of security. First, the cost estimate and security levels must cover the amount it would cost BEIS/Scottish Ministers to organize and fund decommissioning, not developers/owners (BEIS, 2019; Scottish Government, 2019). This may be significantly higher than if the costs were calculated based on developers/owners undertaking the work themselves.[5] Second, as BEIS/Scottish Ministers are unable to re-use infrastructure should decommissioning fall to them, the level of security provided must reflect any recycling or disposal costs and the potential for re-use should be excised from the costing underpinning it (BEIS, 2019; Scottish Government, 2019). Third, VAT must be built into any security provided as BEIS/Scottish Ministers cannot recover VAT should they – or, more accurately, contractors appointed by them – 'step in' to complete the works of insolvent or recalcitrant developers/owners (BEIS, 2019; Scottish Government, 2019). Finally, as its value can fluctuate significantly, the scrappage value of the OREI cannot be offset from cost estimations (BEIS, 2019; Scottish Government, 2019). This means that it is unable to be used to reduce the level of security. Whilst the installation will have a scrappage value and this may reduce decommissioning costs for developers/owners, this is not deemed to be relevant to cost estimation and security provision.

Under section 114 of the Act, "security" is defined as including (i.e., not a closed list) a charge over a bank account or any other asset, a deposit of money, a performance bond or guarantee, an insurance policy, a letter of credit, and a letter of comfort. Except for the latter, these are common means of satisfying security requirements. Letters of comfort are highly problematic as they are merely intended to give "comfort" to a party – in this context, BEIS or Scottish Ministers – through the provider assuming, "not a legal liability" to ensure payment (or performance) of obligations under an agreement, "but a moral responsibility only" (*Kleinwort Benson Ltd v Malaysia Mining Corp* [1989] 1 WLR 379, 391). That they do not even express a contractual promise to pay calls into question the legitimacy of their inclusion within the definition of "security". And whilst insurance will have a limited role to play in relation to decommissioning due to its known, foreseen nature – insurers will only cover fortuities – it could deal with risks associated with environmental damage discovered when the project ends.

BEIS' and the Scottish Government's guidance express views on the acceptability of different means of providing security, offering a more nuanced approach to the interpretation of "security" under section 114. This is where some differences between the legal jurisdictions appear. In line with section 114, upfront cash deposits, cash reserving, letters of credit, bank guarantees and performance bonds are all accepted means of evidencing security (BEIS, 2019; Scottish Government, 2019). There is no explicit mention of letters of comfort in either document. Whilst reserving cash in one's *own* accounts is not acceptable according to BEIS, the draft Scottish guidance does not expressly prohibit it. The wording of the latter indicates that it is permissible provided "appropriate arrangements" (e.g., a funding deed which 'ring fences' funds) are put in place to ensure the "funds will remain protected in the event of insolvency" (Scottish Government, 2019, p. 31). Parent company guarantees will only be accepted by BEIS in "exceptional" circumstances, a phrase that is not elaborated on in the guidance, or as a "secondary" form of security to provide further reassurance to BEIS that the taxpayer is protected (BEIS, 2019, p. 37). They are not acceptable to Scottish Ministers due to difficulties associated with their enforceability (Scottish Government, 2019). As they do not mandate creation of a capital reserve, their ability to ensure that decommissioning will be carried out in the event of the insolvency (or even the mere financial deterioration) of the developer/owner and its parent company is low.

The measures deemed acceptable are some of the most secure forms of security as the underlying funds (e.g., cash in a bank account in favor of the regulator or a bond provided by a third party) are not exposed to the claims of the developer's/owner's creditors should it become insolvent. They are, therefore, *capable* of enabling the polluter-pays principle to be taken seriously under the regime. Further protection is provided under section 110A of the Act where security has been provided under an approved decommissioning programme "by way of a trust or other arrangement" (s 110A(1)). This excludes application of the Insolvency Act 1986 (or any other enactment or rule of law) from reaching that security and preventing or restricting it from being applied in accordance with the trust or other arrangement (s 110A(4)). The aim of this provision is to protect funds already set aside for decommissioning from the reach of creditors of the person responsible for decommissioning. It does, however, have no effect in respect of funds that have not yet been set aside.

3. Sources of taxpayer risk within the regulatory framework

The Energy Act's decommissioning provisions aim to ensure that taxpayers are protected from having to fund decommissioning in the event of default by developers/owners (BEIS, 2019; Scottish Government, 2019). This section examines the likelihood of that goal being realized through the way that security requirements are currently deployed by BEIS/Scottish Ministers. Four principal causes of taxpayer risk will now be outlined, each of which dilutes the prospect of public funds being protected.

3.1. Excessive regulatory discretion

This section will show that the degree of discretion possessed by BEIS/Scottish Ministers under the regulatory framework in relation to security provision presents an increased risk to taxpayers. Whilst they will want to reduce the risk of developers/owners defaulting – thereby protecting public funds – stringent security requirements impose a cost burden on the sector which may impact upon the jurisdiction's attractiveness to prospective developers/owners. BEIS/Scottish Ministers may, on balance, choose to rely on lax (or no) security requirements to create conditions amenable to industry to ensure the requisite level of capacity can be installed.

Before proceeding, it is important to observe that the excessive regulatory discretion described in this section certainly contributes to the risks identified in section 3.2 ('A Flawed Focus on 'Financial Strength') and section 3.3 ('The Dangers of Gradual Accrual'). For example, as we shall see, BEIS/Scottish Ministers have discretion to determine whether a developer/owner possesses sufficient financial strength to warrant being permitted to accrue funds gradually (e.g., across years 10–20). But if that strength deteriorates, funds may not accrue as planned. This may result in a security shortfall. Whilst each of these factors are connected, it is helpful to examine them separately as they raise their own unique issues. Moreover, concerns pertaining to a

[5] For example, in the context of the Canadian mining sector, Guzman observes that the amount to be deposited has been estimated to be "three to five times higher than what the mining company would spend if it did the work itself." (Guzman, 2017, p.8).

focus on financial strength and the gradual accrual of funds are not unique to a discretionary framework. They could exist in a prescriptive regime where, for instance, funds were permitted to accrue gradually where financial criteria were met.

3.1.1. The dilemma: countering default risk v. hindering development of OREIs

The Act confers absolute discretion upon the appropriate Minister in relation to the necessity of security and the acceptable type(s) of security and timing of payments (i.e., lump sum or accrued) should it be required. Thus, it does not cater for the specificities of security provision. It is the guidance issued by BEIS and the Scottish Government and, more importantly, the subsequent discussion and negotiation that takes place with developers/owners (or, where relevant, an associated company) following presentation of their proposed means of financing the decommissioning programme that brings the security into fruition. They will bargain between themselves in relation to the precise form(s) that the security is to take and how it ought to accumulate. Thus, to a large degree, the security that is conditioned following approval of the programme derives from a process of *negotiation* between the parties (Gerard, 2000).

There is the danger that to facilitate the essential transition to greener, cleaner sources of energy generation – to ensure that the requisite level of capacity can be installed – BEIS/Scottish Ministers may exercise their discretion generously to accept security that is amenable to the developer/owner but which exposes taxpayers to what may objectively be considered an inadvisable level of risk. It is a difficult balance to strike. While BEIS acknowledged that security reduces the risk of developers/owners defaulting on their liabilities, it asserted that, "[a]t the same time, *we do not want to hinder the development of [OREIs]*." (BEIS, 2018b). The draft Scottish guidance makes a similar statement.[6] The message is clear and goes some way to explaining the rationale for the discretionary nature of the framework: security requirements can and do hinder the development of OREIs and this is not desirable. Thus, BEIS/Scottish Ministers are acutely aware that the way that their discretion is exercised impacts upon their jurisdiction's attractiveness as a business location.

Stringent security requirements certainly have the potential to harm the economic competitiveness of a jurisdiction (Conaway, 2017; Komoroski, 1988; Stewart, 1993). Stringency may relate to various factors, including the level required (e.g., whether the scrappage value of the infrastructure may be used to reduce the decommissioning cost estimate and so warrant a lower security value), when it is to be provided, and the prohibition of certain high-risk but low-cost measures (e.g., parent company guarantees). Other things being equal, developers/owners trading from jurisdictions with stringent security requirements will be at a competitive disadvantage to those trading from jurisdictions whose are lax (or non-existent) owing to the higher compliance costs of the former (Conaway, 2017; Stewart, 1993). The reverse will also be true. Jurisdictions, therefore, have incentives to exercise the discretion afforded to them to impose lax (or no) security requirements to encourage development of OREIs in their waters and attract industry to that market.

It is not just unequal global competition that may be fostered by utilization of this discretion. Domestic competition may also be impacted (Mackie and Combe, 2019). The relaxation, or more permissive application, of security requirements in Scotland could make developers/owners contemplating the construction or acquisition of infrastructure in English and Welsh waters reassess and invest in a project in Scottish waters instead (or vice versa). This issue rears its head across the globe and across sectors: if X's regulatory regime is robust and Y's is less so, *other things being equal*, it may be expected that companies will gravitate towards Y due to the lower costs of compliance. Jurisdictions with stringent security requirements may even relax their regimes to stem such a flow. There may even be differential treatment between developers/owners within the *same* jurisdiction where, for instance, one was treated more favorably than another due to its perceived financial strength. As we shall see in Section 3.2, this may result in it benefitting from less stringent security requirements.

It is also important to acknowledge that a jurisdiction is unlikely to give up its competitive position voluntarily through requiring more stringent security requirements if there is a risk that others will not. As Stewart observes, "Nations that have adopted less stringent standards presumably wish to retain whatever economic benefits, including competitive advantages, that such standards confer" (Stewart, 1993, p. 2045). While it will weigh other factors into the equation, such as the benefits attained through effective environmental protection measures, it could lead to a race to the bottom with the regulator exercising their discretion to gain a competitive advantage (Stewart, 1993). This may produce short-term gains but is bad for the environment and public funds in the long term and should be avoided.

The position is exacerbated by a lack of transparency. Both sets of guidance state that whilst the decommissioning programme itself is to be made publicly available, commercially confidential sections on costs and securities in it may be redacted (BEIS, 2019; Scottish Government, 2019). Thus, the public, commentators and interested non-governmental organizations will never know the level and type of security set aside for decommissioning. They can never find out how regulatory discretion has been exercised and, in turn, gauge the corresponding level of risk to public funds flowing from the transition to renewables. This creates a troublesome accountability deficit given that it is society that will end up paying – metaphorically and financially – if developers/owners default on their liabilities.

3.1.2. Offshore oil and gas installations in the UK: a comparator

The regulatory framework governing the decommissioning of UK offshore oil and gas installations and submarine pipelines may be viewed as an example of a regime which sought not to hinder development, a decision with consequences that will hit with impact in the years to come. The regime is more lenient than the current provisions for OREIs. There is no requirement under the Petroleum Act 1998 for all responsible persons to provide security for decommissioning. The scheme is based on regularly assessing, through application of financial tests, the capability of responsible persons to meet their decommissioning liabilities. This is akin to self-bonding, a means of evidencing security that is well known to pose a "systemic" risk to the environment and taxpayers (Malone and Winslow, 2018, p. 4).

Section 29(1) of the Petroleum Act 1998 empowers the Secretary of State to request, by written notice, that a party (or parties) to submit to him a programme setting out the measures to be taken to abandon an offshore installation or submarine pipeline. If the Secretary of State has concerns about their ability to fund the project's decommissioning, he can use utilize his power under section 38(4) of the Petroleum Act 1998 to require that they provide security (BEIS, 2018c). Section 38(4) is broad in scope and enables the Secretary of State to "requir[e] the person to take such action as may be specified in the notice within such time as may be so specified". BEIS (2018c, p. 115) asserts that "in some circumstances, where there is only one or a small number of operators in a field, the Secretary of State may enter into a DSA [decommissioning security agreement] or other trust or finance deed or instrument directly with these parties to obtain security". Though, this is clearly not the default position. When section 38(4) is used to require security, a DSA will not be required (BEIS, 2018c).

As of January 2019, BEIS had only required operators to set aside £844 million in security (NAO, 2019). When considered against the

[6] The Scottish Guidance states that "Scottish Ministers wish to implement the scheme in such a way that it does not hinder the development of offshore renewable energy installations, whilst at the same time ensuring that the tax payer is protected against having to organize and fund decommissioning" (Scottish Government, 2019, p.15).

estimated cost to operators to decommission offshore oil and gas production, transportation, and processing infrastructure in the UK of £38-£61 billion (central estimate of £48 billion) (OGA, 2021), the security only covers 1.38–2.22% of the sector's total estimated liabilities. This is concerning as the UK government bears ultimate responsibility for decommissioning these installations and pipelines under UNCLOS 1982. When the state performs the obligations of an insolvent operator using public funds then it indirectly subsidizes the project.

The extent to which UK taxpayers are exposed to the cost of oil and gas decommissioning in the event of operator default is troublesome and is especially sensitive given growing public concern about climate change (Climate Assembly UK, 2020). By failing to capture the true cost to society of oil and gas over its full lifecycle, including decommissioning, energy prices from oil and gas remain artificially low, thereby effectively competing against the expedited roll-out of renewables as part of climate action. This adds to pressure on margins in offshore wind, creating a situation in which the underestimation of decommissioning costs may be more likely, more on which is said in section 3.4.

3.2. A flawed focus on 'financial strength'

When determining the acceptability of proposed means of financing decommissioning programmes, the focus of BEIS/Scottish Ministers on the perceived financial strength of developers/owners may be considered dangerous given the well-known risk that its deterioration poses for their ability to complete the works. As we have seen, there are several acceptable forms of security and timelines over which it may be provided, with proposals from developers/owners considered on a case-by-case basis (BEIS, 2019; Scottish Government, 2019). BEIS′ and the Scottish Government's guidance makes clear that the *type* of security and *timing* of security arrangements likely to be acceptable will depend, inter alia, upon the "*financial strength* of those responsible for decommissioning" (BEIS, 2019, p. 35; Scottish Government, 2019, pp. 30–31). Thus, 'financially strong' developers/owners *will* be given greater latitude as to the type of security that they may be permitted to present and the period over which it must accrue as compared to those that are less well positioned financially.

However, it is widely recognized that a weakening in the financial strength of developers/owners can render them unable to perform their end-of-life obligations (Boyd, 2001). It is, thus, not clear why this ought to be a relevant criterion in the decision as to the acceptability of a measure or the timing of the accrual of decommissioning funds. It focuses on present-day ability to pay, not ability to pay in the distant future. The latter is the issue of critical importance in relation to OREIs where the project life may extend beyond two decades, even before lifetime extension or repowering is considered.

The pertinence of 'financial strength' renders the *process* of evidencing it of significant regulatory importance. However, this is susceptible to problems related to how it is to be determined. Unlike systems that permit self-bonding, where specific, publicly available financial tests and ratios must be satisfied to utilize that measure, no criteria are published in either BEIS′ or the Scottish Government's guidance to facilitate objective determination as to when developers/owners will be deemed to possess the requisite 'financial strength' (i.e., what it means, in legal terms, to be *financially strong*). This creates a risk of differential treatment between developers/owners, or at the very least a feeling of such treatment, and for subjectivity – and, potentially, unconscious bias – to enter decision-making by BEIS/Scottish Ministers as to whether the threshold has been met.

The presumption is that the figures presented are accurate, but this may not be the case. In the U.S. coal mining sector, for instance, coal companies "engage in financial gimmickry by overvaluing assets, undervaluing liabilities, or pushing liabilities off balance sheet in order to appear solvent and continue operating" (Macey and Salovaara, 2019, p. 934). Where developers/owners do not adopt transparent, uniform accounting procedures in deriving the relevant financial data, this will lead to difficulties in ensuring equality of treatment between them.

Inaccuracy may be unintentional. A company may struggle to capture its liabilities accurately where its activities are wide-ranging and carried out across different jurisdictions. In such circumstances, it may be difficult, if not impossible, for BEIS/Scottish Ministers to verify the figures presented. But inaccuracies may also be intentional, with some companies deliberately attempting to portray their financial position to be healthier than is the case to avoid having to pay for third-party products, such as bonds (GAO, 2005). A simple means of doing so would be to inflate asset values artificially. This may be done through questionable valuation techniques, or merely by taking assets at historic values when that value was higher than their current market value. The figures presented may not, therefore, reflect the company's true financial position (Mackie and Fogleman, 2016).

Whilst accounting may not be fraudulent in many cases, accounting fraud is relatively common amongst small companies and those in financial trouble (Boyd, 2001). It may only be discovered when it is too late. And the prospect of a formerly large, financially stable energy company becoming financially distressed and portraying a stronger balance sheet than its finances would dictate is entirely possible, Enron being a notable precedent (Beecher-Monas, 2003). BEIS/Scottish Ministers must subject the data presented by developers/owners to the requisite level of analysis. This is time intensive and expensive and will become more so due to the increasing complexity of the ownership structures of OREIs. With the tightening of budgets, robust auditing of the data may not always be possible. Furthermore, the interpretation, verification, and monitoring of the financial data requires BEIS/Scottish Ministers to possess sufficient financial expertise – and in adequate volume – something which may, or may not, exist. Additional staff, with the requisite skills, may be required. Whilst there is no indication that questionable accounting practices have been utilized within the UK's offshore renewables sector, precedents from other sectors demonstrate that the risk of it is real and its implications significant.

3.3. The dangers of gradual accrual

Regulatory tolerance of gradual accrual of decommissioning funds creates a risk of security shortfall should an owner/developer become insolvent prior to the full accumulation of the funds. BEIS′ and the Scottish Government's guidance asserts that while a secure, segregated fund that accrues early in, or during the middle of, the life of an installation is likely to be acceptable, one that accrues late into the operating life will not (BEIS, 2019; Scottish Government, 2019). The risk to which a 'late-life' prohibition seeks to guard against is that in the final stages of the project, after its profitability has been maximized, developers/owners may enter insolvency proceedings in order to avoid their obligations.

There are many examples of bankruptcy/insolvency law being utilized strategically in the energy sector to avoid the equivalent of millions of dollars, sometimes hundreds of millions, worth of end-of-life obligations covered by inefficacious security requirements. The tactic has been used widely in the U.S. surface coal mining sector where four of the largest coal producers have used bankruptcy proceedings to avoid around $1.9 billion in abandonment obligations since 2012 (Macey and Salovaara, 2019). This figure does not include the "potentially billions of dollars" in environmental liabilities unrelated to the Surface Mining Control and Reclamation Act of 1977 (Macey and Salovaara, 2019, p. 883 n. 12).

In the context of OREIs, 'mid-life' is deemed to occur between years 10–15 or 10–20 of the project (BEIS, 2019; Scottish Government, 2019). Accrual during this period is the preferred funding mechanism for developers/owners of offshore wind farms (Topham and McMillan, 2017). Whilst an improvement upon late-life accrual, with mid-life accrual it is likely that *no security whatsoever* is provided in the first 10 years of the OREI's life. This means of financing decommissioning is

exposed to outright failure in the event of the insolvency of developers/owners in the 0–10-year window. Even if funds begin to accumulate after year 10, if an owner becomes insolvent before the scheduled end of the installation's operational life, then they will not accumulate in full. The earlier that insolvency occurs in years 10–20 of the OREI's life, the greater the extent of the likely security shortfall.

Accrual is amenable to industry as it allows developers/owners to spread their decommissioning costs across the OREI's operational life. However, its acceptance by BEIS/Scottish Ministers increases the risk that developers/owners will not bear their decommissioning liabilities in full as and when required; a security shortfall may arise. In the event of the developer's/owner's insolvency, an indirect cost saving – the shortfall – is created. A consequence of this is that the costs associated with unfulfilled obligations will be "externalized", contrary to the core rationale for the Energy Act's decommissioning provisions, the polluter-pays principle. Where this occurs, the costs will either be borne by society through the deployment of public funds or by the environment through reduced environmental quality where the regulator does not 'step in' to perform them or, at least, not in full.[7] This may be viewed as a form of indirect state subsidization (Mackie and Besco, 2020).

Where a developer/owner ceases to trade prior to carrying out their decommissioning programme then, in the absence of (efficacious) security having been provided by them, they have been permitted to place energy on the market without bearing the true social cost of its generation. The true cost to society of the energy generated is masked (a similar dynamic was observed in the oil and gas industry – section 3.1.2). The regulatory framework has allowed them to externalize some (or, potentially, all) of their decommissioning costs, creating false price signals for consumers and sending the wrong messages to industry (Mackie and Combe, 2019). The decommissioning costs should, from an efficiency perspective, have been internalized by them (Perkins, 1998). They should have been incorporated in their business plans, reflected in their pricing and, eventually, borne by consumers (Marine Scotland, 2018). A competitive advantage is conferred upon them over those developers/owners that *have* internalized their own costs (Wirth, 1995; Dernbach, 1998). As consumers benefit from market prices that do not reflect the true social cost of the energy project, there is greater demand for energy generated by developers/owners whose activities have been subsidized indirectly (de Sadeleer, 2002). This leads to inequity in domestic energy generation.

3.4. Uncertainty in the costing of decommissioning programmes

The breadth of the estimated cost range (£1.28–3.64 billion, equating to a spread of £2.36 billion) for decommissioning offshore wind farms in the UK (BEIS, 2018a) raises serious concerns as to the ability of developers/owners to estimate their own decommissioning costs reliably. The spread was put down to the nascent nature of the industry, the lack of experience in undertaking large-scale decommissioning projects, and a variety of uncertainties, including the highly volatile nature of vessel rates and the processes, tools, and techniques used to carry out the decommissioning works (BEIS, 2018a; Purnell et al., 2019). These uncertainties go to the very heart of constructing a reliable, defensible estimate.

Whilst both sets of guidance acknowledge that early decommissioning programmes may not be able to make detailed predictions on costs reliably (BEIS, 2019; Scottish Government, 2019), "best endeavours" should be made by developers/owners to do so, "incorporating precautionary assumptions where necessary" (BEIS, 2019, p. 25; Scottish Government, 2019, p. 22). This means that whilst parts of the decommissioning process will continue to be significantly under-costed, others will remain entirely uncosted (Velenturf et al., 2020).

The estimation of decommissioning costs is important as that figure – a sum derived by developers/owners (or their contractor), not BEIS/Scottish Ministers – informs the level of security that may be required (BEIS, 2019; Scottish Government, 2019). However, developers/owners have little incentive to estimate decommissioning costs accurately. The greater the estimated cost, the greater the level of security that may be required. And the greater the level of security required, the greater the financial burden to them. Thus, in situations of uncertainty – and costing *is* currently uncertain at present – developers/owners may place their estimate at the lower end of the spectrum to alleviate this burden. Whilst BEIS/Scottish Ministers reserve the right to obtain an independent audit of estimated decommissioning costs (BEIS, 2019; Scottish Government, 2019), the auditor may, given the factors detailed above, struggle to challenge all but the most obvious instances of cost underestimation.

The prospect for potentially deliberate under-costing may be expected to reduce as experience grows and as BEIS/Scottish Ministers acquire intelligence from completed decommissioning programmes as to the actual costs incurred by developers/owners. This will take time but will materialize as once decommissioning is complete, owners must provide a report detailing, inter alia, the cost breakdown (BEIS, 2019; Scottish Government, 2019). This may engender a clearer, more detailed understanding of the accuracy of the costings associated with new decommissioning programmes. However, this will only be possible if effective mechanisms to learn from these experiences are in place. They are not currently (Jensen et al., 2020). Indeed, concerns have been voiced that there is no evidence that the renewable sector has learned lessons from the regulatory failure witnessed in the nuclear, oil, coal and gas sectors where current generations have been left with large clean-up bills, impacting significantly upon public funds and the environment (Invernizzi et al., 2020; Jensen et al., 2020). This is deeply troubling, particularly given the purportedly sustainable nature of the renewable energy industry.

The issues connected to uncertainty in the costing of decommissioning programmes could be alleviated through the regular review of decommissioning programmes. Under both regimes, programmes must be reviewed periodically (and, indeed, annually after the first security payment is made), and developers/owners *may* be required to modify the level of security provided where the review indicates that the current amount is insufficient to meet their liabilities or there is a risk of default (BEIS, 2019; Scottish Government, 2019). However, BEIS' guidance merely requires that a "high-level" review be undertaken annually so it may be questioned whether the granular detail needed to understand the degree to which security modification is necessary will be uncovered (BEIS, 2019, p. 19). The Scottish Government's guidance, in contrast, requires that a "review" be undertaken each year, excising any reference to it being of a high-level (Scottish Government, 2019, p. 16). The greater the level of specificity in the review, the more likely it will be to identify the need for security modification.

Regular reviews are eminently sensible but not only is security modification discretionary (the issues created by this were set out in section 3.1), if the level of security required from developers/owners is directly based on the cost estimate and that estimate later proves wrong, this raises a very real risk of a security shortfall that will need to be met by developers/owners. It may be presumed that this will be unlikely when their financial position is weak. In such circumstances, they may not have funds at their disposal to subsume the deficit or, where relevant, the third-party from whom the security product was purchased (e.g., in the case of a bank guarantee being utilized to satisfy the security requirement, the bank) may be unwilling to increase the value of that product. There is also the alluring prospect of entering insolvency proceedings to offload expensive end-of-life obligations, a practice found to be endemic in the fossil fuel sector (Macey and Salovaara, 2019; Dana and Wiseman, 2014).

[7] The exception here would be where there was an industry fund, such as the Orphan Fund in Alberta, that would take on the financial responsibilities for the abandonment obligations of a defunct operator. The Orphan Fund is financed through levies on operators in the sector, but with increasing reliance on large loans from the Government of Alberta to aid its work (Mackie and Besco, 2020).

The experience of other sectors indicates that the prospect of developers/owners of OREIs bearing their decommissioning liabilities in full may be considered low. That said, some developers/owners may, for the time being, have a direct interest in staying active in what is a growing market. They may, therefore, be incentivized to reduce the prospect for the reputational damage that may arise from failing to meet their obligations under their decommissioning programmes and limitations in terms of bidding in new auction rounds for licenses that this may cause.

4. Policy considerations for more efficacious security requirements

This section considers how the utilization of security requirements for the decommissioning of OREIs could be improved to address the taxpayer risk exposed in section 3. When it comes to their design, the devil is in the detail. The intricacies of the proper use of security requirements cannot be fully set out here. This section seeks to propose some high-level policy recommendations to improve their efficacy.

4.1. The prospective responsibilities of the parties

The primary function of security requirements ought to be to empower developers/owners and regulators to discharge specific prospective responsibilities – or *duties* – ascribed to each of them (Mackie and Besco, 2020). Both parties are subject to quite separate responsibilities, but they share a common goal, specifically timely completion of the approved decommissioning programme. Where the programme is approved, the developer/owner is subject to a responsibility under the public law – a legal duty – to carry it out at its own private cost. Failure to do so "in every respect" and comply with any conditions attached to it is an offence under the Energy Act (s 109(2)). The programme, whose terms the developer/owner knowingly accepted in commencing operations, may be viewed as reflecting the basis upon which society tacitly allowed the energy project to proceed to construction. The developer/owner ought not to be able to vary those terms unilaterally and retrospectively through the strategic use of insolvency law to avoid their responsibilities under it.

The unique role of the regulator in securing performance of end-of-life obligations is underplayed in most accounts of the regulatory function of security requirements. BEIS/Scottish Ministers ought to be viewed as subject to a prospective responsibility – a duty – that is complementary to that of the developer/owner. This is to ensure, on behalf of society and the environment, that the approved decommissioning programme is performed on time and at private cost. The duty may be deemed to be discharged where BEIS/Scottish Ministers obtain security from the developer/owner (or a body corporate associated with them) that can deliver that outcome.

That BEIS/Scottish Ministers are subject to such a duty is recognized in the guidance, though not the Energy Act 2004 itself. The Act conceives of it as a "power" – the exercise of which by the appropriate Minister is *discretionary*, not mandatory – to approve the decommissioning programme "subject to" a condition that security be provided (Energy Act 2004, s 106(4)(a)). The guidance, in contrast, asserts that "the [UK] Government has a duty to ensure that the taxpayer is not exposed to an unacceptable risk of default in meeting costs associated with decommissioning" (BEIS, 2018c, p. 34). An identical duty is imposed on Scottish Ministers under the draft Scottish guidance (Scottish Government, 2019). The primary duty of BEIS/Scottish Ministers is, thus, to protect the taxpayer. This not only requires that the discretionary power to require security be exercised, but that BEIS/Scottish Ministers reflect carefully on the *level* of security that is proposed, the *measures* that will be used to evidence security, and the *period* over which that security will accrue when making their final decision.

The crucial issue relates to the threshold at which the risk of default is deemed 'unacceptable' for it is this that gives essential substance to the duty owed to taxpayers. In the absence of a clear articulation of it, BEIS/Scottish Ministers have too great a degree of discretion in approving security proposals. The 'acceptability' of the risk is, ultimately, a *political* decision but one with implications for economic equity in domestic energy generation. The higher the acceptable level, the greater the likelihood of the burden falling to the public. If this occurs, the state indirectly subsidizes the project.

It is certainly implicit in the way that the duty is expressed that a *risk* of default is ever present. Whilst this is true to a degree, it must not be overplayed as it legitimizes poor regulatory practice. The risk is created by a variety of factors. Given the uncertainties involved in costing decommissioning, there is a real prospect of a deficit arising between the actual decommissioning costs and the estimated costs, which will have influenced the value of the security set aside. Where this shortfall cannot be met by the developer/owner due, for example, to its weakened financial position, and no other parties can be held liable for it, it will fall to taxpayers. And a security measure, such as a parent company guarantee, could fail. Or the developer/owner may become insolvent prior to full accumulation of funds. But aside from the currently high likelihood of the cost estimate proving inaccurate, the risk of default can be controlled to a large extent through restricting the range of acceptable security measures to those that exhibit low risk to taxpayers and limiting the period over which funds are permitted to accrue.

4.2. More efficacious security requirements: a guiding principle

Policy development pertaining to the more efficacious utilization of security requirements ought to be shaped by a guiding principle: the security required must be capable of *guaranteeing* that decommissioning will be performed at private cost. By this it is meant that the security must ensure that the legal duty imposed upon developers/owners (or company associated with them) under section 109(1) of the Energy Act to carry out the approved programme in every respect can be discharged.

When evaluating a security measure for its ability to guarantee performance (or, phrased negatively, the risk of default it may engender), we see a weak-to-strong spectrum of likelihood that decommissioning will be carried out, with self-bonding and cash reserving in one's own accounts without 'ring-fencing' at one end (weak) of the spectrum and full, upfront cash deposits with a regulator at the other (strong) (Marine Scotland, 2018; GAO, 2005). Different measures sit at various points along this spectrum. The closer the marker is to the weak end, the greater (and, we contend, the more *unacceptable*) the risk to public funds, with the reverse also being true. The 'acceptability' of the risk of default ought to be guided by where (1) a particular measure and (2) the timing of the security accumulation, sits upon this spectrum. Indeed, BEIS/Scottish Ministers are already on this direction of travel through their prohibition of certain security measures and timing of accruals (e.g., late life).

Where the original cost estimate of undertaking the works is accurate – and this, as we have seen, is no easy task – certain measures, when utilized diligently (i.e., an adequately capitalized escrow account segregated from the assets of developers/owners, outside their administrative control and accessible only by the regulator), increase the likelihood that decommissioning will be performed at private cost. However, where performance is conditional upon the maintenance of the *financial strength* of developers/owners or some third party, such as providers of bonds, bank guarantees, and/or a parent or affiliate company, then the financial value (and overall legal credibility) of that guarantee wanes. And unless specific and sufficient assets are 'ring-fenced' and beyond the reach of their creditors, there is the risk that if their financial position deteriorates then they may be unable to bear those costs. It is not just developers/owners and their parent or associated companies that are exposed to the risk of insolvency. Banks and insurers can and do become insolvent (Boyd, 2001).

If security requirements are to *guarantee* (i.e., ensure) that the

programme will be performed, they should prescribe that the full estimated costs of doing so must be paid into a capital reserve with a third party in favor of BEIS/Scottish Ministers. This would be done prior to the OREI entering the water. The first-best option would be for deposit-based measures, such as trust funds or a bank account in favor of BEIS/Scottish Ministers, to be the only means of evidencing security in the mid to long term. And there ought to be a prescribed requirement for lump-sum deposit-based measures rather than accrual-based deposit-based measures. Financial strength-based measures, such as self-bonding and parent company guarantees, and letters of comfort ought to be prohibited under the legal framework or in the associated guidance published for industry, with no discretion permitted to accept them in "exceptional" circumstances as per the current approach to parent company guarantees by BEIS.

Lump-sum deposit-based measures are best placed to enable developers/owners to shoulder their obligations. They are also the clearest examples of measures that show that they have the *ability* and *intention* to bear the costs associated with those obligations. These are two essential features of efficacious security requirements. Developers/owners could, in theory, demonstrate current ability to pay by evidencing their financial strength, a practice that both BEIS and the Scottish Government express comfort with. However, that ability will evaporate if their financial position deteriorates. They may (or may not) have an initial intention to pay. And even if they did, that can change if the market changes for the worse. While BEIS/Scottish Ministers may believe that they can gauge the ability of developers/owners to pay, they cannot gauge their intention to pay. Thus, a means of evidencing security should not be accepted by BEIS/Scottish Ministers where its ability to fund decommissioning would be placed in jeopardy by changes in the ability and/or intention of the developer/owner to pay.

The appropriate Minister has powers under section 111 of the Energy Act to make regulations relating to, inter alia, the manner in which security is to be provided, and this would appear to be a prudent place for the requisite prescription to be detailed. This should also mandate that the security levels and submitted cost estimates provided by developers/owners be made publicly available. It is simply not tenable for this to continue to be redacted in publicly available decommissioning programmes. Risks cannot be fully assessed by stakeholders without access to all pertinent information. Even if details of security provision were to be published, this is of no substantive use to wider stakeholders unless the estimated costs of carrying out the programme are released alongside it. It is the relationship *between* the costing and security provision that is key to understanding the risk to public funds. Transparency will go some way to augment the accountability of the sector.

4.3. Balancing financial viability with regulatory risk

The first-best option (i.e., full estimated costs of performing the decommissioning programme, paid into a capital reserve with a third party in favor of BEIS/Scottish Ministers prior to the OREI entering the water) may be unattainable for many socially valuable projects and for all but the largest of developers/owners. Thus, it could be tolerable to enable developers/owners that could demonstrate that the first-best option would impose "undue financial hardship" upon them to default to our second-best option. This would be for a bank guarantee purchased from a third-party provider to be used initially as funds accumulated in line with a strict timeline to achieve the appropriate target sum in the capital reserve. If developers/owners did not have the financial capacity to acquire the bank guarantee on their own, a parent or other associated company (or companies) may be able to assist. The sum guaranteed by the bank would decrease proportionately in line with an increase in the accumulating cash deposits. This option would be permissible for years 0–10, with the funds accumulating in full by the end of that period. If this did not occur, their license could be suspended until the deficit was redressed.

4.4. Improve decommissioning cost estimates over time

Whilst improved utilization of security requirements is crucial, this will not, *in itself*, be sufficient to ensure performance of the approved decommissioning programme at private cost. Recall that it is the cost estimate relating to that programme that informs the level of security to be provided, meaning that if the estimate is inaccurate then there will be a security shortfall that developers/owners may be required to 'plug'. This may not be possible where their financial position is weak or their cashflow is restricted. Thus, any improvement in the utilization of security requirements must be coupled with the acquisition by BEIS/Scottish Ministers of the granular detail of the costs that arise upon, and following, performance of the programme. Currently 'hidden' costs must be exposed. The effort expended will be rewarded by greater protection of public funds and furtherance of the polluter-pays principle.

The prospect of reducing levels of security provision by an amount equal to no more than 50% of the scrappage value of the OREI, verified annually by an independent third-party audit, could be discussed by policy makers to counterbalance the increased (albeit not new) costs that will be imposed upon developers/owners as a result of our proposed policy measures. This is, as we have seen, currently prohibited under BEIS′ and the Scottish Government's guidance.

Academia may have an important role to play. For instance, it could take a leading position in collating costings from completed decommissioning programmes – or precedents – to populate a publicly available benchmarking database that could aid both industry and regulators when submitting and reviewing costings respectively. This would maintain independence and impartiality. There would then be a corresponding obligation upon developers/owners to show that these precedents had been adopted – or, where not, then departure from them would need to be explained – in regularly updated decommissioning programmes. This would require more openness and sharing of data within OREI industries, converse to the current tendency to operate in siloes for the consecutive lifecycle stages. If the commercial advantages of greater data sharing (such as cost savings and new markets for reused components and materials) were not recognized by industry, an initial set of government incentives or regulations may be required to facilitate such culture change.

Enhancing the numbers, skills, and experience of those tasked with reviewing submitted decommissioning costings will also be crucial. Administrative fees could be charged for the processing of decommissioning programmes. It may be prudent for the appropriate minister to utilize their power under section 188 of the Energy Act to make regulations to require the party submitting the programme to pay for this. This may help to fund the acquisition of the staff, in sufficient numbers with the requisite expertise, that is central to regulatory success. Alternatively, governments could decide to continue to carry such costs as part of measures to facilitate the sustainable energy transition.

5. Conclusion and policy implications

This article sought to elucidate the principal causes of risk to taxpayers created by the manner in which 'security requirements' are currently deployed by BEIS/Scottish Ministers in relation to the decommissioning of offshore renewable energy installations (collectively, OREIs) in English, Welsh and Scottish waters. It did so to inform policy development pertaining to their more efficacious utilization. In this context, security requirements are a regulatory tool which necessitate that developers/owners evidence their ability to finance their decommissioning obligations.

There were found to be four key causes of significant risk to taxpayers. First, to facilitate the essential transition to greener, cleaner sources of energy generation – to ensure that the requisite level of capacity is installed – BEIS/Scottish Ministers may choose to accept security that is amenable to developers/owners (or, where applicable, a company associated to them) but which exposes taxpayers to an

inadvisable level of risk. Second, the focus of BEIS/Scottish Ministers on the perceived financial strength of developers/owners when evaluating the acceptability of their proposed means of evidencing security and timing of its accrual is dangerous given the well-known risk that its deterioration poses for their ability to carry out the programme. Third, widespread acceptance of gradual accrual of decommissioning funds (predominantly across years 10–20 of the project) by BEIS/Scottish Ministers creates a risk of a security shortfall by providing scope for obligations to be avoided through entry into insolvency proceedings. Fourth, a conflict of interest is created by the fact that decommissioning costs are estimated by developers/owners. That estimate informs the security level that may be required by the appropriate Minister. In situations of uncertainty – and costing is currently inherently uncertain – the developers/owners may be inclined to place their estimate at the lower end of the spectrum to alleviate the financial burden placed upon them, creating the likelihood of a security shortfall.

Three of the issues – excessive regulatory discretion, a flawed focus on financial strength and the risk of shortfall created by gradual accrual – can be addressed through improved utilization of security requirements. Our key policy recommendations in relation to these issues comprise in brief:

- Policy development and the requisite legislative prescription ought to be guided by the principle that security requirements must guarantee that the approved decommissioning programme will be carried out in every respect at private cost.
- If security requirements are to ensure that this occurs, they should prescribe that the full estimated costs of carrying out the programme must be paid up-front into a capital reserve with a third party in favor of BEIS/Scottish Ministers (first-best option).
- If developers/owners could demonstrate that the first-best option would impose "undue financial hardship" upon them then they could purchase and maintain a bank guarantee until funds accumulated in line with a strict timeline (second-best option).

Issues pertaining to the potential for developers/owners to underestimate the costs associated with carrying out the decommissioning programme may, in contrast, be resolved through the acquisition of experience and intelligence around costings by BEIS and the Scottish Government. This could be supported by an independent (academic) body that was able to offer cost estimates, evaluate the accuracy of cost estimates when programmes were submitted and drive continuous improvement across the sector, providing feedback on governments' approaches to security requirements. It would seek to foster learning across energy sectors, including offshore oil and gas and nuclear.

The measures proposed in this article will encourage responsible and sustainable corporate conduct in the decommissioning of offshore renewables and will support learning from the regulatory failures witnessed in the fossil fuel and nuclear sectors of the UK and elsewhere. The growing deployment of renewables, such as offshore wind, forms a crucial part of climate action, but it is essential that due care is taken if sustainability at every stage of the lifecycle, including decommissioning, is to be ensured and public funds protected. The same old mistakes cannot continue to be made.

CRediT authorship contribution statement

Colin Mackie: Conceptualization, Investigation, Formal analysis, Writing – review & editing, Writing – original draft. **Anne P.M. Velenturf:** Investigation, Formal analysis, Funding acquisition, Project administration, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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