RETHINKING THE FUNCTION OF FINANCIAL ASSURANCE FOR END-OF-LIFE OBLIGATIONS

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SUMMARY

This Article develops a new normative account of the function of financial assurance requirements (FARs) for end-of-life obligations in the energy sector. These obligations cover restoration of the site to its original condition or to a level that could accommodate another productive use once the energy project ends. FARs necessitate that operators evidence ability to pay for this. However, many FARs are failing across the United States, Canada, and the United Kingdom, posing serious implications for public funds and the environment and resulting in significant cost savings for operators that have the potential to distort trade. The authors argue that it is time to rethink FARs' function, and that they ought to empower operators and regulators to discharge important legal responsibilities—or duties—ascribed to them prospectively. From the operator's perspective, this is a duty to perform their end-of-life obligations. In contrast, the regulator's duty is to protect the environment and human health by obtaining an appropriate guarantee from the operator that the works will be performed. The authors conclude that the empowering quality of FARs may be achieved most effectively through ensuring that fully funded capital reserves are "ring-fenced" from the claims of creditors prior to operations commencing.

When an operator does not perform their end-of-life obligations, the burden falls on other stakeholders in the energy project, such as local communities, taxpayers, and the environment. Financial assurance requirements (FARs) are a regulatory tool that exhibits potential to prevent this outcome from materializing. They necessitate that an operator (or a company affiliated with them, such as a parent company) evidences ability to pay for the future works. When FARs are implemented within a legal framework, measures commonly utilized by operators include surety bonds, letters of credit, or bank guarantees purchased from a third party provider, a parent company (corporate) guarantee, a self-bond, or cash deposit. However, certain measures are less effective than others and some are completely ineffective in the event of the operator's bankruptcy prior to the project's completion. And while FARs exist—albeit in compromised form—in many frameworks in the coal, oil and gas, and nuclear sectors, they are often conspicuously absent in frameworks governing renewable energy projects, with Canada and the United Kingdom (U.K.) providing ready examples. In this Article, we develop a theoretical framework to aid their more efficacious design.

I. Introduction

When an energy project reaches the end of its functional life, the operator[1] is often required under their permit, license, or other authorization to close the site safely and restore it to its original condition or to a level that could accommodate another productive use.[2] These "end-of-life

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1. We use the term "operator" in this Article to reflect the person—invariably a company—specified under the pertinent legal framework as responsible for undertaking these requirements. Under certain frameworks, such as those governing oil and gas operations, there may be more than one such person. And in certain sectors, such as nuclear, and oil and gas, the term "licensee" may be more accurate. Or, it may be the "grantee," "owner," "landowner," or "developer" in the context of renewable energy production. However, for ease of reference and for the sake of consistency, we use the term "operator" throughout unless the context necessitates otherwise.
2. The works to be undertaken will vary according to the type of energy project and the location of the site (e.g., onshore or offshore). They may, for example, cover backfilling, stabilizing, regrading, recontouring, and revegetating land in the case of a surface coal mine; plugging a well with cement and

obligations"[3] feature prominently in legal frameworks governing the oil and gas,[4] coal,[5] and nuclear[6] sectors of the United States, Canada, and the United Kingdom (U.K.), the jurisdictions of focus in this Article. They may also be imposed upon operators under frameworks regulating their comparatively nascent renewable sectors.[7]

End-of-life obligations may be imposed to achieve a wide variety of objectives. There may be an aesthetic goal associated with requiring their performance, in that visual impacts of the project on the landscape may be addressed (e.g., removal of turbines when generation of electricity at a wind farm ends). They may seek to avoid the sterilization of land in society, enabling the site to be returned to its previous use or employed for another productive activity. And ensuring safe maritime navigation will be key for offshore projects. However, for sites that pose a risk of pollution and/or harm to human health in the event of their improper abandonment, such as oil, gas, and coal operations, protection of the environment and the public will, perhaps, be the most important objectives.[8]

That end-of-life obligations are to be completed in the future, sometimes decades after being imposed, exposes society and the environment to the risk of the operator becoming bankrupt in the interim or simply not having the financial capacity or inclination to undertake the works when required. This is a common occurrence, as evidenced by the vast number of oil and gas wells and mines abandoned by bankrupt operators in the United States.[9] Where an operator does not fulfill their end-of-life obligations, the burden falls on other stakeholders in the energy project, such as local communities, taxpayers, and the environment.

Financial assurance requirements (FARs)[10] are a regulatory tool that exhibits potential to prevent this outcome from materializing. They necessitate that an operator (or a company affiliated with them, such as a parent company) evidences *ability* to pay for the future works.[11] When FARs are implemented within a legal framework,[12] measures commonly utilized by operators include surety bonds, letters of credit, or bank guarantees purchased from a third-party provider, a parent company (corporate) guarantee, a self-bond, or cash deposit.[13] However, as we shall see in

removing surface infrastructure in the case of oil and gas operations; dealing with wastes and reducing radioactivity at the site in the case of nuclear reactors; and dismantling and removing assets and other infrastructure, such as cabling, in the case of solar and wind farms. The remediation of environmental damage caused at the site by the energy project may also be required.

3. We use the phrase "end-of-life obligations" as an umbrella term to encompass works traditionally associated with reclamation, restoration, abandonment, and decommissioning.
4. In relation to the decommissioning of offshore oil and gas wells, platforms, and pipelines on the outer continental shelf (OCS) of the United States, see 30 C.F.R. §§250.1700-.1754 (2019). In relation to abandoning, plugging, and restoring oil and gas wells in British Columbia, Canada, see §§26 and 28 of the Drilling and Production Regulation, B.C. Reg. 282/2010. And in relation to the decommissioning of offshore oil and gas installations and pipelines on the United Kingdom (U.K.) continental shelf, see §29 of the Petroleum Act 1998.
5. In relation to mine reclamation in the U.S. coal sector, see the federal Surface Mining Control and Reclamation Act of 1977 (SMCRA) (codified as amended at 30 U.S.C. §§1201-1211, 1231-1328). And in Alberta's coal mining sector, operators of a coal mine are subject to a duty to reclaim the land under §137(1) of the Environmental Protection and Enhancement Act, R.S.A. 2000, c E-12.
6. In relation to the decommissioning of nuclear power plants in the United States, see 10 C.F.R. §50.75 (2014). For their decommissioning in Canada, see the Nuclear Safety and Control Act, S.C 1997, c 9. And for the decommissioning of nuclear installations in the U.K., see the Energy Act 2008, c 32, §45.
7. For instance, decommissioning requirements for renewable energy activities in U.S. federal waters are regulated by the Bureau of Ocean Energy Management (BOEM) under 30 C.F.R. Part 585. Rehabilitation requirements for renewable energy activities on U.S. federal land, such as wind and solar projects, are regulated by the Bureau of Land Management under §504(d) of the Federal Land Policy and Management Act of 1976 and 43 C.F.R. §2805.12 (2019). In Canada, certain onshore wind projects in Ontario are subject to the Renewable Energy Approvals Regulation, O. Reg. 359/09, which sets out decommissioning requirements. In Nova Scotia, decommissioning and site rehabilitation requirements for marine renewable energy projects are set out in §44 of the Marine Renewable-energy Act, S.N.S. 2015, c 32, amended by S.N.S. 2017, c 12; 2019, c 34. And in the U.K., under §105(2) of the Energy Act 2004, c 20, the Secretary of State for Business, Energy, and Industrial Strategy has the *discretionary* power to require the responsible person to submit a program for decommissioning offshore renewable energy installations (OREIs) and their associated infrastructure. The decommissioning of onshore renewable energy projects in the U.K., such as wind and solar farms, is left to the discretion of local planning authorities to address through the imposition of conditions attached to the planning consent (e.g., the installation is to be removed when no longer in operation and the land restored to its previous use). Ministry of Housing, Communities, and Local Government, *Guidance: Renewable and Low Carbon Energy* (2015), https://www.gov.uk/guidance/renewable-and-low-carbon-energy (paras. 13 (solar farms) and 24 (wind farms)).
8. For instance, in Canada, the Alberta Energy Regulator, the body responsible for the regulation of reclamation and remediation activities resulting from oil, gas, and coal operations in the province, asserts that "[l]icensees are required to ensure that wells will not pose any risk to the environment or the public once abandoned." Alberta Energy Regulator (AER), Closure—Abandonment, Reclamation, and Remediation: Fact Sheet 1 (2014), https://www.aer.ca/documents/enerfaqs/Closure_FS.pdf.
9. David A. Dana & Hannah J. Wiseman, *A Market Approach to Regulating the Energy Revolution: Assurance Bonds, Insurance, and the Certain and Uncertain Risks of Hydraulic Fracturing*, 99 Iowa L. Rev. 1523, 1561 (2014). For instance, the authors note that in the United States, as of 2014, there were an estimated 190,000 abandoned underground petroleum tanks; 57,000 "orphan" unplugged oil or gas wells; and 557,000 abandoned mine sites. *Id*.
10. The terms "financial security," "security deposit," "financial provision," "financial guarantee," "financial responsibility," and "bonding requirements" are also used in legal frameworks and the academic literature. While the term "financial assurance" is used throughout this Article, these terms may be viewed as interchangeable.
11. James Boyd, Financial Responsibility for Environmental Obligations: Are Bonding and Assurance Rules Fulfilling Their Promise? 1 (Resources for the Future, Discussion Paper No. 01-42, 2001), https://media.rff.org/documents/RFF-DP-01-42.pdf.
12. The legal framework itself may prescribe how ability to pay is to be demonstrated, specifying measures deemed acceptable to satisfy the FARs. This is the case in relation to the acceptable means of satisfying FARs in relation to the decommissioning of nuclear power plants in the United States. *See* 10 C.F.R. §50.75 (2014). Alternatively, FARs may be stated briefly in the legislation but fleshed out in a supplementary guidance document where the expectations of the regulator may be set out in greater depth. For example, this is the position under the legal framework governing the production of nuclear energy in Canada under §24(5) of the Nuclear Safety and Control Act, S.C. 1997, c 9 ("A licence may contain any term or condition that the Commission considers necessary for the purposes of this Act, including a condition that the applicant provide a financial guarantee in a form that is acceptable to the Commission.") The document, Canadian Nuclear Safety Commission (CNSC), Regdoc-3.3.1, Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities (2019), http://nuclearsafety.gc.ca/eng/acts-and-regulations/consultation/comment/regdoc3-3-1.cfm, sets out requirements and guidance for applicants and licensees regarding the establishment and maintenance of financial guarantees. However, often the supplementary guidance document is not drafted in prescriptive terms, with discretion being conferred to the operator as to how to comply with the FARs.
13. See the case studies in Section II.A for further detail on the types of financial assurance measures permitted under FARs in the United States, Canada, and the U.K. While insurance will have a limited role to play in relation to

Part II, certain measures are less effective than others and some are "completely ineffective" in the event of the operator's bankruptcy prior to the project's completion.[14] And while FARs exist in many frameworks in the coal, oil and gas, and nuclear sectors,[15] they are often conspicuously absent in frameworks governing renewable energy projects, with Canada and the U.K. providing ready examples.[16]

Ultimately, absent or inefficacious FARs may result in the regulator being forced to make an unenviable decision in the event of an operator's bankruptcy or unwillingness to undertake their end-of-life obligations. In the absence of (sufficient) assurance, the regulator has two options: undertake the works itself using public funds, or concede that they cannot be completed promptly (or at all) at public cost due to budgetary limitations.[17] While the former has serious implications for public revenue, the latter may create severe, localized social and environmental impacts. These have been experienced in communities and environments located close to coal mining operations.[18]

Though of crucial social and environmental importance, these are not the focus of this Article. The legal problem that we address in this Article concerns a *wider* effect of absent or inefficacious FARs, specifically the potential for distortion in trade. This is created by the cost savings they afford to individual operators and, indeed, entire subsectors. We characterize this as a form of state subsidization.

The cost savings can be direct and/or indirect. A direct saving arises where an operator (or operators generally within a subsector) need not incur a cost associated with evidencing assurance (e.g., they are not required to purchase a bond or guarantee from a third party or make a cash deposit with the regulator). Indirect savings are created where an operator is able to abandon all or part of their end-of-life obligations upon bankruptcy or following the regulator's acceptance of an operator's failure to close the site as required.[19] This "externalization" of costs may, for instance, have resulted from the regulator's tolerance of a "high risk" measure, such as self-bonding. This measure relies on the operator's (or its parent company's) financial strength as evidence of ability to pay and does not require assets to be set aside to fund the works, making it prone to outright failure in the event of bankruptcy.[20] As Jason Malone and Tim Winslow observe, "[w]hen an operator self-bonds and files for bankruptcy, there is often little to zero funds for reclamation."[21] While the risk is well recognized, a number of regimes still permit its use.[22]

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end-of-life obligations due to their known, foreseen nature, it could cover risks associated with environmental damage caused by the activity that is discovered upon the site's closure. The remediation of such damage may be part of the end-of-life obligations associated with the site.

14. Jason Malone & Tim Winslow, *Financial Assurance: Environmental Protection as a Cost of Doing Business*, 93 N.D. L. Rev. 1, 3 (2018).
15. For instance, in the United States, SMCRA established a nationwide bonding scheme for the surface coal mining sector. 30 U.S.C. §§1259, 1269; 30 C.F.R. §§800.11-.70 (2014). The Nuclear Regulatory Commission (NRC) requires nuclear power plant operators to provide financial assurance for plant decommissioning. 10 C.F.R. §50.75 (2014). BOEM has bonding requirements for the lessee of an OCS oil and gas or sulfur lease. 30 C.F.R. §556, subpt. I (2019). In Canada, §24(5) of the Nuclear Safety and Control Act, S.C. 1997, c 9, authorizes the Canadian Nuclear Safety Commission (CNSC) to include a condition in a license that the applicant provide a financial guarantee in a form that is acceptable to the Commission where this is necessary for the purposes of the Act. In the oil and gas sector of British Columbia, under §30(1) of the Oil and Gas Activities Act, S.B.C. 2008, c 36, the Oil and Gas Commission may require a holder or applicant to provide security in the amount the Commission requires to ensure the performance of an obligation under the Act, a permit, or an authorization. In Alberta's coal mining sector, §84(1) of the Environmental Protection and Enhancement Act, R.S.A. 2000, c E-12, enables the regulator to require that the responsible person provides "financial or other security and carry insurance" with respect to their obligations.
16. In Alberta, the Conservation and Reclamation Directive for Renewable Energy Operations, Sept. 14, 2018, which sets out decommissioning requirements applicable to renewable energy projects, does not impose FARs with respect to those projects. In Nova Scotia, 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 FARs with respect to decommissioning, abandonment, and rehabilitation under that Act nor under the Marine Renewable-Energy General Regulations, N.S. Reg. 8/2018. In Ontario, the Renewable Energy Approvals Regulation, O. Reg. 359/09, which governs certain onshore wind projects, does not impose FARs with respect to the decommissioning of wind turbines. However, under §132(1) of the Environmental Protection Act, R.S.O. 1990, c E.19, the Ministry of the Environment, Conservation, and Parks has a discretionary power to include in an approval or order with respect to works related to a project a requirement that the person to whom the approval is issued or the order is directed provide financial assurance. And there appear to be no requirements for provision of financial assurance for the decommissioning of renewable energy projects in British Columbia.

    In the U.K. renewable energy sector, the Secretary of State for Business, Energy, and Industrial Strategy possesses a *discretionary* power under the Energy Act 2004, c 20, to require that owners/developers provide financial assurance for the decommissioning of OREIs, *see* §§105(2) and 106(4). Moreover, there are no statutory FARs for the decommissioning of onshore renewable energy projects in the U.K., such as wind and solar farms. Local planning authorities could, it seems, require that financial assurance be made for their decommissioning through the imposition of planning conditions under the planning consent. Ministry of Housing, Communities, and Local Government, *supra* note 7. FARs could also form part of the lease agreement for the site between the developer and the landowner, but this would be determined through the private agreement of the parties and the pertinent details are unlikely to enter the public domain.
17. An exception here would be where an industry fund existed, such as the Orphan Fund in Alberta, *see* Section II.A.2. This provides a source of private-sector funding for the costs associated with the end-of-life obligations of bankrupt licensees of conventional oil and gas wells. The Orphan Fund is financed through levies on operators in the sector, but with increasing reliance on loans from the Government of Alberta to aid its work, *see infra* note 93.
18. For instance, Joshua Macey and Jackson Salovaara observe that "the communities affected by coal companies' bankruptcies bear these costs in the form of worse health, poor financial security, and diminished land and water quality." Joshua Macey & Jackson Salovaara, *Bankruptcy as Bailout: Coal Company Insolvency and the Erosion of Federal Law*, 71 Stan. L. Rev. 879, 904 (2019).
19. There are many examples of bankruptcy law being utilized strategically to avoid the equivalent of millions of dollars, sometimes hundreds of millions, worth of end-of-life obligations secured by inefficacious FARs. It is estimated that four of the largest U.S. coal producers have used Chapter 11 to avoid around $1.9 billion in abandonment obligations since 2012. *Id.* at 883. This figure does not include the "potentially billions of dollars" in environmental liabilities unrelated to SMCRA. *Id.* n.12.
20. Colin Mackie & Valerie Fogleman, *Self-Insuring Environmental Liabilities: A Residual Risk-Bearer's Perspective*, 16 J. Corp. L. Stud. 293, 296 (2016). See Section II.B, for a more detailed critique of self-bonding.
21. Malone & Winslow, *supra* note 14, at 4. The authors assert that self-bonding, therefore, "pose[s] a systemic risk to the environment and taxpayers."
22. For instance, NRC permits licensees of nuclear power reactors to self-bond with respect to the costs associated with plant decommissioning. 10 C.F.R. §50.75(e)(1)(iii)(C) (2014). A parent company (third-party) guarantee is permitted by BOEM's bonding requirements for the lessee of an OCS oil and gas or sulfur lease. 30 C.F.R. §556.905 (2019). And under SMCRA, operators that are in adequate financial health can self-bond in the coal mining sector. 30 C.F.R. §800.23 (2019). As to the prevalence of their acceptance in the U.K., see Mackie & Fogleman, *supra* note 20, at 298.

That absent or inefficacious FARs can mimic state subsidization of operators' end-of-life obligations connects an issue that many classify as purely environmental to the larger economic and political conversation around fairness in trade. Stringent FARs, conceived of as a distinct type of environmental regulation, have the potential to harm the economic competitiveness of a jurisdiction.[23] Other things being equal, operators trading from jurisdictions with stringent FARs will be at a competitive disadvantage to those trading from jurisdictions with lax (or no) FARs owing to the higher compliance costs of the former.[24] This raises the concern that jurisdictions may have incentives to rely on absent or inefficacious FARs to render their operators more competitive in the market. It is not just unequal global competition that is fostered by absent or inefficacious FARs, but also unequal domestic competition.[25] A jurisdiction is also unlikely to give up its competitive position voluntarily by strengthening its FARs if there is a risk that others will not.[26]

An established means of addressing this type of trade-related issue is to allocate the pertinent costs to operators under the legal framework, then require their internalization in line with a "polluter pays" approach. The polluter-pays principle, originated by the Organisation for Economic Co-operation and Development (OECD) in 1972, was the approach recommended to Member countries to deal with the potential for distortions of trade engendered by state subsidization of pollution prevention and control measures imposed by public authorities.[27] It was built upon the economic idea that this could be prevented by ensuring that the costs associated with these measures were "reflected in the cost" of goods and services that cause pollution in production and/or consumption (i.e., internalized).[28]

Within this particular context, the normative value and appeal of such a principle is, perhaps, strongest in the European Union (EU), where it has become a central pillar in helping to facilitate the internal market through the EU's rules governing state aid for environmental protection.[29] It has also emerged as a key legal norm for driving and shaping the EU's wider environmental law and policy.[30] Nevertheless, for reasons outlined below, we find it to provide limited normative steer to address the state subsidization identified in this Article.

There is a large literature on FARs for *unforeseen* environmental obligations, such as cleanup and remediation requirements arising following an oil spill or an industrial accident. More specifically, the capacity of FARs to improve the prospect of operators bearing the costs associated with such environmental obligations and the shortcomings of many of the measures used to evidence ability to pay have been considered.[31] And the capacity for measures, such as insurance, to generate incentives for operators to move toward safer environmental practices has been explored.[32]

However, the deceptively simple, but more challenging, question regarding the evaluative standard(s) against which the function of FARs for end-of-life obligations ought to be judged has received little direct and sustained scholarly consideration.[33] Where this has been considered, it is often asserted that their function is to require operators to "internalize" the costs of these future environmental obligations,[34] aligning with the logic commonly associated with the polluter-pays principle.[35] Even where more conceptual ideas are touched upon, this is often as a brief aside to the primary discussion of FARs for cleanup and remediation.[36]

The aim of this Article is to derive a normative account of the function of FARs for end-of-life obligations that could inform the design of more efficacious FARs. These will help to address the problem of indirect state subsidization described above. We explore three central questions. First, does the economic idea of cost internalization inherent in many "polluter pays"-based approaches to the design of environmental law and policy provide a complete and defensible account of the function of FARs (the *polluter-pays* question)? Second, in what ways could ideas of legal responsibility, specifically *prospective/role-responsibility*, improve that account (the *responsibility* question)? Third, how could these economic and legal ideas be

23. Richard B. Stewart, *Environmental Regulation and International Competitiveness*, 102 Yale L.J. 2039, 2041 (1993); Kenneth S. Komoroski, *The Failure of Governments to Regulate Industry: A Subsidy Under the GATT?*, 10 Hous. J. Int'l L. 189, 204 (1988).
24. Stewart, *supra* note 23, at 2044. The reverse will also be true. *Id*. at 2056.
25. Colin Mackie & Malcolm Combe, *Charges on Land for Environmental Liabilities: A Matter of "Priority" for Scotland*, 31 J. Envtl. L. 83, 102 (2019).
26. Stewart, *supra* note 23, at 2045 ("Nations that have adopted less stringent standards presumably wish to retain whatever economic benefits, including competitive advantages, that such standards confers.").
27. OECD, C(72)128, Council Recommendation on Guiding Principles Concerning the International Economic Aspects of Environmental Policies (1972) [hereinafter OECD 1972 Recommendation].
28. *Id*. para. 2.
29. Marcin Stoczkiewicz, *The Polluter-Pays Principle and State Aid for Environmental Protection*, 6 J. Eur. Envtl. & Plan. L. 171, 171 (2009).
30. Nicolas de Sadeleer, EU Environmental Law and the Internal Market 57, 461 (2014) ("The polluter pays principle has gradually commanded recognition as one of the pillars of the EU's environmental policy.").
31. *See*, *e.g.*, James Boyd, Financial Assurance Rules and Natural Resource Damage Liability: A Working Marriage? (Resources for the Future, Discussion Paper No. 01-11, 2001), https://media.rff.org/archive/files/sharepoint/WorkImages/Download/RFF-DP-01-11.pdf; Boyd, Financial Responsibility, *supra* note 11; Hubert Bocken, *Financial Guarantees in the Environmental Liability Directive: Next Time Better*, 15 Eur. Envtl. L. Rev. 1, 13 (2006); Michel G. Faure, *Environmental Liability*, *in* Tort Law and Economics 247-86 (Michael Faure ed., Edward Elgar Publishing 2009); Michael G. Faure, *Regulatory Strategies in Environmental Liability*, *in* The Regulatory Function of European Private Law 129-87 (Fabrizio Cafaggi & Horatio Muir Watt eds., Edward Elgar Publishing 2011); Lucas Bergkamp et al., *Financial Security and Insurance*, *in* The EU Environmental Liability Directive: A Commentary 118-38 (Lucas Bergkamp & Barbara J. Goldsmith eds., Oxford Univ. Press 2013).
32. *See*, *e.g.*, Kenneth S. Abraham, *Environmental Liability and the Limits of Insurance*, 88 Colum. L. Rev. 942 (1988); Omri Ben-Shahar & Kyle D. Logue, *Outsourcing Regulation: How Insurance Reduces Moral Hazard*, 111 Mich. L. Rev. 197 (2012); Colin Mackie, *The Regulatory Potential of Financial Security to Reduce Environmental Risk*, 26 J. Envtl. L. 189 (2014); Zachary C.M. Arnold, *Preventing Industrial Disasters in a Time of Climate Change: A Call for Financial Assurance Mandates*, 41 Harv. Envtl. L. Rev. 243 (2017).
33. For the literature that has considered this, see Section III.B and Part V.
34. Boyd, Financial Assurance Rules, *supra* note 31, at 5; Boyd, Financial Responsibility, *supra* note 11, at 29.
35. Boris N. Mamlyuk, *Analyzing the Polluter Pays Principle Through Law and Economics*, 18 Se. Envtl. L.J. 39, 49 (2009) ("The polluter pays principle rests on the theory of cost internalization.").
36. *See*, *e.g.*, Boyd, Financial Assurance Rules, *supra* note 31.

brought together to inform the design of efficacious FARs (the *design* question)?

Our focus is upon the energy sectors of the United States, Canada, and the U.K. owing to the similarity of issues raised by their FARs and the ready availability of data pertaining to their utilization. However, other jurisdictions and other sectors with absent or inefficacious FARs, such as hard-rock mining[37] and carbon capture and sequestration (CCS),[38] may also benefit from our findings.

The Article is structured as follows. Part II presents the trade-distorting effect that absent or inefficacious FARs for end-of-life obligations can have, an issue that has not previously been identified in the literature. Part III examines the *polluter-pays* question. We argue that while the OECD's conception of that principle emphasizes that important trade-related objectives may be achieved through cost internalization, on its own, it provides an incomplete account of the function of FARs for end-of-life obligations. There is substantial conceptual uncertainty as to precisely what the economic idea of cost internalization means for, and requires from, operators in strict *legal* terms. Moreover, the fact that certain costs have been reflected in the costs of producing the energy or extracting the raw sources of energy (i.e., internalized by the operator) does not mean that the funds needed to complete the works are secure or sufficient in the event of the operator's (or their parent's) bankruptcy. This is essential if FARs are to prove a useful regulatory tool. Something more than this "bare" form of cost internalization is needed from FARs.

Part IV examines the *responsibility* question. We argue that the *first-order* function of FARs ought to be to empower operators and regulators to discharge the prospective responsibilities ascribed to each of them. From the operator's perspective, this is their duty under the public law to *perform* their end-of-life obligations. From the regulator's perspective, this is to *ensure* that this occurs. This may be traced to a duty, prevalent in frameworks across the energy sector, ascribed to regulators to protect the environment and human health in exercising their powers. The regulator may discharge their duty through obtaining an *appropriate* guarantee from the operator that performance will occur.

The empowering quality of FARs is, we argue, achieved most effectively through ensuring fully funded capital reserves are "ring-fenced" from the claims of an operator's creditors prior to operations commencing. This forced segregation of funds emphasizes our *second-order* function of FARs: the facilitation of more productive cost internalization. This may generate more rational decisionmaking by operators and address distortions in trade. We present our account and show how it could inform the *design* of FARs in Part V. Part VI draws conclusions.

II. The Implications of Absent or Inefficacious FARs

This part illustrates the trade-distorting effect of absent or inefficacious FARs for end-of-life obligations in the energy sectors of North America and the U.K. We should be clear from the outset that this effect is not peculiar to the energy sector. It may be generated in other sectors, such as metal mining[39] and CCS.[40] However, we believe that the pressure levied on FARs for end-of-life obligations as a result of the scale and increasing pervasiveness of bankruptcies across the energy sector provides the impetus and rationale for using that sector as a discrete case study of sorts to (re)consider their regulatory function.[41] There is also the concern that the indirect state subsidization of operators in the fossil fuel sector hampers transition to cleaner forms of energy,[42] such as wind, tidal, and solar. Equally, indirect state subsidization of environmental obligations in the renewable sector masks the true social cost of the energy that it produces. Thus, it is important to draw these issues into sharp focus to aid open discussion and reflection upon how they can be addressed.

In recent years, bankruptcies of North American and U.K. energy companies have been prevalent. There have

37. In March 2020, the U.S. Government Accountability Office (GAO) reported that in the United States, "[f]ederal agencies spent, on average, about $287 million annually identifying, cleaning up, and monitoring abandoned hardrock mines, for a total of about $2.9 billion, from fiscal years 2008 through 2017" and "[o]f the $2.9 billion in total federal expenditures, approximately $1 billion was reimbursed by responsible parties," meaning that around $1.9 billion was borne by taxpayers in that period. GAO, GAO-20-238, Abandoned Hardrock Mines: Information on Number of Mines, Expenditures, and Factors That Limit Efforts to Address Hazards 22 (2020), https://www.gao.gov/assets/710/705146.pdf.

38. Paul Bailey et al. observe that "financial resources sufficient to cover long-term liabilities must be available over an indefinite time-frame in order to (1) fulfill CCS's purpose—permanent storage of CO_2 [carbon dioxide]—which may require indefinite stewardship of CCS sites and (2) ensure that human health and the environment are not negatively impacted." Paul Bailey et al., *Can Governments Ensure Adherence to the Polluter Pays Principle in the Long-Term CCS Liability Context?*, 12 Sustainable Dev. L. & Pol'y 46, 47 (2012). This would encompass long-term stewardship obligations, including performance of water quality monitoring responsibilities. *Id*. Efficacious FARs are, of course, one means of ensuring that these stewardship responsibilities are performed at the private cost of the operator.

39. For instance, in Ontario, a nickel mining company, Vale Canada Ltd., covers $547,167,674 of reclamation liabilities pertaining to seven of its mines through satisfying a financial test (i.e., self-bonding), including $330,371,149 of such liabilities at a single mine (as of December 31, 2019). Ontario Ministry of Energy, Northern Development, and Mines, *Financial Assurance Table*, https://www.mndm.gov.on.ca/en/news/mines-and-minerals/financial-assurance-table (last posted Jan. 21, 2020). As of December 31, 2019, no other mining company operating in the province uses the financial test to evidence assurance for its mines. Vale Canada Ltd.'s self-bonded figure of $547,167,674 equates to 28.6% of all financial assurance held by the regulator with respect to mine reclamation in the province. *Id*. The commercial advantage conferred upon Vale Canada Ltd. through this ability to self-bond, to the exclusion of other mining companies in the province, will be significant.

40. Bailey et al., *supra* note 38, at 47 ("Many governments across the globe have adopted regulatory frameworks that subsidize the long-term liability costs associated with CCS. Government subsidization of long-term CCS liabilities transfers a portion of the responsibility to pay for CO_2 pollution away from the CO_2 storage facility owner/operator and onto the public.").

41. These bankruptcies will have cross-border effects where the organization has operations in different countries. For instance, the entry of the Dublin-based tidal energy company, OpenHydro, into bankruptcy proceedings resulted in its Canadian subsidiary, OpenHydro Technologies Canada, filing for bankruptcy protection in July 2019. A valuable asset belonging to the latter was a large tidal turbine installed in the Minas Passage in Nova Scotia, *see* Aaron Beswick, *Legal Fight Over Open Hydro Continues*, Chron. Herald, July 11, 2019, https://www.thechronicleherald.ca/business/local-business/legal-fight-over-open-hydro-continues-331863/.

42. Hyung-Jin Kim, *Subsidy, Polluter Pays Principle, and Financial Assistance Among Countries*, 34 J. World Trade 115, 125 (2000).

been increasing numbers of casualties in the fossil fuel sector owing to cheap natural gas and the falling cost of renewable energy, such as solar power and wind.[43] In the U.S. coal mining sector, Foresight Energy LP filed for bankruptcy in March 2020, adding to the wave of bankruptcies in recent years.[44] Alberta-based Grande Cache Coal entered into bankruptcy proceedings in early 2017.[45] Scottish Coal, formerly the U.K.'s largest coal mining company, entered into liquidation in 2013.[46]

In the North American oil and gas sector, between the first quarter of 2015 and the first quarter of 2020, there were 215 filings for bankruptcy by oil and gas producers.[47] The three largest contributing jurisdictions were Texas (98), Delaware (33), and Canada (18).[48] The position is worsening: 24 oil and gas producers filed for bankruptcy in 2017, 28 in 2018, and 42 in 2019.[49] This upward trend is predicted to continue.[50] The North Sea experienced a proportionally high share of insolvencies, with an "all-time high" of 16 U.K. oil and gas businesses going insolvent in 2016, with that number expected to rise.[51] In early 2020, the U.K. oil and gas sector was deemed to be in a "paper-thin" position.[52]

The trend is not peculiar to the fossil fuel sector. Westinghouse Electric Co., which led development of nuclear energy in the United States, filed for bankruptcy protection in April 2017 with debts of $9.8 billion.[53] This had a "disastrous impact" on its Japanese parent company, Toshiba, which is also a major global player in the sector.[54] FirstEnergy Solutions Corp., its subsidiaries, and FirstEnergy Nuclear Operating Co. filed for bankruptcy protection in March 2018.[55] Further bankruptcies in the nuclear sector have been predicted.[56] We have also witnessed the bankruptcy of renewable energy giants, such as Sun Edison Inc.,[57] in recent years. In the U.K., there have been bankruptcies in the wave energy sector. In late 2014, a sector leader, Pelamis Wave Power,[58] entered bankruptcy proceedings and in October 2015, Aquamarine Power Ltd. followed suit.[59]

A. *FARs in the Energy Sector: Case Studies From the United States, Canada, and the U.K.*

This section examines FARs from the energy sectors of the United States, Canada, and the U.K. These pertain to the decommissioning of nuclear power reactors (United States), the abandonment of conventional oil and gas wells (Alberta, Canada), and the decommissioning of offshore renewable energy installations (England and Wales). We selected these particular frameworks for analysis as they exhibit the types of inefficacies common to many FARs applicable across the energy sectors of the United States, Canada, and the U.K. They include tolerance of "high risk" measures and approaches, questionable assumptions regarding the amount of assurance to be provided, only requiring assurance when an operator's financial strength has deteriorated, and conferring discretion upon a regulator to determine whether, in fact, assurance is to be provided at all by an operator. Neatly illustrating concrete examples of inefficacies, these case studies provide both crucial context with respect to regulatory practice across different subsectors and useful empirical evidence to ground our analysis.

1. Decommissioning Nuclear Power Reactors in the United States

This subsection examines FARs pertaining to the decommissioning of nuclear power reactors in the United States. The Nuclear Regulatory Commission (NRC) is the federal agency responsible for "protecting the health and safety of the public and the environment" through its licensing and regulation of civilian uses of specified radioactive material.[60] It regulates provision of financial assurance for the decommissioning of nuclear power reactors under 10 C.F.R. Part 50. The costs associated with decommissioning can be vast. While the total cost of decommissioning a reactor facility depends upon a wide variety of factors

43. Cecilia Jamasmie, *Foresight Energy Joins Ranks of Bankrupt U.S. Coal Companies*, Inst. for Energy Econ. & Fin. Analysis, Mar. 11, 2020, https://ieefa.org/foresight-energy-joins-ranks-of-bankrupt-u-s-coal-companies/.
44. Steven Church et al., *Foresight Energy Is Latest U.S. Coal Miner in Bankruptcy*, Bloomberg, Mar. 10, 2020, https://www.bloomberg.com/news/articles/2020-03-10/foresight-energy-is-latest-u-s-coal-miner-on-bankruptcy-heap.
45. Reid Southwick, *Grande Cache Coal Bankrupt as Town Deals With Declining Population*, Calgary Herald, Feb. 6, 2017, https://calgaryherald.com/business/local-business/grande-cache-coal-bankrupt-as-town-deals-with-declining-population/.
46. Erikka Askeland, *Last Scottish-Owned Coal-Mining Company Folds*, Scotsman, Apr. 20, 2013, https://www.scotsman.com/news-2-15012/last-scottish-owned-coal-mining-company-folds-1-2903162.
47. Haynes and Boone LLP, Oil Patch Bankruptcy Monitor 13 (2020), https://www.haynesboone.com/-/media/files/energy_bankruptcy_reports/oil_patch_bankruptcy_monitor.ashx?la=en&hash=D2114D98614039A2D2D5A43A61146B13387AA3AE.
48. *Id*. at 5.
49. *Id*. at 10-12.
50. *Id*. at 2.
51. Stephen Naysmith, *Fears More Firms Could Go Bust Before Oil Industry Can Recover*, Herald, Jan. 2, 2017, https://www.heraldscotland.com/news/14998312.fears-more-firms-could-go-bust-before-oil-industry-can-recover/.
52. OGUK, Business Outlook 2020: Markets & Investment 3 (2020), https://oilandgasuk.co.uk/wp-content/uploads/2020/03/OGUK-Business-Outlook-2020-Markets-Investments.pdf.
53. Diane Cardwell & Jonathan Soble, *Westinghouse Files for Bankruptcy, in Blow to Nuclear Power*, N.Y. Times, Mar. 29, 2017, https://www.nytimes.com/2017/03/29/business/westinghouse-toshiba-nuclear-bankruptcy.html.
54. Mycle Schneider & Antony Froggatt, The World Nuclear Industry Status Report 2019 (2019), https://www.worldnuclearreport.org/The-World-Nuclear-Industry-Status-Report-2019-HTML.html.
55. Press Release, FirstEnergy, FirstEnergy Announces Agreement in Principle With Creditors in FirstEnergy Solutions' Chapter 11 Proceedings (Apr. 23, 2018), https://www.firstenergycorp.com/newsroom/news_articles/firstenergy-announces-agreement-in-principle-with-creditors-in-f.html.
56. Fred Pearce, *Industry Meltdown: Is the Era of Nuclear Power Coming to an End?*, YaleEnvironment360, May 15, 2017, https://e360.yale.edu/features/industry-meltdown-is-era-of-nuclear-power-coming-to-an-end.
57. Peg Brickley & Liz Hoffman, *SunEdison Files for Chapter 11 Bankruptcy Protection*, Wall St. J., Apr. 21, 2016, https://www.wsj.com/articles/sunedison-files-for-chapter-11-bankruptcy-protection-1461247026.
58. Victoria Weldon, *Jobs Threat as Cash Troubles Sink Wave Firm*, Herald, Nov. 21, 2014, https://www.heraldscotland.com/news/13190634.jobs-threat-as-cash-troubles-sink-wave-firm/.
59. *Aquamarine Power Calls in Administrators*, BBC, Oct. 28, 2015, https://www.bbc.co.uk/news/uk-scotland-scotland-business-34659324.
60. NRC, *Regulation of Radioactive Materials*, https://www.nrc.gov/about-nrc/radiation/protects-you/reg-matls.html (last updated Sept. 22, 2017).

(e.g., type of reactor and its location), it is estimated to cost between $280 million and $612 million.[61] Three facilities in the United States are estimated to cost in excess of $1 billion to decommission.[62]

Under §50.75(b), each applicant for, or holder of, an operating license must submit a decommissioning report certifying that financial assurance for decommissioning will be provided in an amount derived from one of two methods. First, the amount may be calculated using a funding formula, with the sum not being less than NRC-specified minimum levels.[63] This amount is not site-specific and so is not intended to reflect the actual cost of decommissioning the facility. Second, the licensee may choose to provide an amount of assurance based on a cost estimate for decommissioning the facility.[64] That sum *is* site-specific and usually results in a larger amount of assurance being required.[65] It is the least popular of the two methods by some margin.[66] Whichever method is chosen, the amount of assurance to be provided must be recalculated annually using an adjustment factor.[67] A licensee is also required to report to NRC, at least every two years, on the status of its decommissioning funding.[68]

The purpose of the FAR is to indicate to NRC *how* a licensee will provide "*reasonable* assurance that funds will be available for the decommissioning process."[69] A wide array of acceptable mechanisms for providing assurance are specified in §50.75(e). First, a full "prepayment" of cash or liquid assets into a segregated account prior to the start of operations or transfer of the license.[70] Second, a segregated fund established and maintained by setting aside funds periodically (an "external sinking fund").[71] Third, a surety method (such as a surety bond or letter of credit), insurance, or "other guarantee method" that meets specified requirements.[72] The "other guarantee method" includes a parent company guarantee or self-bond where a specified financial test may be satisfied.[73] Fourth, the contractual obligations of a licensee's customer(s) may be used to evidence assurance where these are sufficient to cover the decommissioning costs.[74] Finally, there is broad, catch-all, "[a]ny other mechanism" acceptable to NRC category, whose regulatory tolerability is based on an assessment of the "specific circumstances" of the licensee.[75] The mechanism must, however, provide funding "equivalent" to the listed mechanisms.[76] NRC permits mechanisms to be used in combination.[77]

These FARs create some significant risks for the public and the environment. First, the policy driving utilization of the funding formula generates the real risk of an assurance shortfall. The table of minimum amounts in §50.75(c) was established in 1988 "as a means to ensure that the *bulk* of funds needed for decommissioning would be available."[78] As a preliminary point, NRC did not define the term "bulk," making it impossible to determine whether the formula is performing as intended.[79] More significantly, the inference to be taken from NRC's use of that term, defined in the *Oxford English Dictionary* as the "[g]reater part, or, in relation to number, the *majority*,"[80] is that it was acknowledged and accepted that an unspecified portion of the funds needed for decommissioning would *not* be covered by assurance. When considering that it will often cost in excess of $500 million to decommission a facility, this raises the prospect for what, in pecuniary terms, may be deemed a large deficit in decommissioning funding, which the licensee may not be in a financial position to remedy.

Second, and relatedly, the U.S. Government Accountability Office (GAO) has concluded, somewhat alarmingly, that the funding formula "may not reliably estimate adequate decommissioning costs."[81] Writing in 2012, GAO was concerned by the fact that NRC could not reliably explain its rationale for the cost elements that supported the formula and formula-generated cost estimates, and that it had not performed a risk analysis on the formula.[82] GAO discovered a "wide range of differences" between amounts derived through the formula and site-specific cost estimates (SSCEs).[83] This is concerning because, as of December 31, 2016, the licensees of 96% of plants have utilized the funding formula to derive the amount of assurance to be provided.[84] Only four of the 100 plants listed in the *2017 Decommissioning Funding Status Report* had presented an SSCE.[85] SSCEs had some of the largest figures on the list by some margin, with two of the facilities estimated

61. NRC, *Financial Assurance for Decommissioning*, https://www.nrc.gov/waste/decommissioning/finan-assur.html (last updated July 25, 2019).
62. NRC, 2017 Decommissioning Funding Status Report for Operating Power Reactor Licensees (2016), https://www.nrc.gov/docs/ML1809/ML18096B543.pdf.
63. 10 C.F.R. §50.75(b)(1) (2014). The minimum levels are specified in §50.75(c).
64. *Id.* §50.75(b)(4).
65. GAO, GAO-12-258, Nuclear Regulation: NRC's Oversight of Nuclear Power Reactors' Decommissioning Funds Could Be Further Strengthened 13 (2012), https://www.gao.gov/assets/590/589923.pdf ("NRC expects that its formula estimate may be less than licensees' site-specific cost estimates.").
66. As of December 31, 2016, the licensees of 96% of plants utilized the NRC minimum as the amount of assurance to be provided. NRC, 2017 Decommissioning Funding Status Report, *supra* note 62.
67. 10 C.F.R. §50.75(b)(2) (2020).
68. *Id.* §50.75(f)(1), (2).
69. *Id.* §50.75(a) (emphasis added).
70. *Id.* §50.75(e)(1)(i). The deposit must be sufficient to pay decommissioning costs by the time permanent termination of operations is expected. *Id.*
71. *Id.* §50.75(e)(1)(ii).
72. *Id.* §50.75(e)(1)(iii).
73. *Id.* §50.75(e)(1)(iii)(B), (C). However, a self-bond may not be used where the applicant or licensee has a parent company holding majority control rights in its voting stock. *Id.*
74. *Id.* §50.75(e)(1)(v). All proceeds from the contracts are to be deposited in the external sinking fund. *Id.*
75. *Id.* §50.75(e)(1)(vi).
76. *Id.*
77. *Id.*
78. NRC, Regulatory Improvements for Power Reactors Transitioning to Decommissioning: Regulatory Basis Document F-2 (2017) (RIN No. 3150-AJ59; NRC Docket ID NRC-2015-0070) (emphasis added), https://www.nrc.gov/docs/ML1721/ML17215A010.pdf.
79. GAO, *supra* note 65, at 13.
80. "bulk, n.1". OED Online (Oxford Univ. Press, Mar. 2020) (emphasis added), https://www.oed.com/view/Entry/24472?rskey=aXgtpy&result=1 (last visited Mar. 31, 2020).
81. GAO, *supra* note 65, at 13.
82. *Id.* at 15.
83. *Id.* at 14.
84. NRC, 2017 Decommissioning Funding Status Report, *supra* note 62.
85. *Id.*

to cost more than $1 billion to decommission.[86] Thus, the true cost to licensees of decommissioning plants that have provided a level of assurance based on the funding formula is likely to be far larger than the cost listed.

Third, with around 70% of licensees permitted to accumulate decommissioning funds over the operational life of their plants,[87] entry into bankruptcy proceedings prior to full accumulation of funds will likely result in an assurance shortfall. The scale of that shortfall will be dictated by how early the plant closes. NRC asserts that if a licensee "permanently shuts down its reactor prematurely, it will need to accumulate any shortfall in decommissioning funds (less future estimated earnings)."[88] This is easier said than done, particularly in light of their being insolvent. The licensee may just not have the financial capacity to "plug" the gap. We are beginning to witness this type of risk materializing. When FirstEnergy Solutions Corp., its subsidiaries, and FirstEnergy Nuclear Operating Co. filed for bankruptcy protection in March 2018, a 2017 estimate placed decommissioning costs for its three nuclear plants in Ohio at US$5.4 billion against a (then) current decommissioning fund (i.e., assurance) level of only US$2.5 billion.[89] This equated to a shortfall in decommissioning funding of US$2.9 billion.

2. Abandonment of Conventional Oil and Gas Wells in Alberta, Canada

This subsection examines FARs pertaining to the abandonment of conventional oil and gas wells in Alberta. The province is the largest oil and natural gas producer in Canada, possessing the third largest crude oil reserves in the world.[90] The Alberta Energy Regulator (AER) is responsible for regulating the life cycle of oil, oil sands, natural gas, and coal projects in the province "in a manner that protects public safety and the environment, while ensuring that the regulatory system is as efficient as possible."[91]

The AER uses two tools to manage liabilities relating to conventional oil and gas wells. The first, the Orphan Fund, is "remedial" in nature.[92] It is financed primarily through levies made by the AER against licensees,[93] and is administered by the Orphan Well Association (OWA).[94] The OWA utilizes these funds to pay for the suspension, abandonment, remediation, and reclamation of a well, facility, or pipeline where a licensee or a party with a working interest becomes defunct (e.g., bankrupt).[95] Its inventory is large and predicted to grow.[96] As of March 23, 2020, the OWA had 2,789 wells for abandonment, 233 facilities for decommissioning, 4,113 pipeline segments for abandonment, and 3,331 sites for reclamation.[97]

The second, the Licensee Liability Rating (LLR) Program, is purportedly a "preventive tool."[98] It governs most conventional upstream oil and gas wells, facilities, and pipelines in Alberta.[99] The program's purpose is to "*prevent* the costs to suspend, abandon, remediate, and reclaim a well, facility, or pipeline . . . from being *borne by the public of Alberta* should a licensee become defunct, and *minimize the risk to the Orphan Fund* posed by the unfunded liability of licensees."[100] The inference is that its purpose is not to ensure that the *licensee* can pay for these costs, but to prevent the public from having to pay. The difference is subtle but important in helping us to understand the program's underlying logic. It places great importance—perhaps unrealistically—on the adequacy of the Orphan Fund in terms of financing, human capacity, and technical capabilities to deliver on this goal.

The liability management rating (LMR) underpins the program. This is the ratio of a licensee's eligible deemed assets to its deemed liabilities *arising under specified regulatory programs*.[101] The LMR, calculated monthly, is designed to assess a licensee's ability to address its suspension, abandonment, remediation, and reclamation liabilities.[102] If a licensee's deemed liabilities exceed its deemed assets (including security deposits made), it is held to have "a security-adjusted LMR" below 1.0 and is required to provide the AER with a security deposit "for the *difference*."[103] Only cash and letters of credit can be used.[104] The deposit

86. *Id.*
87. NRC, *Backgrounder on Decommissioning Nuclear Power Plants*, https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/decommissioning.html (last updated Aug. 15, 2018).
88. NRC, Standard Review Plan on Power Reactor Licensee Financial Qualifications and Decommissioning Funding Assurance 17 (1999) (NUREG-1577, Rev. 1), https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1577/r1/sr1577r1.pdf.
89. Schneider & Froggatt, *supra* note 54.
90. World Energy Cities Partnership (WECP), *Member Cities: Calgary, Canada*, https://energycities.org/member-cities/calgary-canada (last visited May 4, 2020).
91. AER, *What We Do*, https://www.aer.ca/providing-information/about-the-aer/what-we-do.html (last visited May 4, 2020).
92. Vanessa Alboiu & Tony R. Walker, *Pollution, Management, and Mitigation of Idle and Orphaned Oil and Gas Wells in Alberta, Canada*, 191 Envtl. Monitoring & Assessment 611, 621 (2019).
93. Orphan Well Association (OWA), *Welcome to the Orphan Well Association*, http://www.orphanwell.ca/ (last visited May 4, 2020). However, in 2017, the Government of Alberta provided a loan of $235 million Canadian dollars (CAD) to the OWA "to accelerate the reclamation of oil and gas well sites that no longer have a responsible owner," which was extended by a further $100 million CAD in March 2020. Government of Alberta, *Upstream Oil and Gas Liability and Orphan Well Inventory*, https://www.alberta.ca/upstream-oil-and-gas-liability-and-orphan-well-inventory.aspx (last visited May 4, 2020).
94. The OWA is an independent nonprofit organization that operates under the delegated legal authority of the AER. OWA, *supra* note 93.
95. AER, Directive 006: Licensee Liability Rating (LLR) Program and Licence Transfer Process 5 (Feb. 17, 2016), https://www.aer.ca/documents/directives/Directive006.pdf.
96. In a presentation to a private audience in Calgary in February 2018, the vice president of closure and liability for the AER, Rob Wadsworth, disclosed that liabilities from conventional wells were "getting larger" due to an increasing number of licensees with "questionable financial capacity to meet closure obligations." Mike De Souza et al., *Cleaning Up Alberta's Oilpatch Could Cost $260 Billion, Internal Documents Warn*, Global News, Nov. 21, 2018, https://globalnews.ca/news/4617664/cleaning-up-albertas-oilpatch-could-cost-260-billion-regulatory-documents-warn/.
97. Legacy wells under long-term care and custody are excluded from the 2,789 wells for abandonment figure. OWA, *Orphan Inventory*, http://www.orphanwell.ca/about/orphan-inventory/ (last visited May 4, 2020).
98. Alboiu & Walker, *supra* note 92, at 10.
99. AER, Directive 006, *supra* note 95, at 3 (emphasis added).
100. *Id.* at 5 (emphasis added).
101. *Id.* at 3.
102. *Id.*
103. *Id.* at 4. The AER is entitled to collect security deposits under Parts 1.1 and 16.6 of the Oil and Gas Conservation Regulations, A.R. 151/71.
104. AER, Directive 068: ERCB Security Deposits 3 (Sept. 17, 2010), https://www.aer.ca/documents/directives/Directive068.pdf.

is required to bring the licensee's LMR back to above 1.0 in an attempt to reduce the likelihood that its liabilities will need to be borne by the Orphan Fund.[105]

There are a number of significant problems associated with the LLR program. We shall sketch four here. First, the program relies entirely upon a licensee's demonstration of its financial strength as evidence of ability to pay for its obligations. This renders it susceptible to issues associated with how financial strength is determined. The LMR is based on information *self-reported* by licensees to the AER,[106] meaning that if licensees, deliberately or otherwise, undervalue their liabilities or overvalue their assets, then the ratio gives an entirely misleading picture of their financial position.[107] Second, security (i.e., financial assurance) need only be provided to the AER when the licensee's LMR falls below 1.0 and this is only to *correct* the LMR (i.e., bring it back to >1.0), not to cover the estimated cost of undertaking the works. Indeed, the LMR was intended to incentivize licensees to undertake abandonment and reclamation in a timely fashion to maintain an LMR of >1.0 and so *avoid* the need to make a security deposit.[108] There is, however, the clear risk that by the time their LMR falls below 1.0, they may not have the ability to make the deposit. If its financial position is weak, it is unlikely to obtain a letter of credit upon reasonable terms from a third-party provider.[109] The requirement for a large cash deposit may push it closer to bankruptcy.

Third, "deemed assets" are calculated using "netbacks," a provincial industry *average*.[110] The LMR assumes that all operations are *equally* profitable.[111] This is unlikely to be the case. Technical, site-specific difficulties associated with accessing the resource, low production quantities, and/or imprudent management of the well are all factors that can render licensees' operations unprofitable.[112] Fourth, "deemed liabilities" are those arising under particular regulatory programs. The figure only covers the estimated costs of abandoning and reclaiming wells, not the full range of the licensee's financial liabilities, such as debts and other legal liabilities.[113] It therefore provides a very restricted picture of the licensee's liabilities. Thus, to conclude, the LMR overestimates assets and underestimates liabilities and so is unable to identify operators that are a financial risk to the program and so to Albertans.

The data paints a dismal picture of the program's efficacy. As of January 4, 2020,[114] of the 735 licensees evaluated, 355 were below the threshold of 1.0.[115] This means that 48% of licensees are considered—according to the logic of the program—unable to address their suspension, abandonment, remediation, and reclamation liabilities. However, as we have seen, an LMR of greater than 1.0 cannot *ensure* that a licensee is able to meet these liabilities due to the way deemed assets and deemed liabilities are calculated. Of greater concern was the fact that the 735 licensees have total estimated liabilities of $30,646,836,270, with only $227,371,440 of security deposits held by the AER.[116] Thus, the deposits cover less than 1% of total estimated liabilities (0.74%). More than 99% of total estimated liabilities, amounting to $30,419,464,830, have no security attached to them.

A senior official from the AER has disclosed that the true cost of cleaning up Alberta's conventional oil and gas wells will be closer to $100 billion.[117] The financial implications of this regulatory model are severe, and look set to worsen.[118] However, inactive, suspended, and orphaned wells also pose risks for surface, soil, and groundwater contamination and methane gas leakage that contributes to greenhouse gas emissions.[119]

3. Decommissioning Offshore Renewable Energy Installations in English and Welsh Waters

This subsection examines FARs pertaining to the decommissioning of offshore renewable energy installations and their related electric lines (collectively, OREIs) in English and Welsh waters. The statutory decommissioning scheme for these OREIs, including wind farms and wave and tidal energy devices, is contained in the Energy Act 2004.[120] The Act does not prescribe technical requirements for decommissioning, the stated logic for this being that industry best practice may be expected to develop over time as experience grows.[121] The Secretary of State for Business, Energy,

105. AER, Directive 006, *supra* note 95, at 4. The AER's requirements with respect to the form, use, and refund of security deposits provided under a liability management program are in Directive 068.
106. AER, Liability Management Programs Results Report January 2020, at 1 (2020), https://www.aer.ca/regulating-development/project-closure/liability-management-programs-and-processes/liability-management-rating-and-reporting.html.
107. This practice is rife in the U.S. coal mining sector. *See* Macey & Salovaara, *supra* note 18, at 934 ("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").
108. Barry Robinson, Ecojustice, The Inactive Well Compliance Program: Alberta's Latest Attempt to Bring the Inactive Well Problem Under Control 5 (2014), https://ecojustice.ca/wp-content/uploads/2014/12/IWCP-Paper-FINAL-20-Nov-2014.pdf.
109. Mackie & Fogleman, *supra* note 20, at 296.
110. Under AER Directive 006, *supra* note 95, at 3, "netback" is defined as "earnings before interest, taxes, and depreciation and is equal to gross margin (midstream revenue less cost of goods sold) less direct operating costs and applicable general and administrative expenses."
111. Robinson, *supra* note 108, at 5.
112. *Id.*
113. *Id.* at 6.
114. While the AER publishes monthly updates on the LMR Program, January 2020 was the last month that figures attributable to "Total Estimated Liabilities" and "Total LMR Security Held" were released by the AER. These important figures are, for some reason, excised from the February 2020 report and the monthly reports thereafter and no longer appear on the monthly updates. We use the January 2020 figures due to their inclusion of this valuable, additional information and the fact that they may be considered, in relative terms, to be up to date.
115. AER, Liability Management Programs Results Report, *supra* note 106, at 1.
116. *Id.*
117. De Souza et al., *supra* note 96.
118. *See supra* note 96.
119. Alboiu & Walker, *supra* note 92, at 2.
120. The United Nations Convention on the Law of the Sea (UNCLOS) 1982 outlines the U.K.'s international obligations to decommission disused installations. Article 60(3) specifies the need for "any [abandoned or disused] installations and structures" in the exclusive economic zone to be "removed" to ensure safety of navigation.
121. Department of Business, Energy, and Industrial Strategy (BEIS), Decommissioning of Offshore Renewable Energy Installations Under the Energy Act 2004: Guidance Notes for Industry (England

and Industrial Strategy (BEIS) has *discretionary* powers under the Act to request decommissioning programs[122] and security[123] (i.e., assurance) from owners/developers for the decommissioning of OREIs. Where requested, a decommissioning program must, inter alia, set out measures to be taken for decommissioning the OREI and include an estimate of the likely expenditure (i.e., costs).[124] *If* the Secretary of State does require the owner/developer to provide assurance, this will be as a "condition" of the decommissioning program's approval.[125]

Where assurance is required, its "purpose" is to enable BEIS to decommission the OREI where the owner has failed to and where there are no other parties that can be held liable.[126] The context is that as a signatory to the United Nations Convention on the Law of the Sea (UNCLOS), the U.K. government is the "decommissioner of last resort" and so bears ultimate responsibility for the associated costs.[127] These may be significant. In a 2018 report commissioned by BEIS, the total cost of decommissioning offshore wind farms alone in the U.K. until 2045 was estimated at between £1.28 billion and £3.64 billion, with BEIS' liability expected to be in the region of £1.03 billion and £2.94 billion.[128] The Crown Estate, which issues leases and licenses for OREIs, and the Scottish government are potentially liable for the balance.[129] Of the 37 wind farms modeled under the report, 25 were BEIS' responsibility.[130]

BEIS' guidance on acceptable means of evidencing assurance is, on the face of it, robust. Upfront cash, cash reserving, letters of credit, bank guarantees, and performance bonds will be accepted.[131] Reserving cash in one's own accounts is not considered an acceptable approach,[132] and parent company guarantees will only be accepted in "exceptional" circumstances.[133] The guidance indicates that while a secure, segregated decommissioning 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.[134] Nevertheless, as with NRC's regulation of nuclear reactor decommissioning, there is still the risk that the funds will not have accumulated in full should the owner/developer become bankrupt before the scheduled end of the OREIs' operational life. Crucially, this guidance, which will facilitate more secure assurance than, for instance, NRC's requirements set out above, will be superfluous where the Secretary of State does *not* exercise its discretion to require assurance from owners/developers.

There are several risks associated with the framework. First, the discretion conferred upon BEIS to require owners/developers to provide financial assurance is problematic and creates ideal conditions for indirect state subsidization. While BEIS acknowledged that financial assurance reduced the risk of owners/developers defaulting on their liabilities, it asserted that, "[a]t the same time, *we do not want to hinder the development of [OREIs]*."[135] The message is clear and goes some way to explaining the rationale for the discretionary nature of the framework: FARs can and do hinder the development of OREIs and this was not desirable. As the U.K. government is ultimately responsible for decommissioning OREIs in English and Welsh waters, taxpayers will bear the financial burden of this policy position.

Second, the breadth of the cost range (between £1.03 billion and £2.94 billion) in relation to the estimated liability of BEIS for decommissioning offshore wind farms in the U.K. raises serious concerns as to the ability of owners/developers to estimate their own decommissioning costs reliably. The figure they present will drive decisionmaking around the amount of assurance that *may* be demanded from them. The wide range 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 work.[136] These uncertainties go to the very heart of constructing a reliable, defensible estimate. This means that the prospect of the owner/developer providing a level of assurance sufficient to meet the costs of decommissioning an OREI must be considered to be low. There is the risk of a significant assurance shortfall.

and Wales) 25 (2019), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/788051/decommissioning-offshore-renewable-energy-installations-guidance.pdf.

122. More specifically, under §105(2), the Secretary of State "may" require a person who is responsible for the OREI to submit a program for decommissioning the relevant object (a decommissioning program). Under §105A(1), the Secretary of State "may" give a notice to a body corporate associated with the responsible person where the Secretary of State "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." This would, of course, be unnecessary had the Secretary of State required the responsible person to provide appropriate financial assurance.
123. Under §106(4), the Secretary of State has the power to approve the decommissioning program subject to conditions, including a condition that the person who submitted the program provides such security (i.e., financial assurance) as may be specified by the Secretary of State.
124. Energy Act 2004, §105(8).
125. *Id.* §106(4).
126. BEIS, Decommissioning of Offshore Renewable Energy Installations, *supra* note 121, at 29.
127. *Id.* at 33.
128. BEIS, Cost Estimation and Liabilities in Decommissioning Offshore Wind Installations: Public Report, Final 33 (2018), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/725316/Cost_and_liabilities_of_OWF_decommissioning_public_report.pdf. The total decommissioning liability in real (2017) terms was forecast to be £1.82 billion. This did not account for inflation. However, the figures above 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. *Id.*
129. *Id.* at 1, 33.
130. *Id.* at 13.
131. BEIS, Decommissioning of Offshore Renewable Energy Installations, *supra* note 121, at 35.
132. *Id.*
133. *Id.* at 37.
134. *Id.*
135. BEIS, *Consents and Planning Applications for National Energy Infrastructure Projects* (Guidance on Regulations Covering New Power Generating Plants and Wayleaves) (emphasis added), https://www.gov.uk/guidance/consents-and-planning-applications-for-national-energy-infrastructure-projects#offshore-wind (last updated Sept. 6, 2018).
136. BEIS, Cost Estimation and Liabilities in Decommissioning Offshore Wind Installations, *supra* note 128, at 1, 16, 33.

Third, BEIS asserts that "[t]here may be a number of acceptable forms of security," with proposals being "considered on a case by case basis."[137] And its guidance makes clear that the type of security likely to be acceptable will depend, inter alia, upon the "*financial strength* of those responsible for decommissioning."[138] However, given the well-known risk that an operator's financial deterioration poses for its ability to perform its environmental obligations, it is not instantly apparent why this ought to be a relevant criterion in the decision as to the acceptability of a measure. It focuses on present-day ability to pay, not the ability of the owner/developer to pay in what is likely to be the distant future. The latter is, of course, the issue of central importance.

B. *Absent or Inefficacious FARs as Indirect State Subsidization*

This section will draw into sharp focus the trade-subsidizing effects of absent or inefficacious FARs. Traditionally, subsidies at the domestic level have been understood as financial assistance by the state to the private sector through, for instance, government loans at preferential rates, direct capital investments, and forgiveness of government debt.[139] However, commentators have contended that the term "subsidy" ought to be construed more broadly to include *indirect* forms of assistance.[140] This could encompass affording cost savings to the private sector through artificially low environmental standards or lax enforcement of them.[141]

Indeed, "interventions" by the state that "*mitigate the charges* . . . normally included in the budget of an undertaking" have been held by the Court of Justice of the EU to amount to "aid" for the purposes of the EU's state aid rules.[142] These rules delimit the parameters of the assistance that EU Member States may lawfully provide to their domestic undertakings. While such "interventions" were not subsidies "in the strict sense of the word," they were "of the same *character* and have the same *effect*."[143]

The implementation of sector-specific exclusions, exemptions, and special conditions that "lighten" the regulatory burden of an operator or operators would also be pertinent here.[144] These are, for Patrice Simms, "a special and distinct class of industry subsidy" that is "paid for by the communities who bear the burden of the impaired natural resource."[145] This could constitute an exemption from a regulatory obligation or its financing, such as the obligation to pay a guarantee—or, through analogy, to provide financial assurance—or a public authority paying for costs that would normally fall on an operator (e.g., end-of-life obligations).[146] John Dernbach draws these ideas together with the observation that "externalized costs"—a likely consequence of such exemptions—provide an indirect subsidy that may give the benefitting operator(s) a trade advantage.[147]

Absent or inefficacious FARs afford cost savings to the private sector, and thereby exhibit a trade-subsidizing effect, in three distinct ways. First, where there are *no* FARs or where regulatory discretion is exercised *not* to require assurance from them, operators are spared the expense of providing assurance (e.g., purchasing a product, such as a surety bond, from a third party or making cash deposits in a segregated account). Or they may be spared expense until their financial position deteriorates below a tolerable level (e.g., the LMR in Alberta), at which point assurance may be required. These provide examples of exemptions that lighten the regulatory burden of a specific sector, as articulated by Simms.[148] Given the large costs often associated with performing end-of-life obligations,[149] the savings to an operator associated with not being required to provide assurance can be significant. It represents capital that can be used elsewhere in their business to enhance its profitability.

This failure to demand assurance creates the real prospect of indirect state subsidization. As we have seen, the security deposits—provided by operators once their LMR falls below 1.0—held by the AER as of January 2020 cover less than 1% of total estimated liabilities, leaving more than 99% of the liabilities ($30,419,464,830) with no security attached to them.[150] The true extent of the liabilities has

137. *Id.* at 35.
138. *Id.* (emphasis added).
139. Kim, *supra* note 42, at 120; DE SADELEER, *supra* note 30, at 436.
140. Richard J. King, *Trade and the Environment: European Lessons for North America*, 14 UCLA J. ENVTL. L. & POL'Y 209, 222 (1996); Kim, *supra* note 42, at 120; DE SADELEER, *supra* note 30, at 436, 439, 440; Patrice L. Simms, *Furtive Subsidies: Reframing Fossil Fuel's Regulatory Exceptionalism*, 35 VA. ENVTL. L.J. 420, 420-21 (2017).
141. King, *supra* note 140, at 222; Kim, *supra* note 42, at 120.
142. Case C-126/01, Ministre de L'Économie, des Finances et de L'Industrie v. GEMO SA, 1 C.M.L.R. 9, para. 28 (2004). Article 107(1) of the consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union sets out the EU's position on state aid:
> Save as otherwise provided in the Treaties, any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the internal market.
143. Case C-126/01, 1 C.M.L.R. 9, at para. 28. The publication of guidance by the regulator setting out acceptable approaches for evidencing assurance, such as self-bonding or parent company guarantees, affects the course of the operator's ultimate ability to undertake their end-of-life obligations at its own private cost and, therefore, ought to be deemed to amount to an "intervention." So too should the exercise of discretion by a regulator *not* to demand assurance from an operator.
144. King, *supra* note 140, at 222; Simms, *supra* note 140, at 420-21.
145. Simms, *supra* note 140, at 420-21, 429.
146. DE SADELEER, *supra* note 30, at 436, 439, 440.
147. John C. Dernbach, *Sustainable Development as a Framework for National Governance*, 49 CASE W. RES. L. REV. 1, 59 (1998).
148. Simms, *supra* note 140, at 420-21.
149. In relation to the nuclear sector, see Section II.A.1. While in the U.S. coal mining sector, Alpha Natural Resources, formerly the fourth largest coal producer in the United States, entered bankruptcy in August 2015 with a total of $655 million in reclamation liabilities ($411 million in Wyoming and $244 million in West Virginia). Macey & Salovaara, *supra* note 18, at 919. End-of-life obligations can also be expensive in the renewable sector. For instance, Minnesota-based Xcel Energy estimates that it will cost $71 million (in 2019 dollars) to decommission the 134 wind turbines in operation at its Noble facility. *The Cost of Decommissioning Wind Turbines Is Huge*, INST. FOR ENERGY RES., Nov. 1, 2019, https://www.instituteforenergyresearch.org/renewable/wind/the-cost-of-decommissioning-wind-turbines-is-huge.
150. AER, LIABILITY MANAGEMENT PROGRAMS RESULTS REPORT, *supra* note 106, at 1.

been put at closer to $100 billion.[151] While, in theory, the OWA shoulders the burden of dealing with orphaned wells, increasingly this is being achieved with the support of large loans from the Government of Alberta.[152] A senior figure at the AER has indicated that the number of licensees with "questionable" financial capacity to meet their obligations is growing.[153] Thus, as the number of orphaned wells can be expected to increase, the public funding needed to bolster the OWA can also be expected to increase. This injection of public funds directly subsidizes the OWA's activities, indirectly subsidizing the sector.

Similarly, in the U.K., there is no requirement under the Petroleum Act 1998 for all operators to provide assurance for the decommissioning of offshore oil and gas installations and submarine pipelines.[154] The Secretary of State "may" require assurance where the responsible person is deemed *incapable* of carrying out their obligations under an approved abandonment program.[155] But there is no legal requirement for the responsible person to submit such a program, unless the Secretary of State so demands.[156] This is discretion built upon discretion.

The result is that in January 2019, against estimated future decommissioning costs to operators of between £45 billion and £77 billion, BEIS had only required operators to set aside £844 million in assurance.[157] This means that the assurance held by BEIS only covers between 1.88% and 1.1% of the sector's total estimated liabilities. The crucial context is, as we have seen, that the U.K. government bears ultimate responsibility for decommissioning these installations and pipelines under UNCLOS 1982.[158] Where the state performs the obligations of a bankrupt operator using public funds, then it indirectly subsidizes the energy project.

Second, a cost saving may be created for an operator where the level of assurance accumulated by them at the point at which they enter bankruptcy is insufficient to cover their end-of-life obligations. The *shortfall* is the saving to the operator. The obvious risk with a shortfall is that the costs associated with unfulfilled obligations will become "externalized" upon the operator's bankruptcy. Either they will be borne by society through the deployment of public funds, or by the environment itself through reduced environmental quality where the regulator does not perform them.[159] This is the indirect state subsidization.

The shortfall may be caused by a variety of factors. The method used to determine the amount of assurance required may be unreliable, such as NRC's permitted use by licensees of the funding formula. There, the cost of decommissioning will likely exceed the industry minimum level of assurance provided for 96% of plants.[160] Or, utilizing the discretion afforded by the legislation, the regulator may permit funds to accumulate in a segregated account across the operational lifetime of the site. The bankruptcy of the operator prior to the full accumulation of funds would result in the funds set aside being insufficient to meet the estimated costs of the end-of-life obligations. The earlier the operator's bankruptcy occurred in the site's operational life, the greater the likely assurance shortfall.

The energy sector is replete with examples of assurance shortfall. For instance, the bankruptcy of FirstEnergy Solutions Corp., its subsidiaries, and FirstEnergy Nuclear Operating Co. and the estimated shortfall of US$2.9 billion in its assurance for the decommissioning of its power reactors provides a somewhat stark illustration. And in Canada, a March 2019 report highlighted the shortfall of assurance provided by five recently bankrupt operators in the oil and gas sector of British Columbia.[161] With total estimated restoration costs of $85,695,000, collectively, these operators had only provided security deposits of $3,225,000 to the Oil and Gas Commission.[162] This resulted in a shortfall of $82,470,000.[163] A single operator, Terra Energy Corp., was responsible for $53,750,000 of it.[164]

A third means of creating savings for operators is where legislators explicitly permit, or regulators accept, self-bonding and parent company (corporate) guarantees as evidence of compliance with FARs. While some frameworks explicitly prohibit one or both of these measures,[165] they continue to be tolerated in many others despite the known risks.[166] This third point connects with the previous two points, in the sense that the failure of these measures is likely to result in insufficient funds being available to perform the works (i.e., an assurance shortfall will be created). When this occurs, the prospect for indirect state subsidization arises. However, it ought to be viewed as a point separate to the absence of FARs, inaccurate estimations of the amount of assurance required, and inadequate fund accumulation. This is due to the risk of their outright failure and the lack

151. De Souza et al., *supra* note 96.

152. *See*, *e.g.*, *supra* note 93 (the Government of Alberta has provided loans of $335 million CAD to the OWA in recent years to aid the reclamation of orphan sites).

153. De Souza et al., *supra* note 96.

154. BEIS, Guidance Notes: Decommissioning of Offshore Oil and Gas Installations and Pipelines 115 (2018) ("*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.") (emphasis added), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/760560/Decom_Guidance_Notes_November_2018.pdf.

155. Petroleum Act 1998, §38(4)-(4A).

156. *Id.* §29(1).

157. National Audit Office, Report by the Comptroller and Auditor General, Oil and Gas in the UK—Offshore Decommissioning 4 (2019) (HC 1870 Session 2017-2019), https://www.nao.org.uk/wp-content/uploads/2019/01/Oil-and-gas-in-the-UK-offshore-decommissioning.pdf.

158. UNCLOS, Dec. 10, 1982, art. 60(3), 1833 U.N.T.S. 397.

159. 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. *See* Section II.A.2.

160. *See infra* note 184.

161. Office of the Auditor General of British Columbia, The BC Oil and Gas Commission's Management of Non-Operating Oil and Gas Sites 42 (2019), https://www.bcauditor.com/sites/default/files/publications/reports/OAGBC_Oil-Gas-Non-operating-Sites_RPT.pdf.

162. *Id.*

163. *Id.*

164. *Id.*

165. For instance, under the framework governing financial guarantees for decommissioning of nuclear facilities in Canada, parent company guarantees are not considered an acceptable financial assurance measure. CNSC, Regdoc-3.3.1, *supra* note 12, at sec. 4.7.

166. As to the prevalence of their acceptance, see *supra* note 22.

of a pecuniary cost for the operator (or their parent) when they are utilized to satisfy FARs.

There are two principal cost savings for operators (or their parents) that self-bond or utilize a parent company guarantee. First, there is the cost saving associated with the fact that these measures, unlike a bond or guarantee purchased from a third party, come at no direct cost to the operator or its parent.[167] They merely need to pass a financial test.

Second, there is the further, more socially and environmentally harmful saving deriving from the fact that the measures provide the "space" for obligations to be disclaimed in bankruptcy. As they do not require assets or funds to be ring-fenced to finance the future works, they are notoriously fragile in the event of the bankruptcy of the operator or its parent company.[168] Their perceived efficacy rests on the somewhat tenuous assumption that satisfaction of certain financial tests or ratios render the operator (or an affiliate, such as a parent or subsidiary) able to meet the costs of their future environmental obligations.[169]

Self-bonding may work when a sector is "booming and resilient."[170] However, it backfires if prices fall, demand wanes, and the sector's resilience deteriorates.[171] If the operator (or their parent) enters into bankruptcy proceedings, their assets will generally be available to its creditors.[172] The prospect of the regulator, positioned as an unsecured creditor, receiving anything, let alone a sum close to what is needed to complete the works, is often extremely low.[173] For example, in the U.S. coal sector, the world's largest coal company, Peabody Energy, entered into bankruptcy in April 2016 with recognized reclamation obligations of approximately $2 billion, with only $600 million covered by surety bonds and other guarantees.[174] The remainder ($1.43 billion) were self-bonded.[175] As a result, it was able to discharge around $745 million of its liabilities in bankruptcy,[176] with "state regulators [accepting] a mere 17 cents on the dollar" with respect to the self-bonded obligations.[177]

Described as "uniquely susceptible to complete failure,"[178] the scale at which self-bonding has been accepted in some sectors is deeply troubling. For instance, in 2015, GAO found that $33 billion of decommissioning liabilities associated with oil and gas infrastructure in the Gulf of Mexico were self-bonded.[179] This equated to 86.4% of the total estimated liabilities in the Gulf.[180] And, collectively, the four largest coal companies in the United States had accumulated nearly $2.8 billion in self-bonded reclamation obligations by 2015.[181]

C. *The Competitive Advantage*

Where a jurisdiction's FARs are absent or inefficacious in form, then this may confer a competitive advantage upon operators trading from it.[182] Other things being equal, operators there will, due to their lower costs of compliance, be advantaged when competing against operators trading from more stringent regimes.[183] The competitive advantage may be generated in two distinct ways.

First, the practices identified above in Section II.B not only *reduce* an operator's cost of compliance—and so save them money—but also allow them to *use* those funds more productively than operators in regimes with stringent FARs. To draw upon an example that illustrates the point starkly: while licensees of nuclear reactors in the United States can utilize the highly attractive parent company guarantee to satisfy NRC's FARs,[184] those in Canada are prohibited from doing so under the Canadian Nuclear Safety Commission's FARs.[185] And Jeanna Heard observes that self-bonding enabled U.S. coal companies to "thrive and stay competitive in the global market," by permitting them to continue to use funds that would otherwise have been set aside for reclamation bonds.[186] Billions of dollars were released and made available to reinvest and grow.[187] However, the sector's profitability has largely evaporated and the funds needed to undertake the works no longer exist.

Second, and relatedly, where an operator ceases to trade prior to performing their end-of-life obligations in full, then, in the absence of (efficacious) financial assurance, it has been permitted to place on the market (1) energy or (2) the raw sources of energy that have been extracted, without bearing the true social cost of its production. The

167. Mackie & Fogleman, *supra* note 20, at 305.
168. *Id*. at 296.
169. *Id*. at 308.
170. Jeanna Heard, *Bankruptcy's Role in the Growing Dilemma of Self-Bonding in the Coal Industry*, 34 Emory Bankr. Dev. J. 205, 211 (2017).
171. *Id*. at 238.
172. The position in Canada is now different following the 2019 decision of the Canadian Supreme Court in *Orphan Well Association v. Grant Thornton Ltd.*, [2019] S.C.C. 5 [hereinafter *Redwater*]. There, it was held that an operator's entry into bankruptcy proceedings did not necessarily negate the onus upon the operator or, more accurately, the insolvency professional dealing with the insolvent operator's estate, to undertake their end-of-life obligations. In *Redwater*, S.C.C., para. 160 (emphasis added), Chief Justice Richard Wagner held:

> Bankruptcy is not a licence to ignore rules, and insolvency professionals are bound by and must comply with valid provincial laws during bankruptcy. *They must, for example, comply with non-monetary obligations that are binding on the bankrupt estate, that cannot be reduced to provable claims, and the effects of which do not conflict with the [Bankruptcy and Insolvency Act]*, notwithstanding the consequences this may have for the bankrupt's secured creditors.

In *Redwater*, the insolvency professional was required to comply with the operator's unfulfilled end-of-life obligations.
173. Malone & Winslow, *supra* note 14, at 4.
174. Macey & Salovaara, *supra* note 18, at 928.
175. *Id*.
176. *Id*. at 933.
177. *Id*. at 929.
178. Malone & Winslow, *supra* note 14, at 4.
179. GAO, GAO-16-40, Offshore Oil and Gas Resources: Actions Needed to Better Protect Against Billions of Dollars in Federal Exposure to Decommissioning Liabilities 24-25 (2015), https://www.gao.gov/assets/680/674353.pdf.
180. As of October 2015, total decommissioning liabilities in the Gulf were estimated at $38.2 billion. *Id*. at 24.
181. Macey & Salovaara, *supra* note 18, at 895.
182. Arnold, *supra* note 32, at 282; Stewart, *supra* note 23, at 2057; Komoroski, *supra* note 23, at 204.
183. Stewart, *supra* note 23, at 2044. The reverse will also be true. *Id*. at 2056.
184. 10 C.F.R. §50.75(e)(1)(iii)(B) (2020).
185. CNSC, Regdoc-3.3.1, *supra* note 12, at sec. 4.7.
186. Heard, *supra* note 170, at 211.
187. *Id*.

pertinent framework has allowed the operator to externalize some (or, potentially, all) of the costs associated with its end-of-life obligations, creating false price signals for consumers and sending entirely the wrong messages to industry.[188] The costs of undertaking those obligations should, from an efficiency perspective, have been internalized by the operator.[189] A competitive advantage is conferred upon that operator over those operators who *have* internalized their costs.[190] As consumers benefit from market prices that do not reflect the true social cost of the energy project, there is greater demand for energy produced by, or raw sources of energy (e.g., coal, oil and gas) extracted by, the operators whose activities have been subsidized indirectly.[191] Therefore, more of that form of energy is produced, or raw source extracted, than is socially efficient.[192]

The effect of these two points can be illustrated with a simple example. This assumes that the initial estimate of the costs of the end-of-life obligations was accurate. A regime that creates conditions for a large "assurance deficit"—which we define as the difference between the estimated costs of undertaking the requisite works and the level of assurance actually *held* by the regulator—is implemented in one state (State A). There, self-bonding and parent company guarantees are permitted, and for those operators that choose to make a cash deposit, funds can accumulate across the project's operational life. In contrast, a regime that presents little or no assurance deficit is implemented in two other states (States B and C). There, cash deposits reflecting the *full* estimated costs of the works must be placed in a segregated bank account in favor of the regulator prior to works commencing.

The disparity in regimes distorts competition and affects trade between the states. The position of operators in State A is strengthened as compared to competing operators in States B and C. Operators in State A that self-bond or who benefit from a parent company guarantee do not have to bear the costs of providing assurance. And through those measures, they (or their parent companies) possess the "space" to disclaim obligations through bankruptcy. This has the potential to reduce the price of the energy produced, or raw sources of energy extracted, in State A and exported to States B and C. If operators in State A had been required to make efficacious financial assurance (as is required from operators in States B and C), then the costs associated with undertaking their obligations would have been borne as a cost of production (i.e., "internalized" by them). When internalized costs are not reflected in an increased energy or raw material price, operators must tolerate reduced profitability.[193]

Conversely, the energy produced, or the raw energy sources extracted, in States B and C, whose operators *have* borne the costs associated with their obligations, are less competitive in State A as there is a cheaper alternative. Thus, the stringent FARs in States B and C—which exhibit a low assurance deficit—have a detrimental effect on the international competitiveness of operators from those states. The reverse is also true. While the general public may benefit from cheaper energy prices as a result of lax FARs, the effect of these indirect (or, according to Simms, "furtive") subsidies is "to compel communities to pay part of the cost of . . . [the operator's] . . . profit-making activity . . . whether or not the affected members of the public consent or themselves realize any substantial benefit."[194] The environment also bears the burden.

Thus, an operator's costs of production, of which end-of-life obligations are a significant component, may be altered dramatically by the stringency of a jurisdiction's FARs (or lack thereof), including the *approaches* that are permitted in order to satisfy them. This may impact upon the attractiveness of a jurisdiction as a business location. The degree of subsidization may be a pull factor when subsidization is high and a push factor when the degree of subsidization is low. For instance, as we have seen, self-bonding and parent company (corporate) guarantees release funds to be used productively by operators. This means that jurisdictions that tolerate these measures have a distinct advantage in attracting operators over states that do not.[195] Jurisdictions, therefore, have incentives to rely on inefficacious FARs as a tool to make their domestic operators more competitive.

To build upon the above example, operators from States B and C, where FARs are stringent, may move their operations to State A to take advantage of its less stringent FARs. Or States B and C may relax their regimes to stem such a flow. While the jurisdiction will weigh other factors into the equation, such as the benefits attained through effective environmental protection measures, it is conceivable that it could lead to a "race to the bottom," with them loosening their FARs in order to gain a competitive advantage in the sector.[196] This may produce short-term gains but is clearly bad for the environment, human health, and public funds in the long term. The downside is that states, such as State A, are also unlikely to give up their competitive position voluntarily by strengthening their FARs if there is a risk that others will not.[197]

State A's FARs may also encourage overproduction and overconsumption of environmentally harmful forms of energy, enriching operators trading from it at the expense

188. Mackie & Combe, *supra* note 25, at 102.

189. Rudy Perkins, *Electricity Deregulation, Environmental Externalities, and the Limitations of Price*, 39 B.C. L. Rev. 993, 1033 (1998) (internal citations omitted).

190. David A. Wirth, *The Rio Declaration on Environment and Development: Two Steps Forward and One Back, or Vice Versa?*, 29 Ga. L. Rev. 599, 643-44 (1995) ("a country of export's failure to implement the Polluter Pays Principle could be treated as a pollution subsidy that distorts international trade"); Dernbach, *supra* note 147, at 59 ("externalized costs provide an indirect subsidy that may give the benefited entity an international trade advantage").

191. Nicolas de Sadeleer, Environmental Principles: From Political Slogans to Legal Rules 21 (2002).

192. Genevra Richardson et al., Policing Pollution: A Study of Regulation and Enforcement 4 (1982); Anthony I. Ogus, Regulation: Legal Form and Economic Theory 19, 35 (2004).

193. Charles Pearson, *Testing the System: GATT + PPP = ?*, 27 Cornell Int'l L.J. 553, 555-56 (1994); Boyd, Financial Responsibility, *supra* note 11, at 29.

194. Simms, *supra* note 140, at 434, 444.

195. Heard, *supra* note 170, at 217 (emphasis added).

196. Stewart, *supra* note 23, at 2058-59.

197. *Id.* at 2045 ("Nations that have adopted less stringent standards presumably wish to retain whatever economic benefits, including competitive advantages, that such standards confers.").

of its taxpayers.[198] Where operators are not required (or know that they will not be so required) to bear the full costs associated with their end-of-life obligations, they are incentivized to carry out the activity to the point at which no further private gain can be obtained (i.e., overutilize it), intensifying the damage and deterioration caused.[199] This concern is particularly pertinent to the fossil fuel sector where operators maximize extraction knowing that they will be unable to meet their end-of-life obligations. In the context of the U.S. surface mining coal industry, Joshua Macey and Jackson Salovaara assert that when a company finds itself in financial troubles "it has an incentive to continue to *expand as rapidly as possible*, because the larger its unclaimed environmental obligations, the more desperate state regulators will be to find a way for the company to *stay* in business."[200] This is likely to force further indirect subsidization of the sector.

III. The Polluter-Pays Question

This part examines whether the function of FARs ought to be to allocate to operators the costs associated with their end-of-life obligations and require their internalization. The allocation of pollution prevention and control costs to polluters was the primary policy goal that led to the origination and subsequent development of a polluter-pays principle by the OECD, an intergovernmental economic organization with 36 Member countries.[201] The United States, Canada, and the U.K. are Member countries. The OECD's economic goal gained traction in the environmental laws of jurisdictions across the world, often evolving into a recognized legal norm within their unique legal systems. Under EU environmental law, for instance, the polluter-pays principle is described as a "cost allocation principle."[202] This leads us to consider whether this idea should shape our account. There are, of course, other analytical frames. The idea of "stewardship" is valuable and relevant.[203] However, the economic goals of a "polluter pays" mindset have dominated debates on environmental liability for some time and so merit exploration.

It is important to observe from the outset that similarly named principles do not "indicate equivalent legal developments across jurisdictions."[204] Thus, the precise manner in which a "polluter pays"-styled principle is understood and implemented in one jurisdiction may differ to how it is in another. We resolve the methodical impropriety associated with examining *the* polluter-pays principle—when there is, strictly, no such singular conception—by focusing our analysis upon the OECD's vision for it. This should be viewed as a supranational position of economic policy.

Admittedly, examination of that particular conception is localized and specific to the culture and unique aims of that organization.[205] However, its theoretical basis is sophisticated, illuminating of the regulatory potential attributable to cost allocation as a normative goal, and it is accepted by the United States, Canada, and the U.K. as OECD Member countries. Further, that conception of the principle was introduced by the OECD in an attempt to combat the *types* of issues that were shown to arise due to absent or inefficacious FARs: state subsidization of environmental protection measures and the consequential potential for distortions in trade and investment. For these reasons, it offers a relevant, scalable version of the principle whose scope and policy rationales are clear and highly pertinent to our analysis. It also offers an original lens through which to explore the function of FARs for end-of-life obligations in the energy sector. The literature that does examine this does not, typically, refer to the principle's trade-related policy rationale.

A. *The OECD's Conception of the Polluter-Pays Principle*

The OECD first introduced guiding principles in 1972 to deal with the international economic and trade implications of environmental policies, a polluter-pays principle being one.[206] For the OECD, this principle meant that the polluter should bear the expenses of carrying out pollution prevention and control measures decided by public authorities to ensure the environment was in an "acceptable" state.[207] The costs of these measures were to be "reflected in the cost" of goods and services that cause pollution in production and/or consumption (i.e., internalized).[208] Moreover, the measures were not to be accompanied by subsidies that would create "significant" distortions in international trade and investment.[209] This message was echoed in a clarification of the principle in 1974,[210] with guidance given there on certain exceptions to the principle. An important extension to the principle was made by the OECD in 1989 when it asserted that operators of hazardous installations should bear the cost of reasonable measures to prevent and control *accidental* pollution from their installations.[211]

This allocation of prevention and control costs to the polluter had two aims. These have become the "enduring

198. Kim, *supra* note 42, at 125.
199. John Alder & David Wilkinson, Environmental Law and Ethics 172 (1999).
200. Macey & Salovaara, *supra* note 18, at 898 (emphasis added).
201. For a full list of members see OECD, *List of OECD Member Countries—Ratification of the Convention on the OECD*, https://www.oecd.org/about/document/list-oecd-member-countries.htm (last visited May 4, 2020).
202. Case C-254/08, Futura Immobiliare Srl Hotel Futura v. Comune di Casoria, 3 C.M.L.R. 45, para. 33 (2009) (opinion of Advocate General Kokott).
203. Emma Lees, *The Polluter Pays Principle and the Remediation of the Land*, 8 Int'l J.L. Built Env't 2, 3 (2016); Emma Lees, *Interpreting the Contaminated Land Regime: Should the "Polluter" Pay?*, 14 Envtl. L. Rev. 98, 107 (2012).
204. Eloise Scotford, Environmental Principles and the Evolution of Environmental Law 4 (2017).
205. OECD 1972 Recommendation, *supra* note 27, para. 2.
206. *Id.*
207. *Id.* para. 4.
208. *Id.*
209. *Id.*
210. OECD, C(74)132, Recommendation of the Council on the Implementation of the Polluter-Pays Principle (1974).
211. OECD, C(89)88, Recommendation of the Council Concerning the Application of the Polluter-Pays Principle to Accidental Pollution, para. 4 (1989).

purposes" of the polluter-pays principle.[212] The first was to encourage (more) rational use of environmental resources.[213] The OECD recognized that if the costs of deterioration to environmental resources caused by economic activity were not incorporated into the "price system," then the market would not account for the scarcity of those resources.[214] However, if regulatory measures could ensure that the prices of goods reflected their scarcity "more closely," then a more efficient allocation of resources would be achieved and pollution reduced.[215]

The second aim was to avoid distortion of international trade and investment.[216] This was an important "political" objective.[217] When industrialized nations sought to remedy their environmental problems in the late 1960s, there was the realization that new costs would be imposed upon manufacturers from states adopting strong environmental protection positions.[218] There was a concern that some states would use public funds to subsidize private pollution control, thereby granting their domestic companies a competitive edge by conferring a price advantage upon them in the market.[219] This would cause imbalances in international trade.[220] We witnessed a similar potential in relation to a state's FARs in Section II.C.

Two points must be clarified before we proceed. First, end-of-life obligations would not appear to be a cost that the OECD intended to encompass in its original conception of the principle. The works attached to such obligations are inherently *restorative*.[221] They are different in nature to the preventive and purely remedial works following a pollution incident to which the OECD referred. That said, the allocation of the costs of complying with future, known environmental obligations (i.e., end-of-life obligations) to operators can deliver the economic goals which the OECD sought to achieve through its origination of the principle. These, as we have seen, comprised the desire to encourage more rational use of environmental resources and avoid distortions in international trade and investment. We therefore contend that end-of-life obligations are a cost that can rightly come within the purview of the principle.

Second, the OECD provided no guidance on the type of *instruments* that were to be used to implement their principle within the legal frameworks of its Member countries.[222] By "implement" the principle, we mean codify the policy position that an operator ought to reflect certain costs in its costs of production to achieve the two objectives detailed above. Routes to implementation were left entirely to the legislatures of Member countries. In theory, FARs provide a potentially powerful regulatory instrument, alongside taxes, charges, and a liability system, capable of implementing the OECD's policy position.[223] The reality as to whether this can be achieved will, as we shall now see, depend upon the particular financial assurance measure(s) under scrutiny and the time frame over which funds are permitted to accumulate during the project's operational life.

B. Cost Allocation as the Function of FARs

We now reflect on whether the economic focus of the OECD's principle ought to inform our account of the function of FARs. We are interested in whether FARs, the specificities of which would be shaped by the normative goal of allocating the costs associated with end-of-life obligations to operators, could achieve two important regulatory goals: first, the policy objectives described in the previous section; second, that the requisite works are performed at the operator's own private cost.

It should be noted that the OECD was concerned with *cost allocation* (i.e., *who* should pay) when it originated the principle.[224] However, realization of the goals identified in the previous section, specifically engendering more rational and sustainable purchasing patterns by consumers and avoiding distortions in international trade and investment, is contingent upon not only the costs being allocated to polluters, but polluters actually reflecting them in the cost of producing their goods or providing their services. This is commonly known as *cost internalization*, but the OECD did not utilize that language when it originated the principle. Technically, costs could be allocated notionally to a polluter under a legal framework, but that polluter may not internalize them unless they are required to or sufficiently incentivized to. We proceed on the basis that the OECD intended that cost allocation was a natural precursor to cost internalization and that this understanding was implicit in its use of the term "allocate" and its variants (i.e., the OECD intended that the allocated costs be internalized by polluters). We can therefore see a clear role for FARs, as one category of instrument for implementation of the OECD's policy position, to facilitate this.

The cost-internalizing potential of FARs for end-of-life obligations has been recognized in pockets of the literature. However, as we shall see, this is often a side issue to the main thrust of the work. A clear and explicit connection between FARs for such obligations and furtherance of the policy objectives examined above has, however, not been made. Indeed, in four significant contributions to the theory and understanding of FARs for reclamation and

212. Sanford E. Gaines, *The Polluter-Pays Principle: From Economic Equity to Environmental Ethos*, 26 Tex. Int'l L.J. 463, 489 (1991).
213. OECD 1972 Recommendation, *supra* note 27, para. 2.
214. *Id.*
215. *Id.*
216. *Id.*
217. Hans C. Bugge, *The Polluter Pays Principle: Dilemmas of Justice in National and International Contexts*, *in* Environmental Law and Justice in Context 411, 414 (Jonas Ebbesson & Phoebe Okowa eds., Cambridge Univ. Press 2009).
218. Gaines, *supra* note 212, at 466.
219. *Id.* at 465-66, 471.
220. *Id.* at 465.
221. *See* Section IV.B.1 for further discussion.
222. OECD 1972 Recommendation, *supra* note 27, Annex 1.
223. Maria Lee, *Tort, Regulation, and Environmental Liability*, 21 Legal Stud. 1 33, 38 (2002) ("The polluter pays principle . . . can be implemented by a variety of regulatory techniques. It does not necessitate even a liability system.").
224. Candice Stevens, *Interpreting the Polluter Pays Principle in the Trade and Environment Context*, 27 Cornell Int'l L.J. 577, 579 (1994).

restoration works,[225] there is no mention of a polluter-pays principle in the main body of the work.[226] This is surprising given, as we have seen, that the trade-distorting effects of absent or inefficacious FARs are particularly acute, albeit hidden.

In the literature that has considered the cost internalization function of FARs for end-of-life obligations, Macey and Salovaara observe that the U.S. Surface Mining Control and Reclamation Act's bonding requirements serve two purposes: "[t]hey *ensure* that the land will be reclaimed, and they force coal companies to *internalize* the environmental costs associated with mining."[227] Two comments may be made here. First as a preliminary point, the statement is more reflective of the ideology of the Act's bonding requirements than the reality of their implementation. Indeed, the authors identify some quite significant regulatory problems with them, specifically the Act's tolerability of self-bonding, the scale of its acceptance, and the risks that go with it.[228] Second, while the authors make the important observation that reclamation and cost internalization are two distinct purposes of FARs, they do not elaborate upon the relationship between them. While reclamation (at the operator's private cost) does lead inevitably to cost internalization, cost internalization does not lead inevitably to reclamation.

As we shall see shortly, there is significant conceptual uncertainty surrounding what cost internalization means from a legal perspective and what it requires from operators in practical terms. It suffices to note here that an operator may internalize their obligations in different ways, including by self-bonding, reserving cash in accounts, or purchasing a bond from a third party. However, each of these measures has the potential to fail entirely, meaning that the private funds required to undertake the works may not be available when needed. Thus, while cost internalization may have technically occurred when the bond was posted, it cannot *ensure* that the end-of-life obligations will be performed at the operator's private cost.

James Boyd and Daniel Ingberman recognized that something more than bare cost internalization is needed, identifying that FARs "foster cost internalization by *mandating the existence of capital reserves dedicated to the satisfaction of liabilities*, even after corporate dissolution."[229] Two observations may be made here. First, the authors appeared to view cost internalization as the secondary (or indirect) goal of creating dedicated capital reserves, an idea that we develop in Part V. Cost internalization was something to be *encouraged*. Capital reserves were to be created, principally, to ensure operators satisfied their liabilities. This would occur when the operator performed the works or where the regulator used the assurance to perform them on the operator's behalf. The satisfaction of liabilities—or, more accurately, the *performance* of the requisite works—was their primary goal. An indirect effect of this would be that the costs of doing so would be internalized by the operator. We see strength in this position.

Second, not all financial assurance measures mandate the creation of a capital reserve. Escrow accounts, sinking funds, trust funds, and cash deposits in favor of the regulator are examples of measures that do so. Self-bonding and parent company guarantee do not mandate a capital reserve, meaning that the ability of the operator to satisfy their liabilities is low if the operator becomes bankrupt.[230] Measures such as surety bonds and bank guarantees pose a similar risk because they also do not mandate that such a reserve exists.

These measures, which are provided by a third party, exhibit potential to fail for different reasons. Surety bonds and bank guarantees, when distilled down to their basic function, are built upon the financial strength of the third-party providers. Banks and insurers, like other organizations, can and do become bankrupt.[231] They are not immune from the risk of financial deterioration. Even where the financial position of the third-party provider remains strong, it may dispute its liability under the instrument, meaning the obligations may not be paid for by them.[232] The lack of a capital reserve inhibits the measure's ability to *satisfy* the operator's liabilities. We return to this in Part V.

In a separate contribution, Boyd briefly explored "conceptual justifications" for FARs.[233] He does, however, caveat that discussion with the assertion that "[t]he report will primarily deal with financial assurance as a complement to pollution liability law."[234] That is, his interest in FARs for end-of-life obligations was indirect and secondary to his focus on liabilities arising from, for example, industrial accidents. In a short section titled "Financial Assurance as a Performance Bond," he makes the interesting and insightful observation that assurance instruments for end-of-life obligations "are best thought of as surety, or performance, bonds to *guarantee the performance* of a known future action."[235]

225. *See* Boyd, Financial Assurance Rules, *supra* note 31; Boyd, Financial Responsibility, *supra* note 11; Macey & Salovaara, *supra* note 18; David Gerard, *The Law and Economics of Reclamation Bonds*, 2 Resources Pol'y 189, 189 (2000).

226. The exception is, perhaps, Malone and Winslow who contend that "[t]he underlying principle for financial assurance in environmental law is that the polluter pays for their environmental costs." Malone & Winslow, *supra* note 14, at 5. They do not, however, seek to tie that statement to any specific conception of the principle. As we know, there is no *singular* conception of it. Moreover, the authors proceed to assert that "[t]his Article *does not question* the polluter-pays concept, but rather, seeks to evaluate the environmental laws designed to assure such cost internalization." *Id.* (emphasis added). We take a more critical perspective on the principle, probing the validity of its normative function in the context of end-of-life obligations. Moreover, Malone and Winslow do not seek to link their assertion to the anti-trade-distorting effect of cost internalization, which is the focus of this Article.

227. Macey & Salovaara, *supra* note 18, at 894 (emphasis added).

228. *Id.* at 897.

229. James Boyd & Daniel Ingberman, *The Vertical Extension of Environmental Liability Through Chains of Ownership in Contract and Supply*, *in* The Law and Economics of the Environment 44, 65 (Anthony Heyes ed., Edward Elgar Publishing 2001) (emphasis added).

230. Malone & Winslow, *supra* note 14, at 4. While Malone and Winslow are referring explicitly to self-bonds, the same concerns are pertinent to parent company guarantees.

231. See Boyd, Financial Responsibility, *supra* note 11, at 39-41, for pertinent examples of assurance provider insolvencies.

232. Mackie & Fogleman, *supra* note 20, at 330-31.

233. Boyd, Financial Assurance Rules, *supra* note 31, at 3.

234. *Id.* n.7.

235. *Id.* at 5 (emphasis added). Shortly afterwards, he repeats that "bond-based assurance," of the type that would be utilized for end-of-life obligations,

On the face of it, this appears to speak to the importance of, and focus upon, securing performance of that action, something that we develop in Part IV. However, it seems to have been offered from a purely cost internalization perspective. For Boyd, the "motivation" for assurance for end-of-life obligations is that the instrument "guarantees that operator funds will be available in the future to *internalize* costs associated with their commercial operations."[236] And in another contribution, he asserts that "[a]ssurance rules need to guarantee firms' *ability to internalize* the costs of future environmental obligations."[237] Through this lens, the dominant function of FARs is to facilitate cost internalization, not engender performance of the works as a venerable goal in itself. While Macey and Salovaara deemed FARs to possess two *distinct* purposes, specifically guaranteeing both performance and cost internalization, Boyd appeared to view cost internalization as guaranteeing performance. We highlight problems with this position below.

Boyd emphasizes the wider benefits of securing cost internalization via FARs. He asserts that the "very point" of assurance is to "raise" the operator's costs by "*forcing* the internalization of otherwise avoided obligations."[238] These are redistributed costs, not new ones. In the absence of FARs or in the presence of inefficacious FARs, society and the environment itself are, typically, left to bear these costs should the operator become bankrupt.[239] According to Boyd, "[a]ssurance simply *redistributes* those costs to the polluter."[240] Indeed, this was the aim of the OECD's origination of the polluter-pays principle. The newly internalized costs are "very real" to the operator and can be expected to reduce its profitability.[241]

It is in this way that efficacious FARs can generate more informed decisionmaking at an early stage in the project-planning process. The costs associated with end-of-life obligations would be factored into business planning as a cost of production, making certain energy projects, such as opening a new coal mine, less appealing from the operator's perspective. Other projects will become more appealing. Thus, efficacious FARs, viewed as a type of legal intervention, may help market forces steer transition to cleaner, less environmentally damaging forms of energy. There is also the ensuing incentive for operators to develop legitimate means of undertaking their obligations at lower cost, such as through careful selection of the site itself and intelligent design of the installation, including ease of its decommissioning. This will reduce the level of funds to be dedicated to end-of-life obligations.

However, when we apply the logic of cost internalization to FARs for end-of-life obligations, some important limitations inherent in the OECD's economic conception of the principle emerge. Indeed, these limitations may be seen in other conceptions of the principle, such as those implemented within discrete legal systems, that prioritize the economic goal of cost internalization over other normative goals.[242] First, while polluter cost internalization has been viewed as "nearly unassailable as a guiding principle for environmental regulation,"[243] it is a *legally* imprecise regulatory function for FARs. Claiming baldly that costs ought to be internalized is akin to asserting that polluters ought to pay. And the latter is first and foremost a statement of *policy,* and a somewhat vague one at that.[244] As with the polluter-pays principle, it is the manner in which the requirement to internalize costs is codified and implemented within legislation and elucidated in guidance issued by the regulator that gives shape, structure, and meaning to it as a legal rule.[245] It possesses limited normative value in the absence of this.

Nevertheless, some large conceptual issues hinder the ability for the economic idea of cost internalization to operate as *the* regulatory function of FARs. These derive from the uncertainty surrounding what internalization means for, and requires from, operators in strict legal terms. Anthony Ogus captures the feeling in the literature when he asserts that internalization is concerned principally with requiring an operator to "cover" the costs that could potentially be imposed on others in the "pricing" of its goods or services.[246] Such costs could, of course, encompass end-of-life obligations.

Importantly, a wide array of terminology has been used to describe the action of "internalization," with scholars referring to the idea of costs being included in the polluter's financial balance sheets[247]; brought within the polluter's accounts[248]; taken into account in the polluter's decision-making process[249]; absorbed by the causer[250]; accounted for in the cost of the transaction[251]; accounted for in a proj-

"guarantees *performance* of a known regulatory restoration, or other performance, requirement." *Id.* (emphasis added).

236. *Id.* (emphasis added).
237. Boyd, Financial Responsibility, *supra* note 11, at 37.
238. *Id.* at 29.
239. *Id.*
240. *Id.* (emphasis added).
241. *Id.*

242. While, with the exception of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017/407, the polluter-pays principle is not mentioned explicitly in legislation pertaining to environmental liability in England and Wales, there are a handful of explicit references to it in the statutory guidance associated with the contaminated land regime in Part IIA of the Environmental Protection Act 1990. There, it is tentatively defined as the principle by virtue of which "the costs of remediating pollution are to be borne by the polluter," providing a clear nod to a cost internalizing role. Department for Environment, Food, and Rural Affairs, Environmental Protection Act of 1990: Part 2A—Contaminated Land Statutory Guidance 63 (2012), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/223705/pb13735cont-land-guidance.pdf.
243. Boyd, Financial Responsibility, *supra* note 11, at 2.
244. Scotford, *supra* note 204, at 3.
245. Lee, *supra* note 223, at 39 ("It is only in the detailed design of a regulatory scheme that the polluter pays principle begins to acquire any meaning.").
246. Ogus, *supra* note 192, at 19.
247. In accounting, the term "internalization" is "the process of including in financial balance sheets the cost factors which were previously either not calculated (for example the cost of environmental damage) or met by society at large (for example the health costs associated with pollution)." Chris Park & Michael Allaby, A Dictionary of Environment and Conservation (3d ed. 2017).
248. For Sanford Gaines, the "classic model" of cost internalization meant that "[t]he producer's investment in pollution control *brings within its own accounts* the cost of the pollution it had previously inflicted without charge on external parties." Gaines, *supra* note 212, at 469.
249. Michael Faure, *Economic Aspects of Environmental Liability: An Introduction*, 4 Eur. Rev. Private L. 85 (1996).
250. Alder & Wilkinson, *supra* note 199, at 30.
251. Perkins, *supra* note 189, at 994 n.4.

ect's projected costs[252]; and reflected in the market price of the operator's goods.[253] And in a 1992 report, the OECD indicated that internalization meant that the costs had been "charged" to the polluter.[254] While the language utilized differs in each of these accounts, they chime with the original logic of the OECD: internalization means *reflecting* pollution prevention and control costs in the operator's costs of production.

However, as we saw above, to assert that the costs associated with end-of-life obligations ought to be internalized by operators says nothing as to the ability of that course of action to *facilitate performance* of those obligations. These are two entirely different goals. Indeed, we may say that, as an economic idea, cost internalization is ambivalent as to whether performance does, in fact, occur. Two arguments support this assertion.

The first is that the economic idea is unable to offer any normative steer as to the broad *types* of financial assurance measures that operators ought to use to facilitate its goal. The proper selection of these is crucial to successful performance of end-of-life obligations. Cost internalization merely requires that certain costs be "reflected" in the operator's costs of production or "covered" in the pricing of the goods. It does not tell us how or when this ought to be done. In fact, an economist may be content that cost internalization has occurred upon provision for the costs of undertaking the works being made in the operator's balance sheet.[255] This does describe *one* particular characterization of cost internalization, albeit one that would appear to sit comfortably with the descriptions of cost internalization detailed above (e.g., brought within the polluter's accounts; taken into account in the polluter's decisionmaking process; absorbed by the causer; etc.).

However, as a means of evidencing assurance, provision in accounts is often explicitly prohibited in guidance produced by regulators due to the lack of security that it accords to the regulator in the event of the operator's financial deterioration.[256] And *when* should cost internalization occur? Ought this to be prior to operations commencing, during the operational phase of the project, or upon closure of the site? The economic idea of cost internalization provides no answers to these important questions.

The second argument relates to the fact that even where costs have been internalized by the operator, it does not mean that the funds necessary to complete the works actually exist or, where they do exist, are protected from the claims of its creditors should it enter into bankruptcy proceedings. This *post*-internalization issue has not been recognized in the literature, yet that protection is essential if the regulator is to ensure that the works can actually be performed by the operator or, in the operator's default, by the regulator utilizing the assurance that is available. Thus, bare cost internalization, in the sense that the operator is merely required to "cover" or "reflect" the costs of the works in the pricing of its goods or services,[257] is an entirely inadequate regulatory goal if performance of an operator's obligations is the priority. If performance is to be guaranteed, it necessitates segregation of the *entire* funds necessary to complete the works from the general body of the operator's or third-party provider's assets and them being rendered available as and when needed. We term this "productive" cost internalization.

Where "productive" cost internalization does *not* occur, the cost may be allocated to the polluter, internalized by them but, owing to the effect of bankruptcy law drawing all available assets into the pool accessible by creditors, it may not actually be able to fulfill its end-of-life obligations due to a lack of funds. In such circumstances, the costs may, at least to a certain extent, be reflected in the operator's cost of production and, therefore, technically internalized. However, the internalization is "unproductive" for the purposes of guaranteeing the *performance* of the obligations. Thus, while the policy objectives of the OECD's principle may be furthered to a degree, indicating prima facie regulatory success, it does not ensure delivery of the far more basic regulatory goal: the works actually being performed when required at the private cost of the operator. In the context of FARs, cost segregation must go together with cost internalization. The OECD's principle—and its derivations—does not tell us this.

IV. The Responsibility Question

The previous part illustrated the limitations of pursuing bare (i.e., "unproductive") cost internalization under the guise of the OECD's polluter-pays principle as the overriding function of FARs for end-of-life obligations. This part examines whether the ascription of legal responsibility, specifically *prospective/role-responsibility*, provides a more appropriate normative function for FARs. Some conceptions of the polluter-pays principle, notably those implemented under Canadian law, do present the ascription of responsibility to polluters as the dominant normative function of the principle.[258]

252. Richard D. Gary & Michael L. Teague, *The Inclusion of Externalities in Electric Generation Resource Planning: Coal in the Crossfire*, 95 W. Va. L. Rev. 839, 842 (1993).

253. Lucas Bergkamp, Liability and Environment: Private and Public Law Aspects of Civil Liability for Environmental Harm in an International Context 74 (2001).

254. For the OECD, "[i]n the economic theory, internalisation means that a cost which otherwise would be borne by an economic agent other than the polluter . . . is *charged* to the polluter who as a result 'internalises' such cost with all the other costs he already bears." OECD, OCDE/GD(92)81, The Polluter-Pays Principle: OECD Analyses and Recommendations 5 (1992), http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(92)81&docLanguage=En.

255. Park & Allaby, *supra* note 247.

256. In relation to the decommissioning of OREIs under the U.K.'s Energy Act 2004, BEIS asserts:

> If a developer/owner simply intends to reserve cash in its own accounts, even if it is separated from the company's operating accounts, then it will not be considered an acceptable approach as the Secretary of State would not be guaranteed access to the money in the event of a default.

BEIS, Decommissioning of Offshore Renewable Energy Installations, *supra* note 121, at 35.

257. *See*, *e.g.*, Ogus, *supra* note 192, at 19; Bergkamp, *supra* note 253, at 74.

258. For instance, in Canadian federal environmental legislation, furtherance of the polluter-pays principle is said to ensure "accountability" (Canada Oil and Gas Operations Act, R.S.C. 1985, c O-7, §2.1), recognize the "responsibility of users and producers in relation to toxic substances and pol-

However, ideas of responsibility need not be examined solely through a polluter-pays lens. In fact, even where such ideas are discussed in the context of that principle, little work is done to unpack the difficult conceptual issues.[259] We see greater analytical value in distinguishing between the internalization of costs associated with end-of-life obligations and the ascription of responsibility for them. Each has their own distinct narrative: addressing trade distortion through economic means and imposing duties/obligations through legal measures, respectively.

A. *The Role and Nature of "Forward-Looking" Responsibility*

In this section, we draw upon the works of legal theorists Herbert Hart, Joel Feinberg, and Peter Cane, specifically their portrayal of *role-/prospective responsibility* to answer the *responsibility* question. We sketch these theories here before showing in Section IV.B how they may inform our account. The concept of "forward-looking" responsibility, viewed as a temporal component of the idea of responsibility, is underdeveloped in the legal and nonlegal literature. Indeed, as Cane observes, a significant proportion of the philosophical literature on responsibility concerns what it means to be responsible for some past situation or event (i.e., backward-looking), not what our responsibilities are (i.e., forward-looking).[260]

While scholars such as Cane have taken the ideas of *role-/prospective responsibility* forward in the general legal literature,[261] they have received no sustained treatment by environmental law and energy law scholars. They have not been considered at all in the context of FARs for end-of-life obligations. We believe that they provide a concrete basis upon which to rationalize the ascription of responsibility upon an actor for ensuring that some event occurs in the future and, in so doing, ground our analysis of the function of FARs. This is our specific contribution to the literature. The most significant works in this area are examined in chronological order to illustrate the evolution of thought on the topic.

1. Herbert Hart

In his essay "Responsibility and Retribution," Hart acknowledged the breadth of ideas covered by the use of the expressions "responsibility," "responsible," and "responsible for" in and outside of the law.[262] He provided four "heads" of classifying the different senses of the word "responsibility" and its grammatical cognates: (1) *role-responsibility* (for specific duties attached to a position or office occupied by a person); (2) *causal-responsibility* (for causing/producing certain consequences, results, or outcomes); (3) *liability-responsibility* (a person's connection with an act or harm is deemed sufficient for liability to attach under the law); and (4) *capacity-responsibility* (the normal capacities to conform to the requirements of law or morals, such as understanding and control of conduct).[263]

While Hart's account is directed at human beings in the context of the criminal law, valuable insights can be drawn from his taxonomy and applied sympathetically to obligations arising under environmental and energy law. Hart's first "head," *role-responsibility*, is most relevant to our study. Responsibilities under this head may be legal, moral, or they may fall outside of this dichotomy.[264] It will arise "whenever a person occupies a *distinctive place or office* in a social organization, to which *specific duties* are attached to provide for the welfare of others or to advance in some specific way the aims or purposes of the organization."[265] He defined "role" to include "a *task* assigned to any person by agreement or otherwise."[266] A person was, according to Hart, "responsible for the *performance* of these duties, or for doing what is necessary to fulfil them."[267] These duties were that person's "responsibilities."[268] We will contend in Section IV.B.2 that an employee (or employees) of a regulator whose position within that public organization requires that they oversee the operator's delivery of financial assurance falls within Hart's formulation of *role-responsibility*.

In contrast to Feinberg and Cane, Hart placed little emphasis in his account on the idea of forward-looking responsibility. He saw *liability-responsibility* as the "pri-

lutants and wastes" (Canadian Environmental Protection Act, S.C. 1999, c 33, pmbl.), and hold offenders "responsible" (Antarctic Environmental Protection Act, S.C. 2003, c 20, §50.9) for cleanup and restoration. And in *Redwater*, [2019] S.C.C. 5, para. 29 (internal citations omitted), Chief Justice Wagner held that Alberta's abandonment regime "has the advantage of aligning with the polluter-pays principle, a well-recognized tenet of Canadian environmental law. This principle assigns polluters the responsibility for remedying environmental damage for which they are responsible, thereby incentivizing companies to pay attention to the environment in the course of their economic activities." That said, remedying *environmental damage*, such as may be expected to occur, for example, following an oil spill, is different to undertaking end-of-life obligations of the *restorative* nature described in this Article. This is not acknowledged in Chief Justice Wagner's statement.

259. For instance, the normative value in ensuring that polluters are responsible for their end-of-life obligations is recognized by the U.K. government in BEIS, Decommissioning of Offshore Renewable Energy Installations, *supra* note 121. In relation to its (discretionary) provisions for dealing with the decommissioning of OREIs, the notes assert 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 (the 'polluter pays' principle)." BEIS, Decommissioning of Offshore Renewable Energy Installations, *supra* note 121, at 7 (emphasis added).

BEIS viewed this novel responsibility-focused conception of the principle to be a "guiding principle" informing policy development in that area, particularly in relation to financial assurance for those costs. *Id.* at 34. The normative basis of that conception of the principle is not clear. It appears to be that the person(s) ought to pay for decommissioning because their relationship with the installation or electric line was sufficiently close. Their interaction with it created a responsibility to decommission it and to bear the costs of doing so. While BEIS does not elaborate on the complex ideas captured in this "forward-looking" sense of responsibility, it does list a range of "acceptable" measures that may be used by the parties to help them to shoulder it.

260. Peter Cane, *Role Responsibility*, 20 J. Ethics 279, 281 (2016).

261. *See* Peter Cane, Responsibility in Law and Morality (2002).

262. Herbert L.A. Hart, Punishment and Responsibility: Essays in the Philosophy of Law 200 (2d ed. 2008).

263. *Id.* at 200.

264. *Id.* at 202.

265. *Id.* at 201 (emphasis added).

266. *Id.* (emphasis added).

267. *Id.* (emphasis added).

268. *Id.*

mary" sense of responsibility.[269] This "backward-looking" sense of responsibility meant that a person who failed to rebut a (criminal) charge against them was *liable* to punishment or blame for what they had done.[270] The other senses of responsibility derived from it.[271] For instance, *causal*-and *capacity-responsibility* were independent criteria of it. Thus, it was appropriate not only for the word "responsible" to be used to describe the *cumulative* result of each criteria being satisfied (i.e., *liability-responsibility*), but also in relation to the result of an *individual* criterion being satisfied (i.e., a person is "responsible" if they *cause* harm).[272] He viewed *role-responsibility* to be "less directly derivable" from *liability-responsibility*.[273]

There was, nevertheless, a connection in the sense that the occupant of a role is "contingently" responsible in that primary sense "if he fails to fulfil the duties which define his role and which are hence his responsibilities."[274] Thus, a person appointed to an office or position would be subject to *liability-responsibility* if he or she failed to fulfill the duties assigned to the role. Hart did not make clear if the criteria for ascribing *liability-responsibility*, such as *causal-responsibility* and *capacity-responsibility*, must also be satisfied in order to find a person to have *role-responsibility*. However, we assume this to be necessary and proceed upon that understanding.

2. Joel Feinberg

In his essay "Responsibility for the Future," Feinberg placed greater emphasis than Hart did on the twin-faced nature of responsibility, observing that responsibility can be ascribed "before the fact" by persons whose eyes are on the future and "after the fact" by those, such as judges, who look to the past.[275] Our interest lies in the forward-looking sense. He asserted that when we ascribe *prospective* responsibility we make a "hypothetical" pronouncement about the future: if some event fails to occur, such as performance of end-of-life obligations, then the person now judged responsible for it (e.g., the operator) will be the proper subject of other judgments, such as blame or liability to punishment.[276] Those judgments are made *retrospectively*.[277] There are, thus, two temporal components to the ascription of responsibility. The first is the ascription of responsibility for *ensuring* that some event occurs in the future. The second is the ascription of responsibility if that event does *not* occur.

Like Hart, the idea of duty was important to Feinberg's account of responsibility. For Feinberg, "[t]ypically, our duties are to *obey* rules or authoritative commands."[278] We could, thus, say we have a duty to *comply* with the law or some authorization conferred upon us (e.g., a permit). He classified a "duty" as a type of "prospective *liability*," noting that "duties are meant to be taken seriously as standards of behavior."[279] Statements of duty were "not mere warnings of liability or 'price-tags' put on undesirable behavior."[280] The dereliction of a duty, in the sense of failing to perform it, was "morally or legally *wrong*, not merely imprudent or expensive."[281]

An important observation made by Feinberg, and one that we will develop below, is that to say a person is "responsible" for ensuring that he or she does something at a future date—that the person is subject to a prospective responsibility, such as a duty—means that the person carries a "burden of vulnerability" on his or her shoulders.[282] That burden (or the "liability" associated with that responsibility) was vulnerability to *sanctions*, broadly defined to include punishment, blame, or condemnation.[283] When that person was judged (retrospectively) to be responsible for a failure to perform the duty, then that for which he or she was "liable" became real.[284] There is, at that point, transition from *vulnerability to* sanctions to the *imposition of* sanctions. His use of the term liability in the context of duty, viewed as a category of prospective responsibility, reflects the idea that a person is *at risk* of a sanction being imposed upon them should they fail to fulfill that duty. While Feinberg's "at risk" conception of liability differs from Hart's ex post idea of *liability-responsibility*, his account is still heavily reliant on sanctions in explaining responsibility.

Feinberg helps us to understand precisely to whom responsibilities, such as those prospectively ascribed, are owed. He draws an important distinction between *responsibilities in rem* and *responsibilities in personam*, something that we develop below in Section IV.B.3. He contends that "[j]ust as a landowner has . . . 'a right against the whole world' to the private enjoyment of his property (*no one* can enter without his consent), so some of our *social responsibilities* are, in a similar sense, to 'the whole world.'"[285] Feinberg, therefore, draws an analogy between "rights against" and "responsibilities to." Rights and responsibilities differ markedly in nature. However, their outward direction of travel (i.e., person-world) is the same and this is what, perhaps, provides the basis for their analogy. While he is referring to "social" responsibilities, not legal responsibilities, obeying a legal duty may be considered *both* a legal and social responsibility.

Feinberg refers to liabilities—in the "at risk" sense—to "universal but *informal* social responses" as "*responsibilities in rem*."[286] Sanctions such as blame and condemnation fit nicely into this categorization. And he refers to liabilities to "*authoritative* responses from definite assignable persons"

269. *Id.* at 240.
270. *Id.*
271. *Id.*
272. *Id.*
273. *Id.* at 240-41.
274. *Id.*
275. Joel Feinberg, *Responsibility for the Future*, 14 Phil. Res. Archives 93, 93 (1988).
276. *Id.*
277. *Id.*
278. *Id.* (emphasis added).
279. *Id.* at 98 (emphasis added).
280. *Id.*
281. *Id.* (emphasis added).
282. *Id.* at 94.
283. *Id.* at 98.
284. *Id.* at 94.
285. *Id.* at 109 (emphasis added).
286. *Id.* (emphasis added).

as "*responsibilities in personam*."[287] Sanctions imposed by or through the courts would appear to fit comfortably here. However, Feinberg observes that most of these *in personam* liabilities "also have a public dimension; and insofar as they also involve liability to such informal and unofficial responses as praise and blame, they are also characterizable as responsibilities *in rem*."[288] For instance, if an operator was prosecuted for failing to undertake a duty to which they were bound, then public condemnation of their behavior may follow.

3. Peter Cane

Cane took the twin-facing nature of legal responsibility significantly further forward than Feinberg. Surprisingly, he did not cite Feinberg in this aspect of his account, with Hart's work featuring heavily. Cane saw "[i]deas such as accountability, answerability and liability" as "look[ing] backwards to conduct and events in the past" and "form[ing] the core" of what he termed "historic responsibility."[289] In contrast, "ideas of *roles* and *tasks* look to the future, and establish *obligations* and *duties*"—what he terms "prospective responsibilities."[290]

Cane's reliance upon Hart's idea of *role-responsibility* in building his own account is evident from his use of the terms "roles," "tasks," and "duties" in much the same way as Hart. He also used the term "liability" differently than Feinberg. While for Cane and Hart it was an ex post idea, it was used by Feinberg principally to encapsulate ideas of vulnerability to sanctions (i.e., ex ante). Cane captures the twin-facing nature of legal responsibility neatly in his observation that "[a] person under a legal duty has a *prospective responsibility* to fulfill that duty, and can be held historically responsible for failure to do so."[291]

Unlike Hart, Cane brought prospective responsibility to the fore in his account of responsibility. He was critical of orthodox accounts of legal responsibility that he believed had "tend[ed] to focus on historic responsibility at the expense of prospective responsibility."[292] That focus may be explained by doctrinal scholarship that concentrates on the necessarily retrospective nature of judgments delivered by courts. Prospective responsibilities were, according to Cane, equally important to our understanding of legal responsibility.[293] An analytically valuable observation that he made and that distinguishes his account markedly from Hart's and Feinberg's was that historic legal responsibility was "*parasitic on* and *subsidiary* to prospective legal responsibility."[294]

Historic responsibility, according to Cane, "enforces, reinforces and underwrites prospective responsibility" and was "not an end in itself, but only a *means to the various ends* the law seeks to further by creating and imposing prospective responsibilities."[295] Prevention was "better than cure," and the proper performance of prospective legal responsibilities was more desirable than punishing nonfulfillment, or repair of its consequences.[296] Regulatory requirements that attempt to avert damage to the environment, such as those that impose end-of-life obligations upon operators, illustrate when the prevention-focused nature of this observation is particularly pertinent.

According to the logic of Cane's account of responsibility, historic responsibility for failing to undertake end-of-life obligations would be imposed upon an operator to steer them back toward fulfilling their duty (i.e., performing them), not to punish them.[297] From this perspective, the dominant justification for ascribing legal responsibility for end-of-life obligations to an operator is to engender their *performance*. While historic responsibility found its "role and meaning only in *responding to nonfulfillment* of prospective responsibilities," he did acknowledge that it "may play a role in maximizing compliance with prospective responsibilities."[298] This arose from its potential to encourage compliance, something that is picked up in the literature that considers the function of FARs.[299]

Cane divided prospective responsibilities into three categories: those directed to the *production* of good outcomes (which he terms "productive" responsibilities), those to the *prevention* of bad outcomes (which he terms "preventive" responsibilities), and those to the *avoidance* of bad outcomes (which he terms "protective" responsibilities).[300] For Cane, these responsibilities "play[ed] an important role in facilitating cooperative and value-generating human activity" and were often created by contract or agreement.[301] The only difference between preventive and protective responsibilities appears to be a minor linguistic one in that the former concerns the *prevention* of bad outcomes while the latter concerns the *avoidance* of such outcomes.

However, for Cane, the distinction is more marked. He makes clear that "[p]rotective obligations are directed against harming by misfeasance, whereas preventive obligations are directed against failing to prevent harm by nonfeasance."[302] Of the two, the latter categorization is more pertinent to end-of-life obligations. These are imposed upon operators to prevent them from deserting the site and failing to invest money in its safe closure and cleanup (i.e., to prevent environmental harm by *non*feasance). However, as we contend below, end-of-life obliga-

287. *Id.* (emphasis added).
288. *Id.*
289. Cane, *supra* note 261, at 31.
290. *Id.* (emphasis added).
291. *Id.* n.9 (emphasis added).
292. *Id.* at 31.
293. *Id.* at 34.
294. *Id.* at 35 (emphasis added).
295. *Id.* (emphasis added).
296. *Id.*
297. This insight is borne out in the case law. In *Orphan Well Ass'n v. Grant Thornton Ltd.*, Chief Justice Wagner of the Supreme Court of Canada held that the "ultimate goal" of the regulator in taking enforcement action against the operator (i.e., in imposing historic responsibility) was to have the environmental work "actually performed.") *Redwater*, [2019] S.C.C. 5, para. 128 (emphasis added).
298. *Id.* (emphasis added).
299. Arnold, *supra* note 32, at 264 (emphasis added) (FARs "complement" command-and-control-style approaches to regulation); Gerard, *supra* note 225, at 189 ("Bonding is a mechanism for enforcing contractual and regulatory provisions.").
300. Cane, *supra* note 261, at 31-32.
301. *Id.*
302. *Id.* at 32.

tions do not fall comfortably into these three categories. A new category is needed.

B. Ascription of Forward-Looking Responsibility as the Function of FARs

This section will show how the idea of forward-looking responsibility can inform our account. A central idea that we develop is that end-of-life obligations are not a mere "cost" to be internalized, as typically envisioned by conceptions of the polluter-pays principle.[303] They, or more accurately their proper performance, are more appropriately conceptualized as a socially and environmentally important legal *duty* ascribed to operators. Regulators are ascribed with a distinct, but mutually supportive legal duty to ensure that end-of-life obligations are performed by operators in order to protect the environment and human health. FARs, we contend, ought to facilitate the timely and effective discharge of these duties.

1. Conceptualizing End-of-Life Obligations

The proper conceptual characterization of end-of-life obligations is crucial to our account. We view them as *tasks* to be performed. They connect regulators and operators to other stakeholders in the project, including the environment, local communities, and the wider public. Regulators impose them to protect those stakeholders. Operators undertake to perform them, facilitating that protection on their completion.

In the next subsection, we will contend that operators are responsible for performing their end-of-life obligations and regulators are responsible for ensuring that they are performed. These are distinct responsibilities, but they seek to achieve the same end: completion of end-of-life obligations. When we say that each actor is *responsible* in this way, we mean they have been ascribed a prospective responsibility—a legal *duty*—that they must discharge.[304] While we conceive of these as prospective responsibilities, it is difficult to categorize them using Cane's taxonomy of *prospective responsibilities*: productive, preventive, and protective.

At first glance, completion of end-of-life obligations may be deemed to produce both a good outcome (i.e., restored, or at least improved, environmental quality) *and* prevent a bad outcome (e.g., pollution caused by a failure to plug and safely abandon an oil well). However, their proper categorization requires a more nuanced approach. The project may have resulted in significant environmental damage and deterioration at the site, such as may arise from groundwater and surface water pollution in the coal mining sector.[305] Or it may be inadvisable to leave the site in a condition similar to that which it was before the energy project commenced.

For instance, the environmental impact of removing the pile footings of the foundations, cabling, and other infrastructure of offshore wind installations may be greater than leaving them in situ.[306] While the framework governing the decommissioning of U.S. nuclear power reactors merely requires *reduction* of residual radioactivity to a level that permits "release" of the property for use.[307] It neither requires elimination of radioactivity nor restoration of the property to its original, greenfield condition.[308] In each example, the operator is unlikely to reach the original, pre-activity baseline level of environmental quality at the site, even after completing the requisite tasks.

We propose an alternative category that we term *restorative responsibilities*. This reflects the fact that end-of-life obligations, generally, seek to take the environment (land or marine) to an agreed state and prevent environmental impacts at the site from becoming more severe.[309] The tasks may reduce the visual impact of the project on the landscape (e.g., reclamation of land used for surface coal mining). They may also improve environmental quality at the site as opposed to "fixing" the damage and deterioration caused by the operator's lawful but environmentally harmful activities (e.g., decommissioning a nuclear reactor), enabling the site to be employed for another productive activity. Thus, while performance of end-of-life obligations may prevent a worse outcome from materializing (e.g., *further* contamination of groundwater at a coal mine) and/or produce a better outcome (e.g., *lower* residual levels of radioactivity at a former nuclear power plant), they do not prevent bad outcomes or produce good outcomes. The line is just not as clear-cut as that.

It is important to distinguish restorative responsibilities—the *tasks*—from the pecuniary cost associated with their performance. Where these tasks are imposed under a permit, license, or other authorization, this will oblige the operator to incur a pecuniary cost when they are performed.[310] The scale of the cost will reflect the extent of the works required, ranging from tens of thousands of dollars for modest operations at a single site, to hundreds of millions of dollars for the largest or most complex.[311] However, the cost will, invariably, be calculated to reflect the pecuniary equivalent of the *regulator* (or, most likely, a contractor appointed by them) undertaking the works on the operator's behalf.[312] This may be significantly higher

303. Mamlyuk, *supra* note 35, at 49.

304. *See* Cane, *supra* note 261, at 31; Feinberg, *supra* note 275, at 93.

305. For instance, a 2019 report by the Environmental Integrity Project found that "groundwater beneath virtually all coal plants is contaminated . . . The groundwater at a majority of coal plants (52 percent) has unsafe levels of arsenic . . . The majority of coal plants (60 percent) also have unsafe levels of lithium." Environmental Integrity Project, Coal's Poisonous Legacy: Groundwater Contaminated by Coal Ash Across the U.S. 4 (2019), https://environmentalintegrity.org/wp-content/uploads/2019/03/National-Coal-Ash-Report-Revised-7.11.19.pdf.

306. Eva Topham & David McMillan, *Sustainable Decommissioning of an Offshore Wind Farm*, 102 Renewable Energy 470, 473-74 (2017).

307. 10 C.F.R. §50.2 (2020).

308. NRC, Regulatory Improvements for Power Reactors, *supra* note 78, at F-4.

309. Topham & McMillan, *supra* note 306, at 470.

310. Stoczkiewicz, *supra* note 29, at 176.

311. As we saw in the case study examining the decommissioning of nuclear power reactors in the United States in Section II.A.1, some plants are estimated to cost $1 billion for licensees to decommission.

312. This is the case, for instance, under the U.S. SMCRA. 30 U.S.C. §1259(a); 30 C.F.R. §800.14(b) (2018).

(sometimes by three to five times) than if the cost were calculated on the basis of the operator undertaking the work itself.[313] The justification is that if the operator defaults on their obligations, then the regulator may need to step in to perform them or, more likely, hire a contractor to do so on its behalf.[314] While that cost must be viewed as conceptually distinct from the tasks, it derives from the imposition of those tasks.

Conceptually, it may be viewed as appealing to conceive of the financial commitment accepted by the operator (i.e., the cost deriving from the prospective responsibility) as a *debt* owed by the operator to the state through the intermediary of the relevant regulator. Take the example of restorative responsibilities estimated at $10,000,000 imposed by a regulator upon an operator under their license. From a "costs as debt" perspective, this would be viewed as a form of "credit" advanced to the operator by the state or through state resources with the requirement that the operator either undertake the works or pay the regulator the same. This could lead us to deem that an important regulatory function of FARs is to provide *security* for the advancement of that credit by the state.

While there may be value in the clarity of this perspective, the positive law of Canada and Scotland has been clear that the regulator ought not to be classified as a "creditor" of the operator with respect to the estimated cost of *unfulfilled* restorative responsibilities.[315] Nor can the regulator be characterized as having advanced "credit" to the operator with respect to the costs of undertaking those unfulfilled obligations.

For instance, in *Orphan Well Ass'n v. Grant Thornton Ltd.*, Chief Justice Richard Wagner of the Supreme Court of Canada held that the "ultimate goal" of the regulator in taking enforcement action against the operator (i.e., imposing retrospective responsibility) was to have the environmental work "*actually performed* for the benefit of third-party landowners and the public at large."[316] It was not attempting to recover a debt.[317] Indeed, "[n]either the Regulator nor the Government of Alberta [stood] to benefit financially from the enforcement of these obligations."[318] And in a decision of the Outer House of the Court of Session of Scotland, *Joint Liquidators of Doonin Plant Ltd.*,[319] Lord Raymond Doherty held that while the operator had a statutory obligation to comply with the relevant notice to undertake the closure works, it did not owe a debt to the regulator.[320]

These cases reinforce our feeling that the notion of *tasks* to be performed—and not debt—is the most appropriate characterization of end-of-life obligations and this is the basis upon which we proceed. Where restorative responsibilities are imposed under a legal framework, the operator will be required as a matter of law to perform tasks specified by the regulator. These restorative responsibilities reflect a cost to the operator. However, they are not a debt in the sense that the regulator, in conferring the permit, license, or other authorization, ought to be treated as being *owed* a sum of money by the operator with respect to those costs. Where the regulator is forced to undertake the tasks on behalf of the operator and, thereby, incur a cost, then we can deem a debt to have been created in the regulator's favor. Until that point, the relationship is merely one of regulator-regulatee.

2. What Is the Responsibility and to Whom Is It Ascribed?

Perhaps the most important prospective responsibility of the operator, at least in pecuniary terms, is to perform their restorative responsibilities. Where these tasks are ascribed to an operator, we deem the operator to be subject to a prospective responsibility under the public law—a legal duty—to perform them.[321] This duty can be traced to the framework(s) governing the energy project and/or their permit, license, or other authorization. That instrument may be seen to reflect the terms upon which society tacitly allows the energy project to be conducted. The operator knowingly and willingly accepted those terms in commencing the project, and ought not to be able to vary them unilaterally and retrospectively through the strategic use of bankruptcy law.

The unique role of the *regulator* in securing performance of restorative responsibilities is underplayed in most accounts of the regulatory function of FARs.[322] Indeed, many FARs are just not structured to confer this power. This is due to the flexibility they accord to operators to provide assurance at a time and in a manner that is commercially convenient to them. The decommissioning of nuclear power reactors in the United States provides a pertinent example of this.[323]

However, we contend that the regulator ought to be viewed as subject to a prospective responsibility that is complementary to that of the operator. This is to ensure that the operator's restorative responsibilities are performed on time and at the operator's own private cost. The regulator may discharge their duty through obtaining an *appropriate* guarantee from the operator to that effect. The regulator's prospective responsibility may be traced to a duty prevalent

313. In the context of the Canadian mining sector, Etienne 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." Etienne Guzman, *Canadian Financial Assurance Frameworks for the Remediation of Mining Sites: An Assessment of Ontario's, British Columbia's, and Quebec's Schemes and Three Potential Reform Initiatives*, 31 J. Envtl. L. & Prac. 1, 8 (2017).
314. *Id.*
315. The position is, however, different where the regulator "steps in" to undertake the works on behalf of a recalcitrant operator and then seeks to recover these funds from it. There, the regulator would be treated as a creditor of the operator and would usually be permitted to prove for the associated costs—as a debt—in bankruptcy proceedings.
316. *Redwater*, [2019] S.C.C. 5, para. 128 (emphasis added).
317. *Id.* paras. 128, 135.
318. *Id.* para. 135.
319. 2019 S.L.T. 195.
320. *Id.* at 204 (Lord Doherty).
321. *See* Cane, *supra* note 261, at 31; Feinberg, *supra* note 275, at 93.
322. See the discussion in Part V.
323. *See* Section II.A.1.

in frameworks across the energy sector.[324] This is to protect the environment and human health in exercising its powers, albeit to be balanced delicately against a jurisdiction's need for energy security.[325] This may be augmented by the governing framework, which may impose further stewardship obligations upon the regulator (e.g., the AER's protection of the Orphan Fund).

Operators and regulators will be subject to blame or liability to sanction (i.e., *retrospective/historic responsibility*) if they fail to discharge their duties.[326] To draw upon Feinberg's terminology, each actor carries a "burden" of vulnerability to sanctions, such as blame or condemnation in the public sphere. Failure to discharge their respective duties would not only be legally and morally wrong,[327] it would be imprudent from an environmental and public health perspective. It may also be expensive for taxpayers where the tasks had to be performed at public cost. Importantly, retrospective responsibility is ascribed to help facilitate the proper discharge of each party's duties, not to punish them.[328]

From the operator's perspective, the precise nature of the retrospective responsibility that can be ascribed to it will depend upon the legal framework under consideration. Typically, it may include suspension or revocation of their permit, license, or other authorization for breach of its conditions; prosecution for breach of its conditions; a cost recovery action by the regulator with respect to sums incurred in undertaking the works on behalf of the operator; and/or censure or condemnation of the operator by the press and public for abandoning its obligations. From the regulator's perspective, while it may not be "liable" in the sense of a successful legal action being brought against it, it may be liable in other ways. The regulator itself and, indeed, certain officers may be subject to censure or to condemnation in parliamentary inquiries, independent reviews, or in local and/or national press for their role in the operator's failure to perform the works.[329]

For our purposes, there is a more subtle and thought-provoking ascription of prospective responsibility that warrants consideration. Hart's conception of role-responsibility provides an interesting foundation from which to ascribe responsibility to those *officers* of the regulator charged with overseeing the delivery and maintenance of financial assurance by operators. Here, we view role-responsibility as a distinct type of prospective responsibility. Recall that Hart's account pertains to the responsibility of human beings, not corporations or public institutions. To be true to his account, we must focus upon the responsibility of officers of a public institution, such as a regulator, as opposed to that of the public institution itself.

According to Hart, role-responsibility arises whenever a person occupies a "distinctive place or office in a *social* organization, to which specific duties are attached to provide for the welfare of others or to advance in some specific way the aims or purposes of the organization."[330] That person is responsible for discharging those duties. An officer of a regulator whose position within that organization requires that the officer ensure that an operator's delivery of financial assurance complies with the public law and the regulator's published policy appears to fall within this formulation. We might say that they have role-responsibility. They occupy a distinctive *office* in a *social organization*, terms that Hart neither defined nor expanded upon, and would be subject to duties to both "provide for the welfare of others" and "advance . . . the aims or purposes of the organization." The duty to protect the environment and human health when exercising their powers, an explicit feature of many legal frameworks in the energy sector,[331] pervade both requirements.

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324. For instance, in the United States, under 30 C.F.R. §585.102 (2019), "(a) BOEM will ensure that [renewable energy and alternate uses of existing facilities on the OCS] are carried out in a manner that provides for: (1) *Safety*; (2) *Protection of the environment*; (3) *Prevention of waste*; (4) Conservation of the natural resources of the OCS." In relation to surface coal mining, 30 U.S.C. §1202 asserts that a core purpose of Chapter 25 "is to establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations." Under 10 C.F.R. §51.10(b) (2020), NRC "recognizes a continuing obligation to conduct its domestic licensing and related regulatory functions in a manner which is both receptive to environmental concerns and consistent with the Commission's responsibility as an independent regulatory agency for protecting the radiological health and safety of the public."

In Alberta, under §2(1) of the Responsible Energy Development Act, S.A. 2012, c R-17.3, the mandate of the AER is

> (a) to provide for the efficient, safe, orderly and *environmentally responsible* development of energy resources in Alberta through the Regulator's regulatory activities, and (b) in respect of energy resource activities, to regulate (i) the disposition and management of public lands, (ii) the *protection of the environment*, and (iii) the *conservation and management of water*.

In the Canadian nuclear sector, under §9(a)(i) of the Nuclear Safety and Control Act, S.C. 1997, c 9, the objectives of the CNSC are, inter alia,

> (a) to regulate the development, production and use of nuclear energy and the production, possession and use of nuclear substances, prescribed equipment and prescribed information in order to (i) prevent *unreasonable* risk, to the *environment* and to the *health and safety of persons*, associated with that development, production, possession or use.

And under §9(1) of the U.K.'s Energy Act 2004, the duty of the Nuclear Decommissioning Authority, in carrying out its functions, is to have particular regard to, inter alia, "(b) the need to *safeguard the environment*; (c) the need to *protect persons from risks to their health and safety* from activities involving the use, treatment, storage, transportation or disposal of hazardous material; and (d) the need to preserve nuclear security."

325. For instance, under 30 U.S.C. §1202, one of the core purposes of Chapter 25, Surface Mining Control and Reclamation, is to "assure that the coal supply essential to the Nation's energy requirements, and to its economic and social well-being is provided and strike a balance between protection of the environment and agricultural productivity and the Nation's need for coal as an essential source of energy."
326. *See* Feinberg, *supra* note 275, at 98. Boyd captures this idea from a sanction-focused angle when he asserts that "restoration obligations create a *future liability* for failure to perform necessary reclamation or restoration." Boyd, Financial Responsibility, *supra* note 11, at 1 n.2.
327. Feinberg, *supra* note 275, at 98.
328. *See* Cane, *supra* note 261, at 35.
329. For instance, following a series of high-profile bankruptcies of coal companies operating in the East Ayrshire region of Scotland and the consequential failure to perform vastly expensive, extensive end-of-life obligations, East Ayrshire Council agreed to an independent review of the planning processes pertaining to opencast coal operations in the region. The report was damning: "The failings are many and varied but at their core lie significant and ongoing individual, management and communication failings, particularly within the planning service." Report of Independent Review of Regulation of Opencast Coal Operations in East Ayrshire 5 (2014), https://www.east-ayrshire.gov.uk/Resources/PDF/C/Coal-Independent-Review-of-the-Regulation-of-Opencast-Coal-Operations-in-East-Ayrshire---Redacted-report-by-the-Independent-Review-Team.pdf.
330. Hart, *supra* note 262, at 201 (emphasis added).
331. *See supra* note 324.

It is, however, important to recognize that the officers' decisions are likely to be constrained by the text of any relevant legislation and, importantly, the policies drafted by the regulator. Regulators will publish guidance setting out their preference (or otherwise) for certain financial assurance measures and the way assurance is to accumulate.[332] This limits the applicability of Hart's role-responsibility in the context of this Article. Where it is the policies of the regulator that have resulted in the delivery of inefficacious financial assurance by operators, then the *regulator* should be held retrospectively responsible (in addition to the operator), not the officer(s). The officer(s) will, after all, have a role-responsibility to follow regulator's policies in the course of their employment.

3. To Whom Is the Responsibility Owed?

If we are to assert that operators and regulators are ascribed with forward-looking responsibilities of the types set out above, we must, for the sake of conceptual clarity, consider to *whom* those responsibilities are owed. Feinberg's account helps us to elucidate this. For Feinberg, that question is answered by establishing the party or parties to whom the operator or regulator is "liable." Put another way, a responsibility was owed where a liability existed. He used the terms "liable" and "liabilities" quite differently than Hart and Cane. While they used them in a retrospective/historic sense, he used them in a prospective sense to reflect the idea that a party was *at risk* of a sanction being imposed upon them should they fail to fulfill a duty ascribed to them.

His account comprised two types of liabilities. First, liabilities to "universal but informal *social* responses"[333] (e.g., public condemnation). These "*responsibilities in rem*" were owed to the "whole world." Second, liabilities to "authoritative responses from *definite assignable person*s"[334] (e.g., prosecution). He termed these "*responsibilities in personam*." Thus, for Feinberg, it was the nature and source of the pertinent response that underpinned his categorization of responsibilities as either *in rem* or *in personam*. He did, however, observe that many *responsibilities in personam* also had a public dimension and so could also be characterized as *responsibilities in rem.*

The idea of *in rem* or *in personam* responsibilities may be applied to restorative responsibilities. The position of the operator will be examined first. The positive law of England and Wales offers useful initial doctrinal guidance to determine the parties from *whom* the possible responses—social and/or authoritative—may come. This, in turn, enables us to determine to whom *in rem* and/or *in personam* responsibilities may be owed.

Under the law of England and Wales, the permit, license, or other authorization (e.g., planning consent), of which the restorative responsibilities are usually a key component, may be viewed as constituting a statutory authorization enabling the holder—usually the operator—to undertake activity that would otherwise be unlawful.[335] In conferring these authorizations, which will impose obligations upon the operator, the relevant regulator "acts pursuant to its statutory duties and functions."[336] There is "no intention to enter into any private law legal relations" with the regulatee.[337] Upon this logic, the operator's duty to perform restorative responsibilities is properly viewed as arising under the public law, via a public law instrument, and not through any legal relation created by private law (i.e., contractual).[338] This is true even though certain terms, such as the measure(s) to be utilized by operators to satisfy FARs and the manner in which the funds must accumulate, are likely to be subject to negotiation with the regulator.

We can derive an answer to the question as to whom the duty to perform restorative responsibilities is owed by considering who has the power to *enforce* their performance (i.e., require that they be discharged).[339] This may be established by examining the governing statute/legal framework. As it is usually the regulator that requires that they be discharged,[340] the prospective responsibility ought to be viewed as owed to the regulator. It is the "definite assignable person" who will deliver the "authoritative response," meaning that we can, in fact, model the duty upon Feinberg's conception of *responsibilities in personam*. The operator is vulnerable to sanctions, such as formal enforcement action brought by the regulator, until it performs its restorative responsibilities.

However, the contention that restorative responsibilities ought to be owed to the regulator does contrast with an alternative stance in the positive law of Canada. There, it has been held that restorative responsibilities are owed to the public at large. This chimes with Feinberg's notion of *responsibilities in rem*. For instance, Chief Justice James H. Laycraft in *Northern Badger* held that the obligation to abandon wells imposed upon licensees by the general law of Alberta was not one owed by the licensee to the regulator, but was rather a "public duty" owed to their "fellow citizens."[341] This was affirmed by Chief Justice Wagner in *Redwater*.[342]

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332. For instance, in the U.K., BEIS provides guidance notes on acceptable forms of security, where this is required under §38(4) of the Petroleum Act 1998, to cover decommissioning costs associated with offshore oil and gas installations and pipelines. BEIS, Guidance Notes, *supra* note 154.
333. Feinberg, *supra* note 275, at 109 (emphasis added).
334. *Id.* (emphasis added).
335. In relation to the law of England and Wales, see, for example, *R (Data Broadcasting International Ltd.) v. Office of Communications*, [2010] E.W.H.C. 1243, para. 88, and *Floe Telecom v. Ofcom*, [2009] E.W.C.A. Civ. 47, para. 103.
336. *Data Broad.*, [2010] E.W.H.C. 1243, para. 88.
337. *Id.*
338. Re Mineral Res. Ltd., [1999] B.C.C. 422, 440; *Data Broad.*, [2010] E.W.H.C. 1243, para. 88 (Cranston, J.).
339. In *Newfoundland & Labrador v. AbitibiBowater Inc.*, 2012 S.C.C. 67, [2012] 2 S.C.R. 443, para. 46, Justice Marie Deschamps held that the question to whom the obligation to remediate contaminated land is owed "is answered by the statute, which determines who can require that it be discharged."
340. *See*, *e.g.*, §37(1) of the U.K. Petroleum Act 1998 ("If an abandonment programme approved by the Secretary of State is not carried out . . . the Secretary of State may by written notice require any of the persons who submitted the programme to take such remedial action as may be specified in the notice within such time as may be so specified.").
341. Panamericana de Bienes y Servicios S.A. v. Northern Badger Oil & Gas Ltd., 1991 A.B.C.A. 181, 81 Alta. L.R.2d 45, para. 33.
342. As stated in *Redwater*, [2019] S.C.C. 5, para. 135:

> The end-of-life obligations the Regulator seeks to enforce against Redwater are public duties. Neither the Regulator nor the Govern-

This position is open to challenge. Greater coherence may be brought to the analysis, we submit, if the duty is viewed as owed principally to the regulator, for it has the power to *enforce* those obligations. It can hold the operator retrospectively responsible through the imposition of a cost recovery action should the operator fail to discharge its duty. The public cannot. Benefiting from a legal duty—in the sense of being *owed* that duty—offers no comfort to the beneficiary unless they also have the ability to enforce a breach of it or to hold the operator retrospectively responsible should it fail to discharge it.

That said, wider society and the environment itself benefit directly (a cleaner environment) and indirectly (more public funds) from the operator's completion of the works. The reverse is also true. In *Redwater*, Chief Justice Wagner emphasized that "third-party landowners and the public at large" were the beneficiaries of end-of-life obligations, not the regulator.[343] And Justice David Neuberger held in *Re Mineral Resources*, a decision of the High Court of England and Wales, that closure obligations imposed under a license were "for the benefit of the environment" and it was the "general public" that would be the "loser" where the works were not completed by the operator.[344]

These are anthropocentric positions—the environment will be impacted heavily—but the sentiment that the public and the environment itself are beneficiaries of public duties owed by the operator is conceptually appealing. These cases provide doctrinal support for Feinberg's idea of *in personam* liabilities that also have a "public dimension."[345] Where the operator was exposed, in addition to an authoritative response from the regulator, to blame or condemnation in the public sphere for failing to fulfill their restorative responsibilities, then this ought rightly to be characterized as a situation where both *responsibilities in personam* and *responsibilities in rem* arose.

The position is more complex when we consider to whom the prospective responsibility ascribed to the regulator is owed. According to Feinberg, liabilities to "authoritative responses" from "definite assignable persons" are necessary for characterization as a *responsibility in personam*.[346] We have largely eliminated the prospect of an officer (or officers) being found subject to liability-responsibility for failure to shoulder their role-responsibility where it was the regulator's policies that resulted in the delivery of inefficacious financial assurance. We are left to consider the wider ascription of prospective responsibility to the regulator to protect the environment and human health. Where a regulator tolerates inefficacious financial assurance that cannot guarantee that the operator is able to perform their restorative responsibilities, then the regulator has failed to discharge the duty ascribed to it. There does not, however, appear to be a "definite assignable person" who will deliver the "authoritative response." In these circumstances, there is no regulator of the regulator.

We do, however, find Feinberg's conception of *responsibilities in rem* to be relevant. This idea captures "social responsibilities" owed to the "whole world."[347] It may be going too far to assert that obtaining efficacious financial assurance is a social responsibility owed to the whole world, but we consider it logical to assert that it is one owed to communities located close to the energy project, and wider society. Restorative responsibilities are a burden that these stakeholders will bear where the operator is unable or unwilling to perform them. Thus, while performance of restorative responsibilities is both the operator's and the regulator's responsibility, where this does not occur, it becomes *society's* problem. Society relies on the regulator to prevent this outcome from materializing.

For Feinberg, in order to be characterized as a *responsibility in rem*, there must be a liability to a universal but informal *social* response.[348] The prospect of censure and condemnation in local communities, the national press, and the debating chambers of parliaments arising where operators utilize bankruptcy law to evade their restorative responsibilities may be viewed as the informal retrospective social response of blame. Thus, the prospective responsibility of the regulator to seek an appropriate guarantee that the operator's restorative responsibilities will be performed is not just a formal one deriving from their statutory function to protect the environment and human health when exercising their powers, but an informal one owed to *society*.

V. Realizing the Function of FARs for Restorative Responsibilities

This part captures our account of the function of FARs for restorative responsibilities and illustrates how it could inform the better design of FARs. We contend that the *first-order* function of FARs ought to be to *empower* operators and regulators to discharge specific legal responsibilities—or duties—ascribed to each of them. These are quite separate prospective responsibilities, but they share a common goal, specifically timely completion of restorative responsibilities. The operator's prospective responsibility is to *perform* their restorative responsibilities in accordance with their permit, license, or other authorization at its own private cost. In contrast, the regulator's prospective responsibility is to *ensure* that this occurs through obtaining an appropriate guarantee from the operator.

Before proceeding, it is useful to consider how our position sits with the existing literature. David Gerard presents our empowerment position slightly differently when he observes that "[b]onding is a mechanism for *enforcing* contractual [e.g., obligations under a lease] and regulatory provisions."[349] This capacity derives from the fact that operators are required to post a bond with the regulator that will only be released when reclamation is

ment of Alberta stands to benefit financially from the enforcement of these obligations. These public duties are owed, not to a creditor, but, rather, to fellow citizens, and are therefore outside the scope of "provable claims."

343. *Id.* para. 128.
344. Re Mineral Res. Ltd., [1999] B.C.C. 422, 432-33 (Neuberger, J.).
345. Feinberg, *supra* note 275, at 109.
346. *Id.*
347. *Id.*
348. *Id.*
349. Gerard, *supra* note 225, at 189 (emphasis added).

complete.[350] If reclamation does not occur, the bond will be forfeited and the funds used to finance the unfulfilled reclamation requirements.

Mark Kaiser and Brian Snyder adopt a similar position, asserting that financial assurance "help[s] ensure that operators comply with all regulatory and lease agreements."[351] And for Zachary Arnold, FARs "complement" command-and-control-style approaches to regulation "which prescribe *duties* that might otherwise be avoided through . . . liability-limiting mechanisms," such as incorporating entities with low levels of capitalization.[352] The presence of adequate funds—an *ability* to pay—would enable the prescribed duties to be complied with. Relatedly, Malone and Winslow contend that the purpose of FARs "is to guarantee that a private operator can *cover* any present and future environmental costs of his or her activities."[353]

For these authors, the primary function of FARs is to facilitate regulatory compliance with environmental obligations and, in that respect, resembles our proposed function of FARs. However, the authors' accounts differ from ours in three important respects. First, they do not draw out, and distinguish between, the two different *types* of legal responsibilities (i.e., prospective and retrospective) to which operators and regulators are (or, in the case of retrospective responsibility, may be) subject. Nor do they explain the essential interaction between them in facilitating compliance with a prospective responsibility.[354] We, therefore, provide a more complete account of how FARs facilitate compliance.

Second, they do not acknowledge the different but mutually supportive prospective responsibilities of operators and regulators. Indeed, the crucial role played by the *regulator* in ensuring that restorative responsibilities are performed by the operator—and the environment and human health protected—through obtaining an *appropriate* guarantee that this will occur is absent in their accounts.

Third, and relatedly, there is the presumption in each of the accounts that FARs—or more specifically the *measures* used by operators to satisfy them—automatically engender compliance with environmental obligations. This degree of certainty cannot be provided. There are a variety of measures, as we have seen, that are entirely ill-equipped to do so yet are still described as acceptable forms of financial assurance. We take a more nuanced position on terms such as "cover" that would ensure that the operator could *perform* their restorative responsibilities with the assurance they had provided. As we have seen, terms such as "cover" are legally ambiguous and should be avoided.

To return to our account, we contend that the empowering quality of FARs is most effectively achieved through ensuring sufficient capital reserves are ring-fenced by operators from the claims of their creditors in bankruptcy. The forced segregation of funds necessary to create this reserve helps us to generate our *second-order* function of FARs: productive cost internalization. This function, which is dependent upon successful delivery of the *first-order* function, enables furtherance of the venerable policy objectives that the OECD emphasized in originating its conception of the polluter-pays principle. Recall that this was engendering more rational, sustainable consumption and production patterns and avoiding distortions in trade and investment. The latter objective is particularly pertinent given the trade-subsidizing effects of a jurisdiction's absent or inefficacious FARs as described in Part II.

FARs have a critical role to play in establishing precisely how and when productive cost internalization by the operator is to occur, 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 by the regulator over the way the operator finances performance of their prospective responsibility (i.e., precisely *how* and *when* they will internalize the costs associated with their restorative responsibilities). Their codification and elaboration in guidance documents for industry will provide coherence and concrete legal structure to the economic idea of cost internalization. Without that external control, operators may not be sufficiently motivated to provide the type and amount of assurance necessary to perform their restorative responsibilities when required.

Our idea of productive cost internalization need not be fostered under the explicit guise of a "polluter pays"-styled principle, and it could exist as a far more implicit goal in legal frameworks. The latter approach would avoid the need to displace common conceptions amongst lawyers of it primarily being a retrospective, liability-focused principle of environmental law.[355] However, the principle could provide a useful threshold test, much in the same way as it is used in the context of the state aid rules under EU law,[356] to determine whether state subsidization was occurring and, if so, to what degree. Ultimately, the choice whether to incorporate it under the label of a polluter-pays principle will be down to the domestic legal culture of the jurisdiction at hand and the way in which the principle is understood and applied there.

We now move to consider how this account could inform the better design of FARs. When it comes to their design, the devil is, of course, in the detail. The intricacies of the proper design of FARs cannot be set out here. We merely propose some high-level issues to focus upon. A key factor to consider is *how* FARs ought to ascribe responsibility. This concerns the level of external control that the FARs

350. *Id.*

351. Mark J. Kaiser & Brian Snyder, *Offshore Wind Decommissioning Regulations and Workflows in the Outer Continental Shelf United States*, 36 Marine Pol'y 113, 120 (2012) ("Securities help ensure that operators comply with all regulatory and lease requirements, including rents, royalties, environmental damage cleanup and restoration activities, decommissioning and site clearance, and other lease obligations.").

352. Arnold, *supra* note 32, at 264 (emphasis added).

353. Malone & Winslow, *supra* note 14, at 3 (emphasis added). Kaiser and Snyder adopt a similar position, asserting that the objective of a bonding program is to ensure that regulated entities "provide or demonstrate adequate financial resources to protect the government from incurring any financial loss." Kaiser & Snyder, *supra* note 351, at 120.

354. Cane, *supra* note 261, at 35 (historic (i.e., retrospective) legal responsibility was "parasitic on and subsidiary to prospective legal responsibility").

355. Dirk Heine et al., *The Polluter-Pays Principle in Climate Change Law: An Economic Appraisal*, 10 Climate L. 94, 95 (2020).

356. de Sadeleer, *supra* note 30, at 463-64.

ought to have over the way in which restorative responsibilities are financed. Reducing the discretion afforded to regulators through greater prescription under the FARs of (1) acceptable financial assurance measures, and (2) the way funds must accumulate, to guarantee *performance* of restorative responsibilities, should be the focus.

As we saw in the case studies covered in Section II.A, FARs are often drafted in a manner that leaves a high level of discretion to the regulator relating to *how*—and in the case of the decommissioning of OREIs in English or Welsh waters, *if*—assurance is to be provided. The specificities of the "real world" delivery of assurance are often just not catered for in the framework itself. It is the guidance issued by the regulator and, perhaps more importantly, the subsequent discussion and negotiation that takes place with the operator that brings the financial assurance into fruition.

For instance, operators and regulators will bargain between themselves in relation to the precise form(s) that financial assurance is to take and how the assurance accumulates (i.e., lump-sum or staggered payments). Therefore, to a large degree, the financial assurance provided derives from a process of negotiated agreement between the operator and the regulator.[357] Limiting the discretion afforded to regulators will minimize the prospect for indirect state subsidization of the operator's activities. This may be considered more likely to arise in FARs that exhibit high levels of regulatory discretion. It was seen in Section II.C that indirect state subsidization generates a competitive advantage at the domestic and international levels for operators trading from jurisdictions with the prospect of a high assurance deficit. A more prescriptive approach to acceptable financial measures and methods of accumulation in a state's FARs would help resolve this.

That FARs must guarantee performance of restorative responsibilities—in the sense of *ensuring* that this duty will be discharged at the operator's private cost—offers a stable normative position from which to steer this legislative prescription. Indeed, we contend that this is the foundation from which FARs should be constructed. To be clear, financial assurance does not, per se, guarantee performance.[358] As we saw from the case studies in Section II.A, the realization of that outcome will depend upon the precise measure, or combination of measures, accepted by the regulator, and the manner in which the funds are permitted to accumulate during the project's operational life. When evaluating particular financial assurance measures, we see a weak-to-strong form *spectrum of likelihood* that the tasks will be actually performed, with self-bonding at one end (weak) of the spectrum and full, upfront cash deposits with a regulator at the other (strong).[359]

Different measures sit at various points along this spectrum.[360] The closer the marker is to the weak end, the greater the risk to the environment, public health, and public funds. The reverse is also true. The tolerable level of risk is, ultimately, a *political* decision but one that has implications for domestic and international trade. Where the original cost estimate of undertaking the future works is accurate—and this, in itself, is no easy task—certain measures, when utilized properly (i.e., an adequately capitalized escrow account segregated from licensee assets, outside its administrative control, and accessible by the regulator), increase the likelihood that the tasks will be performed at the operator's private cost.

But as soon as performance is rendered conditional upon the *financial strength* of the operator 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. Unless specific and sufficient assets or funds are ring-fenced from the reach of their creditors, there is the risk that should their financial position deteriorate, then they may be unable to bear those costs. It is not just operators and their parent or affiliate companies that are exposed to the risk of bankruptcy. As we know, banks and insurers can and do become bankrupt. Strictly, performance can, in our view, only be guaranteed where a fully funded capital reserve *dedicated* to undertaking the works is mandated via FARs.

To fulfill their *first-* and *second-order* functions, it is our view that FARs should prescribe that the full estimated costs of performing restorative responsibilities must be placed in a capital reserve with a third party in favor of the regulator.[361] This would be done prior to operations commencing on-site. The first-best option would be for deposit-based measures, such as trust funds or a bank account in favor of the regulator, to be the only means of evidencing assurance in the mid-to-long term. And there ought to be a prescribed requirement for lump-sum deposit-based measures rather than accumulating deposit-based measures.

Financial strength-based measures, such as self-bonding and parent company guarantees, ought to be prohibited explicitly under the pertinent legal framework or in the guidance published by the regulator. Lump-sum deposit-based measures are best placed to enable operators to shoulder their prospective responsibilities and, in turn, facilitate productive cost internalization. They are also the clearest examples of measures that show the operator has the *ability* and *intention* to bear the costs of their restorative responsibilities. These are two essential features of efficacious FARs.

An operator could demonstrate current ability to pay through, for example, satisfaction of financial tests as per the usual requirements of self-bonding. However, that abil-

357. Gerard, *supra* note 225, at 190 ("In the case of US mining, the environmental standards stipulated in operating permits are often a product of negotiations between the regulatory agency (the principal) and the regulated firm (the agent) where environmental laws provide a baseline [sic] negotiations.").

358. Malone & Winslow, *supra* note 14, at 3.

359. *See* GAO, GAO-05-658, Environmental Liabilities: EPA Should Do More to Ensure That Liable Parties Meet Their Cleanup Obligations 42-43 (2005), https://www.gao.gov/assets/250/247469.pdf.

360. *Id.*

361. Dana & Wiseman, *supra* note 9, at 1530:

> Reserving [a] pool of money is critical because, absent such funds, there is a high likelihood that operators or public actors will never undertake environmental remediation. Abandoned wells and mines are commonplace, and "orphan" contaminated industrial waste can be found in virtually every city. Even where such sites pose environmental and health risks, no action is what we often observe.

ity will evaporate if the operator's financial position deteriorates. They may (or may not) have an initial intention to pay. Even where that intention existed at the outset, it may change following a collapse in the commodity's value or contraction in demand for it. The point to emphasize is that while the regulator may believe that it can gauge the operator's ability to pay, it cannot gauge the operator's intention to pay. It is our position that a financial assurance measure should not be accepted by a regulator unless *both* the ability and intention of the operator to pay can be ensured through the external legal control generated under the FARs.

We recognize that our first-best option may be unattainable for many socially valuable projects and for all but the largest of operators. Thus, we would enable an operator that could demonstrate that the first-best option would impose "undue financial hardship" upon it 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 time line to achieve the appropriate target sum in the capital reserve. The sum guaranteed by the bank would decrease proportionately in line with an increase in the accumulating cash deposit. This option would be permissible for the first three to five years, with a mandatory transfer to the *first-best* option after this period ended or they would risk their permit, license, or other authorization being suspended until the deficit was redressed.

If the *second-best* option was still not viable for an operator, they would need to think more carefully about *compartmentalizing* the stages or phases of the planned operations, with smaller parcels of land/sea being used or projected levels of activity reduced. Or, where the facility or plant was not yet constructed, its scale may need to be reevaluated. With reductions in operational scale, the financial scale of the restorative responsibilities (and the associated costs of undertaking them) would reduce proportionally. The operator would not be permitted to enter a new stage or phase unless the appropriate form and level of assurance was provided in advance. When used in conjunction with the recommendations outlined above, more rigorous and considered regulatory oversight of the staging and phasing of operations affords a ready solution to the legal problem identified in this Article.

VI. Conclusion

This Article sought to derive a normative account of the function of FARs for end-of-life obligations (what we termed "restorative responsibilities") in the energy sector. Our aim was to inform the better design of FARs. Our study was prompted by the fact that many FARs across North America and the U.K. are either failing, or exhibit clear signs of failing in the future. They are often absent in frameworks governing the renewable energy sector. Absent or inefficacious FARs are resulting, and will result, in significant cost savings for operators and, indeed, entire subsectors. This is artificially reducing the cost of producing the energy (e.g., nuclear, renewable) and extracting the fuel source (i.e., coal, oil and gas). We characterized this as a form of indirect state subsidization of operators' end-of-life obligations that created potential for distortion in trade.

We found there to be some important conceptual limitations associated with pursuing cost internalization as *the* overriding function of FARs for end-of-life obligations. Cost internalization has been the dominant normative position adopted in most discussions of environmental liability, particularly those centering on the polluter-pays principle. However, there is substantial conceptual uncertainty as to precisely what the economic idea of cost internalization means for, and requires from, operators in strict *legal* terms. Further, the fact that costs have been reflected in the costs of producing energy or extracting raw materials (i.e., internalized by the operator) does not mean that the funds necessary to complete the requisite future works are secure or sufficient in the event of the operator's bankruptcy.

Our account was built upon the legal theory pertaining to forward-looking responsibility. We began by introducing a new category of prospective responsibility—restorative responsibilities—to deal with the uniquely *restorative* nature of the works associated with end-of-life obligations. They are neither purely preventive, nor purely remedial. Our categorization reflects the fact that restorative responsibilities seek to take the environment to an *agreed* state and prevent environmental impacts at the site from becoming more severe. The works seek to *improve* environmental quality rather than "fix" the damage or deterioration caused by the operator's lawful but environmentally harmful activities.

We argued that the *first-order* function of FARs ought to be to *empower* both regulators and operators to fulfill their prospective responsibilities. The proper performance of restorative responsibilities ought to be viewed as an important legal *duty* ascribed prospectively to operators under the public law. A core prospective responsibility of the regulator ought to be to ensure that performance occurs, principally by obtaining an appropriate guarantee from the operator. Each actor may be held retrospectively responsible for their failure to fulfill their duty. The empowering quality of FARs would most effectively be achieved through regulators ensuring sufficient capital reserves are ring-fenced by operators from the claims of their creditors in bankruptcy.

The forced segregation of funds necessary to create this reserve helps us to generate our *second-order* function of FARs: productive cost internalization. Cost internalization *plus* forced segregation was shown to increase the likelihood that restorative responsibilities will be performed. It also ensures furtherance of the venerable policy objectives that the OECD emphasized in originating its polluter-pays principle, specifically engendering more rational, sustainable consumption and production patterns and avoiding distortions in international trade and investment. The latter objective is particularly pertinent considering the transnational implications of absent or inefficacious FARs. FARs have a critical role to play in establishing precisely how and when productive cost internalization by the oper-

ator is to occur, what should happen to those funds, who should have access to them, and when that access should be granted. They ought to be viewed as facilitating a form of external legal control by the regulator over the way in which the operator *finances* performance of their restorative responsibilities.

For Cane, "[a] well-functioning and successful legal system is one in which the noncompliance with prospective responsibilities, and hence occasions for the imposition of historic responsibility, are minimised."[362] Well-designed FARs minimize the prospect of an operator's noncompliance with their restorative responsibilities and the need for retrospective responsibility to be imposed by regulators through, for example, attempted cost recovery actions. Our account offers a theoretical framework to deliver this. It is timely, given that jurisdictions such as Canada and the U.K. currently lack automatic (i.e., non-discretionary) FARs for end-of-life obligations in the renewable energy sector.

Our solution is prescriptive, which is often unwelcomed by industry. This is never truer than where it results in increased (albeit not *new*) costs for operators. However, only when such a system is implemented will the necessary works actually be performed consistently by operators, the distortion of trade and investment described here redressed, and more responsible, sustainable corporate conduct across the energy sector encouraged. We must learn lessons from the regulatory failure witnessed in the fossil fuel and nuclear sectors. For society's and the environment's sake, the same mistakes cannot continue to be made.

362. Cane, *supra* note 261, at 35.