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Bluer Than Blue: Exit from Policy Support for Clean Marine Energy

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Abstract: The amendment or removal of superfluous government support policies is typically difficult, yet in the ever more important debate on low-carbon (i.e., clean) marine energy policy under the international law of climate action, the law of the sea, and international investment protection, there are additional dimensions of legal or economic peril. Coastal states enact policies subsidising clean energy investments, such as offshore wind energy generation, in their exclusive economic zones or continental shelves. Investors are attracted to the prospect that policies granting subsidies for ostensibly new industries are sufficiently durable. Are such subsidy policies salient or stale? In principle, the purpose of regulatory policy is the promotion of social welfare, and hence, there is an optimal incidence, magnitude, and duration of the subsidy, in essence, an ideal strategy for starting, altering, or exiting such policy. We aim to introduce the concept of optimisation to the design and implementation of regulatory policy in this context. Our contribution is to offer three maxims of optimal clean marine energy law and policy: the efficiency and equity of alternative regulatory arrangements; the continuous optimisation of such arrangements; and the recognition of linguistic entanglements in the law. We test these maxims against the case of clean marine energy policy on offshore wind energy generation. One legal implication for international investment protection is that coastal states should establish a policy exit clause in their investment contracts. Our analysis of policy optimisation is generalisable across policies supporting the transition to sustainable energy forms.

Keywords: policy exit; international law of climate action; law of the sea; international investment protection; linguistic entanglements in the law; offshore wind energy

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1. Introduction

Superfluous policy tends to be difficult to amend or remove. Beneficiaries have an incentive to preserve it, or its victims could be voiceless or have been silenced. Its sunset clause could be missing, poorly designed, or badly implemented. Its mutations in political discourse might have rendered it hardly recognisable or practically invisible, or legislators or regulators may have forgotten its origins. How to deal with it, therefore, even under tranquil circumstances, requires considerable effort.

Yet, in the current debate on the use of marine resources for a low-carbon economy, there are additional dimensions of economic peril in a complex, legal regime of the international law of climate action, the law of the sea, and international investment protection. Within this legal regime, coastal states adopt policies subsidising decarbonisation investments, such as electricity generation from offshore wind plants or the sequestration of carbon in decommissioned oil reservoirs, in their exclusive economic zones (EEZ) or continental shelves (CS). Investors are ultimately attracted to the prospect that policies granting subsidies for ostensibly new industries are sufficiently durable. These policies are enshrined in law.

How to determine if such subsidy policies are salient or stale? In principle, the purpose of regulatory policy is the promotion of social welfare. For example, learning-by-doing spillovers in firms constitute a *bona fide* positive externality meriting a Pigouvian subsidy, and

there is an efficient level of policy support. In practice, firms receiving the subsidy ideally function as regulatory mechanisms delivering social benefits arising from the positive externality. They respond decisively to the commercial opportunities the subsidy has availed for them. Otherwise, they are mere rent seekers inflicting unnecessarily high prices on society, enjoying undue profits under the auspices of the state, and wasting precious resources better used elsewhere. In such a situation, it would be wise to optimise the policy support (i.e., adjust or abolish the subsidy).

Our objective in this paper is to develop a set of first principles (maxims) informing the substance and process of optimal marine energy policy and law in the multi-layered setting of the international law of climate action, the law of the sea, and international investment protection. Under our approach, policy is a contract, and the state and the investors are contracting parties. Deploying the tools of law and economics, we characterise the contractual behaviour of the state as an optimising agent in the face of potentially stale policy. The state offers a contract, the subsidy policy, to investors, and continues to perform on it, *as long as* they are willing and able to pursue the efficiency gains from genuine positive externalities. In the undesirable event of rent seeking, the prudent response of the state, invoking the concept of optimal breach, is to change or end the contract (i.e., alter or withdraw the policy support). There is, therefore, an optimal incidence, duration, and magnitude of the subsidy, and, by ricochet, an ideal exit strategy for unnecessary policy.

Our main contribution is to advance three maxims of optimal marine energy policy and law on low-carbon resources: the efficiency and equity implications of alternative regulatory arrangements as the drivers of state action; the continuous optimisation of the costal state's policy portfolio; and the recognition of linguistic entanglements in the law. One legal implication for international investment protection is that coastal states may have to establish a policy exit clause in contracts for investments in their EEZs or continental shelves.

Section 2 explains the complex governance of marine resources governing a transition to a low-carbon economy under the international law of climate action, the law of the sea, international investment protection, and the domestic law of coastal states. Section 3 develops our three maxims of optimal marine energy law and policy making for coastal states within this regime. Section 4 provides a case study on offshore wind energy in order to test these doctrines. Section 5 develops the legal implications for international investment protection law. Section 6 offers conclusions and areas for further research.

2. The Governance of Marine Energy Resources in the Transition to a Low-Carbon Economy

Marine resources will be playing a crucial role in the transition to a low-carbon energy economy. Offshore wind electricity generation has long been recognised as a low-carbon option [1]. Technological advances of placing windfarms in ever deeper waters offshore, the falling costs of a maturing industry, and the laying of large interconnected offshore transmission grids have massively expanded capacity at scale. Marine resources are also essential to the decarbonisation of fossil fuels. The carbon that these fuels emit upon combustion can be captured at source, and then, safely sequestered. The cavernous space required for such sequestration is available offshore in decommissioned oil or gas reservoirs under the seabed. That space itself becomes a marine resource. A number of projects to deploy this technology at scale have now been launched [1]. Harvesting these marine resources for offshore electricity generation and carbon sequestration projects will require largescale investments, mostly private, and from both domestic and international investors. The question for the coastal state is which policy, to be enshrined in law, will incentivise the appropriate investment.

The starting point is that these marine resources are subject to complex governance that both enables and constraints the costal state in this policy and law-making. This governance sets the parameters for the regulation, the exploitation of, and investment in these resources as well as the coastal states' support. The applicable international law

comprises three separate but interacting layers of law, the international law of climate protection, the law of the sea, and international investment law. Each will be described in turn.

The international climate regime establishes the responsibility for states. The use of marine energy, primarily offshore wind energy, as a climate change mitigation strategy has been a global consensus and politically required by the Johannesburg Plan of Implementation [2], the outcome document of the Rio + 20 conference on sustainable development [3], and Agenda 2030 [4]. This consensus is concretised by the international law of climate action, a regime formed of the UN Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement. Under the 2015 Paris Agreement, States Parties have to pledge policies to progressively reduce carbon emissions, as so-called Nationally Determined Contributions. These will need to include policies on increasing renewables [5]. The climate regime thus provides the impetus for states to engage in offshore wind energy exploitation through ancillary infrastructure. To realise this objective, however, the climate regime looks to other international law, the law of the sea, and the law of investment protection.

The 1982 UN Convention on the Law of the Sea (UNCLOS) [6] is the international law framework for all marine energy resources [7]. It allocates competences to states to regulate and exploit these resources. The Convention does so through a zonal approach. Under that approach, the Convention defines certain zones—the Territorial Sea (TS), the Exclusive Economic Zone (EEZ), the Continental Shelf (CS), and the High Seas—and within these zones, competences are allocated either to a single state, the coastal state, or to all the states (the flag state principle) [6]. Most clean energy activities are taking place within 200 nautical miles off the coast, that is, within the TS, the EEZ [8], and the CS of coastal states. These zones define competences specific for each clean marine energy resource.

UNCLOS allocates exclusive competence to the coastal state over wind energy within the TS of 12 nautical miles, but also much further offshore where the most powerful offshore wind energy is now being harvested through floating platforms. The provisions on this use of the water column are found in Part V of UNCLOS on the EEZ. Article 59 provides that the coastal state has the exclusive (sovereign) right to exploit the non-living resources of the water column of the EEZ, including wind energy. This pertains both to regulation of wind energy production and reaping its economic value when fed into a grid by way of submarine cables. The coastal state is also the competent regulator for the above-water 'installations or structures' for wind energy plants in the EEZ, in accordance with Articles 60(1)(b) and 56(1)(a) UNCLOS. The coastal state's comprehensive rights in relation to such installations are set out in detail in Article 60(2)–(8) UNCLOS, which, by virtue of Article 80, are also applicable to the continental shelf. Such plants generate electricity that needs to be transmitted to the onshore grid by cable using high voltage direct current technology. In line with the flag state principle, the Convention provides that all states have the right to lay such cables in the EEZs of all states, even though coastal states often do claim the authority to regulate [9].

These Convention rules seem static, envisaging each coastal state exploiting marine energy resources under their jurisdiction within the TS and EEZ. However, the Convention provides the legal clarity as to which state may do what, which enables cooperation to exploit these marine resources also in a transboundary manner. To achieve a socially optimal outcome for all, states should cooperate to ensure that resources of offshore power are developed as joint and hybrid projects connected to the onshore grid of several states across jurisdictional lines. This requires agreement between the littoral states, either informally or formally. Several models are emerging. An example of an informal agreement is the North Seas Energy Cooperation of Belgium, Denmark, France, Ireland, Luxembourg, the Netherlands, Norway, Sweden, Germany, and the European Commission. These states are cooperating, within an EU law framework, to tackle barriers to the deployment of multinational offshore wind energy projects, arriving at non-binding intergovernmental agreements that are then implemented in domestic law [10]. A governance mechanism to

arrive at a binding agreement is conciliation. Under UNCLOS, the successful conciliation between Timor-Leste and Australia brought forth a treaty on the joint exploitation of transboundary resources with limited third-party design or planning [11,12]. While this instance concerned a fossil fuel marine resource, the mechanism of conciliation can be employed voluntarily by states speedily to arrive at arrangements for shared clean marine resources as well. In this model, the conciliation commission, shaping for itself a "light-touch" role in an intrinsically collaborative process, hears the arguments of disputing states and makes proposals in order for them to freely reach and adhere to an amicable arrangement that puts jurisdictional disputes or questions to one side.

In addition to these enabling rules, the Convention enshrines constraints for protection of the marine environment. Part XII UNCLOS obligates costal states (as well as all other states) to protect and preserve the marine environment in their EEZs and CSs [13,14]. In so doing, they must respect the rights of third states (Article 194(4) UNCLOS). This general but binding obligation [15,16] is concretised by specific standards [13]. These relate to controlling pollution of the marine environment, including the introduction of 'energy' (Article 1(1), (4) UNCLOS); controlling pollution from 'the use of technologies under their jurisdiction or control' (Article 196(1) UNCLOS; and minimising pollution 'to the fullest possible extent' from 'installations and devices' operating in the marine environment (Article 194(3)(d) UNCLOS). 'Installations' includes floating platforms. Protection and preservation of the marine environment encompasses measures for preventing accidents, dealing with emergencies, and ensuring the safety of operations by regulating the design, equipment, and operation of installations or devices. Measures must also be taken in the planning and operation of the offshore activities to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened, or endangered species and other forms of marine life (Article 194(5) UNCLOS). These obligations of due diligence depend on the level of risk and the activities involved and may vary over time [14,17,18]. They are concretised by principles, such as 'use of best environmental techniques' [17] and 'the precautionary approach' [17]. The Convention prescribes environmental impact assessments, if only in general terms [17]. Legislation to prevent, reduce, and control pollution of the marine environment from controlled activity must be no less effective than international rules, standards, and recommended practices and procedures [19]. Competent to develop such rules and standards are regional marine organisations, such as the OSPAR Commission for the North East Atlantic [20].

States are obligated to cooperate. In its provisional measures order in *MOX Plant*, the International Tribunal for the Law of the Sea emphasised that "the duty to cooperate is a fundamental principle in the prevention of pollution of the marine environment under Part XII of the Convention and general international law [21]". Where an area meets the definition of an enclosed or semi-enclosed sea contained in Article 122 UNCLOS, then Article 123 UNCLOS provides that the states bordering such seas should cooperate in the exercise of their 'rights' under the Convention to ensure effective marine environmental protection. The North Sea and the South China Sea are examples.

A third layer of international law relates to investment protection. Deployment of offshore wind energy generation capacity at the desirable scale necessitates attracting private, foreign direct investment. International investment law then protects such investments against unjustified interferences by the host state. The withdrawal of a subsidy for renewable energy projects granted originally by the host state to the investor has become a widely litigated problem. Particularly, but not exclusively, under the 1994 Energy Charter Treaty, there has been a host of such cases. Broadly, these have drawn a line between the simple withdrawal of a subsidy and those instances where assurances were given. Only those then entail a duty to compensate the investor. It is fair to say, though, that the arbitral tribunals have not always been consistent in their assessment and that the law remains somewhat unclear [22].

It results from the above that coastal states have the competence, and pursuant to the Paris Agreement, the responsibility, to design policies and law to ensure that the

marine resources located in their EEZ and CS are effectively used for the purposes of a climate-friendly energy transition. The principal international constraints the coastal state would face in exercising this competence result from the environmental protection obligations under UNCLOS, international investment protection law, and regional EU law where applicable.

3. Optimising Marine Energy Policy and Law

After explaining the legal parameters of international climate change law, the law of the sea, and international investment protection, we now analyse three maxims of optimal marine energy policy within these parameters: the efficiency and equity implications of alternative regulatory arrangements as the drivers of state action; the continuous optimisation of the policy portfolio; and the recognition and reduction of linguistic complexity in the implementation of policy through law.

3.1. Alternative Regulatory Arrangements

Our first maxim concerns the choice of state action in a policy situation. In fact, there is a choice, which needs to be justified, as to whether the state should act to support at all, and in what form.

In principle, policy is justified if there is market failure (necessity) and if the costs of policy are less than the costs of leaving the market failure uncorrected (sufficiency) [23]. There is essentially a trade-off between the costs of enacting policies to correct market failure and the costs of ignoring it [23]. In practice, however, the key issue is how to assess the relative costs of market and state failures, especially because policy beyond the correction of market failure is generally difficult to justify [23].

Market or state failure is rooted in a trespass of the boundary between the firm and the market or that between the market and the state. The first boundary is a function of the competitive process and discovery. Competition amongst firms determines the extent of the market, and a similar process of entrepreneurial discovery not only defines the reach of the hierarchical firm, but also determines the scope of activities performed through markets (rather than through hierarchies) [24].

The second boundary is a function of freedom and self-determination. The benefit of freedom lies in the emergence of non-designed or freely grown institutions limiting the scope of the market and favouring state action for purposeful and valuable decisions on resource allocation. Most developed economies have nurtured the growth of institutions tightly controlling markets for the delivery of childhood education, health, or pensions [24]. Economies with strong trade unions, large welfare states, or significant regulation perform well on metrics concerning democracy, civil liberties, or innovation [24].

One of the major determinants of market or state failure, then, is the regulatory arrangement arising from state action. There are many illustrations of regulation without or with minimal state action. Regulation is conceptualised as part of the set of services provided by (instead of "done" to) the market, and the discovery of regulatory organisations naturally occurs during an entrepreneurial process [25]. It is certainly feasible to provide regulation within markets, such as finance, the accountancy profession, or sports. Obviously, state regulation is necessary in the case of natural monopoly, a form of market failure requiring the application of economic regulation to such bottleneck facilities as electric power transmission systems, natural gas pipelines, etc. Otherwise, state regulation is not necessarily needed to correct market failure [25], especially if the costs of state regulation exceed those of other regulatory organisations. Conciliation or informal agreement amongst (disputing) states is yet another example of spontaneous or emergent order constituting a regulatory arrangement in lieu of markets or state government [26]. Thus, in principle and practice, there are suitable regulatory arrangements available, such as a common or the provision of regulation within markets, each of which is demonstrably consistent with the quest for efficient and equitable outcomes. Indeed, if the state decides to not act, the risk of inefficiency or inequity does not inevitably escalate.

As a start, let us consider a common, involving the absence of (or a limited scope for) state action. A famous example, based on the work of Elinor Ostrom [27], shows the potential to escape from tragedy in a common. Trust, reciprocity, and reputation enable individuals owning property in common to approach the socially optimal levels of harvest or extraction [28]. A common, featuring group ownership, a narrowly defined group, and the exclusion of non-members, is "an efficient form of governance" (as opposed to open access, featuring no ownership, a broad definition of community, and no exclusion) [28]. In short, tragedy is avoidable in a common. A clear structure of leadership and the occurrence of repeated exchanges in a community, constituting a governance arrangement distinct to market creation (and the establishment of associated property rights), taxation, or regulation, support the pursuit of resource stewardship [29].

The pattern emerging from the discussion of market or state failure is that the menace of inefficiency or inequity largely depends on whether or not the resulting regulatory arrangements, in the effort to correct market failure, respect the boundaries between one social organisation and another. Demarcating that boundary is the province of the principle of subsidiarity. It can guide policy.

Under the principle of subsidiarity, generally, higher levels of aggregation empower lower levels of aggregation to determine themselves [30]. This applies to several political organisations that have concurrent or shared competences to act. In the context of the EU, for example, the EU should act only if Member States cannot sufficiently achieve a certain objective (necessity) and if it can be better achieved by the EU (added value). This is a legal obligation [31], which the EU has operationalised procedurally and which informs its bottom-up approach to energy policy [32,33]. In fact, subsidiarity is a shared principle of the EU and its decentralised member states for their national energy policies [34].

A broader implication of the principle of subsidiarity is that it protects the freedom and creativity animating individuals to take responsibility, in the spirit of ownership and initiative, for their future. Indeed, under the necessity and added value conditions of subsidiarity, the protection of freedom, creativity, ownership, and initiative enhances the momentum towards efficient and equitable outcomes across alternative governance arrangements, such as a common, regulation within markets, property rights and market creation, contracts, or a variety of regulatory regimes. For example, under a common, individuals often can communicate and cooperate in the establishment of institutions feasibly supporting the sustainable use of shared resources. In a market, buyers and sellers establish a spontaneous order through property, contract, and justice [35]. In the spontaneity of a market process, the "miracle" of the price system, in which an equilibrium price is eventually discovered between buyers and sellers having different valuations at the outset, reveals the scarcity of resources and directs them to their best use [35]. As a result, under a market-based policy, the parties closest to the buying or selling exercise their creativity in response to the market signals supporting the pursuit of social welfare maximisation. Even under tax or regulatory regimes, the potency of underlying incentives hinges on the degree to which local actions, such as the determination of the appropriate tax rate, the abatement decisions of relevant entities, or the oversight responsibility of local organisations, are initiated fittingly from the lowest levels of aggregation (rather than imposed imperiously from above). In other words, the principle of subsidiarity, in light of its extemporal affinity for the agency of freedom, creativity, ownership, and initiative in individuals nearest to the matter at hand, is the engine propelling alternative arrangements towards efficiency and equity.

If the state decides to intervene, the threat of inefficiency or inequity depends on the form of state action. Indeed, market or state failure happens, and it makes sense to reckon the net social benefit of different policies [29], such as the pricing of carbon (e.g., the creation of markets or the imposition of Pigouvian taxes), investment or production subsidies for low-carbon alternatives, or the establishment of command-and-control regulation (e.g., technology or performance standards). For example, under the 1970 Clean Air Act (and its amendments thereafter) in the USA, there are various types of policy

instruments, such as emissions trading, Pigouvian taxes, and technology or performance standards (i.e., command-and-control regulation) [36]. Under an emissions trading system (e.g., cap-and-trade), allowances collectively constraining the overall pollution level are initially distributed to polluters, and polluters managing to control their emissions below their allowable levels could sell their surplus allowances or bank them for later use. Polluters have incentives to abate until their marginal abatement costs equal the market price of tradable allowances, and the overall pollution constraint is then met in a cost-effective manner [36]. However, the use right under a cap-and-trade system represents a privilege of usage (rather than a genuine property right), is not tradeable independent of the productive activity, and in need of political or bureaucratic management [29]. The SO_2 trading programme in the US was cost-effective and is widely deemed a success [36], yet, the withdrawal of the banking facility for particular allowances, a worrying sign of regulatory volatility, damaged the credibility of the created asset and prompted a loss of value estimated at $3 B [29]. The European Union's Emissions Trading System applies the cap-and-trade idea to carbon emissions by stationary facilities in the EU. The European Commission administers the system. It has successfully withdrawn excess allowances to ensure the workings of the price mechanism [37,38].

Under a Pigouvian tax regime, the tax per unit of pollution is ideally equal to marginal social damages at the efficient level of control [36]. In theory, even if damages could not be measured, imposing an identical tax on all sources reduces emissions to the point at which marginal abatement costs are equal to the tax, and the necessary condition for cost effectiveness is thus satisfied. Despite the theoretical advantages of a Pigouvian tax, however, the appropriate tax rate is difficult to determine, and abatement, in essence, the response of polluters to a particular tax rate, is inherently uncertain.

Under command-and-control regulation, the state has to know the abatement costs of all polluters in order to allocate the responsibility for emission control in a cost-effective manner. Yet, the state is highly unlikely to have such detailed knowledge, and command-and-control regulation, therefore, is hardly ever cost-effective. Indeed, regulation is efficient if the costs of regulatory alternatives are less than those of defining and enforcing property rights and establishing and operating the associated markets [29]. To an extent, organisational subsidiarity provides a remedy. One advantage of the devolution of environmental oversight is that local agencies may have better information on local conditions or preferences than national authorities, and monitoring and enforcement could then be properly customised [39]. Thus, most of the environmental permitting, inspection, or sanction activities in the US are devolved to state or local authorities [39].

In summary, our first maxim demonstrates that, in the event of state action, the form of state action, bringing about alternative market or regulatory arrangements, is a fundamental driver of the inefficiency or inequity of outcomes.

3.2. Continuous Policy Optimisation

Our second maxim pertains to the continuous optimisation of the policy portfolio, if the state decides to intervene under the first maxim. Policy optimisation introduces the element of time or duration of a support policy. Over that duration, the state has to introduce, modify, or withdraw policies, individually or in combination, in pursuit of social welfare maximisation. It has to manage its portfolio of policies. Thus, the introduction, modification, or withdrawal of policies optimised continuously as a portfolio over time is integral to government.

The introduction of a policy subsidising socially profitable investments in low-carbon technologies is based on the need to compensate the learning-by-doing spill-overs arising from cumulative production [40]. The learning rate, in particular, is a crucial determinant of whether or not a given pattern of such investments is justified. There is a variety of positive learning or production externalities, such as the increase in the productivity of workers as a result of training, or the complementarity between local technology and foreign capital [41]. There is uncertainty about past and future learning rates and their fundamental

drivers, and the gains from learning could be unfairly dispersed. In the presence of information externalities, for example, only the entrepreneur bears the investment cost if an innovation fails, but others imitate for free if it succeeds. As a result, if there is a propensity for "socialised benefits but privatised costs," an entrepreneur may be unduly discouraged to invest in optimal levels of innovation and current or future learning rates would likely suffer.

It is imperative for firms granted a bona fide Pigouvian subsidy to efficiently generate the learning-by-doing spill-overs and monetise, akin to the function of a regulatory mechanism, the social benefits envisioned under the policy. Otherwise, failing as conduits of policy benefits, they would have succumbed to rent seeking, and it would be sensible to adjust or remove the subsidy to mitigate the risk of economic harm. Indeed, suppliers of goods or services required for compliance with a policy obviously have an incentive to perpetuate it [42], and there is evidence that the inadvertent continuation of credit subsidies initially established to correct a genuine market failure supports unproductive entrepreneurs and blocks the entry of productive ones [43].

The control of rent seeking, then, is one of the most important reasons for the continuous optimisation of a policy portfolio. In principle and in practice (in light of the experience of East Asian capitalist economies), the design of incentive systems, regardless of the specific instruments, should be targeted, have performance conditions, include monitoring against benchmarks (e.g., price and quality of imported substitutes), and have clear exit mechanisms (e.g., sunset clauses) [23]. Indeed, California subsidised solar installations at first, but eventually phased them down to avoid the subsidisation of a commercial technology [41].

Making do with less efficient or suboptimal policies dilutes or sacrifices economic gains, yet inefficient or suboptimal policy seems ubiquitous. Pricing carbon, for example, is a first-best policy, but tends to be politically difficult [38]. If a carbon tax, the ideal approach, is enacted, subsidies for the promotion of renewable energy (e.g., investment or production tax credits) could be eliminated, and the savings from their elimination in the US could reach approximately $3 B a year [44]. The incremental cost of performance standards relative to a cap-and-trade system can be large [41]. An increase in a renewable portfolio standard shrinks the contribution of fossil fuels to the generation mix, but reduces the demand for emission allowances (and associated emission prices under a cap-and-trade system) [41]. In addition, opposition to the establishment of transmission lines traversing multiple state jurisdictions in the US could constrain the use of low carbon electricity, such as wind energy from the Midwest or hydroelectric power from Canada [41].

State action may also end up leaving "money on the table". For example, in the presence of coordination externalities, there is a need for simultaneous upstream and downstream investments, especially if scale economies are significant [23]. In such a situation, there is a justification for the state to bear some risk, but the state, unlike a venture capitalist, often fails to earn a financial return on risk-bearing policy that ultimately enables the private sector to make a profit. As a result, if there is a propensity for "privatised benefits but socialised costs," public R&D may be underfunded [23].

There is also a non-trivial risk of economic damage arising from state inaction. Consider a natural experiment inadvertently conducted in Ontario, Canada in 2010. Given the nature of a Feed-in Tariff programme, the challenge is to manage the risks to the timely and reliable estimation of the shadow value of the renewable energy contract. In Ontario, in order to develop a FIT price schedule, assumptions on project costs (i.e. capital, operating and maintenance, and connection costs) and efficiency are made on the basis of consultant studies and professional judgement [45]. In February 2010, the Ontario Power Authority ("OPA") recommended a cut to the FIT price paid for power from micro FIT ground-mounted solar projects in view of its unexpected popularity at 80.2¢ per kWh (providing a 23% to 24% after-tax return on equity instead of 11% intended by OPA) [46]. The recommended price cut was not implemented until August 2010 [46]. Between the recommendation to cut prices in February 2010 and the announcement of the price cut in July

2010, OPA received more than 11,000 applications [46]. Because the government decided to grandfather the price in order to maintain investor confidence, all of the applications, if approved, would qualify for the original rather than the revised price [46]. If the revised price was implemented when it was first recommended by OPA, the cost of the program could have been reduced by about $950 M [46].

A continuous process of policy portfolio optimisation, therefore, provides opportunities to control the hazard of rent seeking or state failure (due to action or inaction), add (or enhance the powers of) a sunset clause in policy, and minimise the dilution or sacrifice of social benefits. This goes beyond the matter of ideal social welfare maximisation. Political leaders, akin to financial asset managers making investment choices, consider the risk and return of competing policy priorities [47]. Responding to the day-to-day problems or opportunities of statecraft, they conduct a significant rebalancing of their policy portfolio across election cycles, not only to stabilise the returns to their policy capital, but also to preserve the stock they had upon an electoral victory [47,48]. Policy portfolios surely have very good reasons to evolve. In the context of climate change, a transition away from less efficient policies in the US is likely to bring huge social benefits, but political factors could hinder the immediate acceptance of a greenhouse gas pricing policy [41]. If policy choices had been more efficient than they were, the benefits of clean air legislation over the past 50 years in the US could have been achieved at a much-reduced cost [49].

3.3. Reducing Legal Complexity

Optimising policy entails legal change, in the shape of amending existing or adopting new regulation. In either case, change raises the risk of legal uncertainty, potentially undermining expected welfare gains. That risk, arising from a lack of rules or an excessively detailed structure of the law, is likely to impede the introduction, modification, or withdrawal of policies optimised continuously as a portfolio, and tends to have a large linguistic element. The third and final maxim thus pertains to the recognition and avoidance of linguistic entanglements in the law.

In principle, law is text and language, a collection of words constituting a network of references across multiple domains, such as statutes, precedents, treatises, opinions of non-legal experts, and facts [50]. The contextualisation of words in the process of introspective inquiry under the law leads to the construction of legal norms [50]. In practice, however, the law over time has evolved into a corpus of legal code [51]. There are various issues affecting the comprehensibility of legal code, such as the length or simplicity of sentences (conciseness); the scope of revisions bringing unexpected or unintended effects (change); the extent of dependencies across different titles, sections, sub-sections, clauses, or other subdivisions (coupling); and the preponderance of conditional statements, exceptions, or special cases (complexity) [51]. These issues arise in all legal settings. In a contract, for example, parties clearly have an incentive to use plain and intelligible language, especially in the event of regulatory scrutiny, adjudication, or enforcement [52]. Complex regulation requiring much effort to comprehend could heighten the level of uncertainty if full comprehension is not achieved [53]. Indeed, failures in regulatory design are largely a function of cognitive processing complexity [53].

Yet the search for the ordinary meaning of legal text appears to require extraordinary effort. Legal theorists and practitioners routinely assess the ordinary meaning of the text in the process of interpreting legal documents, including but not limited to contracts, statutes, regulations, treaties, or constitutions [54]. If, for example, dictionary definitions do not map to an ordinary meaning (and, instead, map to the dictionarist's notion of "desirable meaning"), there could be huge consequences, especially because disputes over legal interpretations typically "turn on questions about subtle shades of meaning [54]". Disconcertingly, the evidence from experiments involving a wide variety of individuals indicates that dictionary definitions, legal corpus linguistics, or "scientific measures of meaning," in principle, may not be reliably used to find straightforward interpretations of the ordinary meaning of legal texts [54]. Thus, potentially bringing serious economic conse-

quences, an increasingly complex corpus of law has elevated the likelihood of linguistic entanglements, in fact, increasing the occurrence of inconsistencies or obfuscations within or across sections, articles, or provisions.

Regulatory complexity is an externality imposing incongruent cost burdens on the drafters of regulation and the entities struggling to comply with or enforce it. Of course, not all instances of regulatory complexity have brought economic disappointment. Air pollution regulation in the US, for example, has increased in complexity since the 1970 Clean Air Act [41], potentially putting a substantial regulatory burden on affected firms, yet the benefits seem to have far exceeded the costs [48]. Yet the social costs of regulatory complexity ought to be reckoned [51]. Various metrics, such as reading scores, are used to determine the difficulty for an average individual to understand contractual language [51]. One of the most important metrics concerns a vagueness–precision spectrum involving, at one end, ambiguous terminology (e.g., "reasonable" or "adequate" under prudential regulation) whose meaning is clarified in a specific context and, at the other end, numerical indicators, such as currency or percentage [51]. There is evidence, for instance, that linguistic complexity in banking regulation is clustered in a few provisions, possibly a result of an effort to incorporate additional commercial realities in the aftermath of the 2008 financial crisis [51].

There is, therefore, an optimal amount of detail, striking a balance between the marginal benefit of transparency and the marginal cost of regulatory complexity, and consequently facilitating the exercise of creativity and innovation in the context of social welfare maximisation and a continuous process of policy portfolio optimisation. The optimal amount of detail in the corpus of legal code is the point at which the marginal benefit of transparency is commensurate to the marginal cost of regulatory complexity. One approach, using the tools of linguistics, is to measure the dimensions of complexity. Vagueness, viewed in terms of processing complexity, is resolved partly through a reference to a particular context, such as a precedent or market practice [51]. Another approach, relying on the notion of comprehensibility, points to the principles of conciseness, change, coupling, or complexity [50], as mentioned above. The difference between, on one hand, humans interpreting and implementing the law and, on the other hand, computers interpreting and implementing software is a matter of degree rather than kind, but since humans are more flexible and intelligent than computers, the law does not have to be as explicit or precise as software [50].

4. The Case of Offshore Wind Energy Generation

We now review the case of offshore wind energy generation in light of our three maxims. Our main inference is that the maxims provide sensible and clear guidance on when to engage in, modify, or exit from support policies. We draw on UK, US, and EU policy examples.

There are policies of support for offshore wind plants through carbon pricing or subsidies for investment or production. Does the prevailing regulatory arrangement support the aspiration for efficiency and equity, assist in the continuous optimisation of a policy portfolio, or manage the menace of linguistic entanglements? Our starting point is the regulatory framework. The proper pricing of environmental externalities, one of the most important market failures in energy markets, is the most efficient policy [55]. The key question is how to put a price on carbon over time. A group of economists has affirmed that a carbon tax calibrated not only to increase yearly until emissions reductions goals are met, but also to be revenue neutral, would encourage innovation, quicken the spread of carbon-efficient goods or services, replace less efficient and cumbersome carbon regulations, and establish regulatory certainty for clean energy investments [56]. However, there is theory and evidence that the carbon price should be high today and fall over time, as both the cost of emissions reductions (due to technological change) and the "insurance" value of mitigation decline [57]. A falling carbon price path highlights both the importance of near-term action and the huge costs of delay [57]. In the US, an enhanced emphasis on

near-term implementation issues changes the cost rankings of climate policy alternatives, and the attractiveness of some previously disregarded climate policies, therefore, could improve [58]. Thus, operating as a portfolio, policies supporting innovation to cut the cost of low-carbon technologies may have to go hand-in-hand with a robust carbon price, if politically feasible.

In the US, due to political considerations, amongst other factors, the level of carbon pricing might be socially suboptimal at the start but can increase over time, and less-efficient policies in the portfolio could then be scaled down [41]. Of course, policy influences and responds to market conditions, and therefore, flexibility is crucial. For example, in the event of abundant natural gas from shale, local air pollution and greenhouse gas emissions are reduced, but the deployment of renewable energy is weakened, and the emissions reductions are less than those from a carbon price rising linearly to approximately $46/tCO2 in 2040 [59]. In other words, lower carbon fuels in the global energy market are another area for optimised policy support.

Given the political difficulties potentially hindering the implementation of a carbon price, the next best policy is to promote low-carbon technologies, such as wind or solar, for electricity generation [50]. Investment or production tax credits for renewable energy projects make sense only if carbon is not taxed [41]. Actually, in the struggle against global climate change, pricing carbon (or other greenhouse gases) is unlikely to be enough, especially if political challenges get in the way, and subsidising innovation to drive down the cost of low-carbon technologies is probably necessary [60]. There is theory and evidence, for instance, that reducing carbon emissions is feasible only through a successful transition to clean technology [61]. The optimal policy relies heavily on research subsidies, and using carbon taxes alone or delaying intervention has significant welfare costs [61]. In addition, most greenhouse gas emissions are from developing countries where a large carbon tax not only slows the climb out of poverty, but also seems less politically acceptable than in developed countries [41].

Fortuitously, the reductions in the costs of low-carbon technologies, such as wind or solar, and their subsequent deployment have been faster than expected [62], regardless of the debate on the attractiveness of subsidised investments or the extent of beneficial free-riding. In the US, federal subsidies for renewable energy, including biofuels for transportation and renewable electricity generation, fell by 56% between FY 2013 and FY 2016 [63]. In the UK, offshore wind prices resulting from an auction in 2017, at £57.50/MWh and £74.75/MWh, were lower than the cost of new nuclear power of £92.50/MWh or the levelised cost of gas-fired power plants [64], and offshore wind prices resulting from another auction in 2019, as low as £39.65/MWh, were approximately 30% lower than those resulting from the 2017 auction [65].

Yet policy support for low-carbon technologies is likely to continue for some time. The UK has the largest share, approximately 34%, of offshore wind capacity in the world, and is advocating a "modern Industrial Strategy" to establish up to 30 GW of offshore wind generation capacity by 2030, create thousands of high-quality jobs, foster a strong supply chain, and promote a five-fold increase in exports [66]. In the UK, the anticipated investments in offshore transmission assets, between £8 B and £20 B by 2030, are higher than those in onshore transmission assets [67]. Moreover, the adjustment (if not optimisation) of the policy portfolio has to account for the possible response of investors. In the UK, there is a recommendation to develop contingency plans bringing forward additional low-carbon generation in the event of a delay or cancellation of planned projects [64].

In the US, federal subsidies for renewable energy, including biofuels for transportation and renewable electricity generation, received 46% of total federal energy subsidies in FY 2016 [50]. Federal tax credits, such as the Investment Tax Credit ("ITC") and the Production Tax Credit ("PTC"), are key drivers of investments in wind or solar projects in the US [68]. In modelling simulations going out to 2050, the extension of the ITC/PTC results in 40% more wind generation than in the reference case, but wind projects are built later (rather than earlier) in the study period [68]. By contrast, the immediate sunset of the ITC/PTC

results in lower wind generation than in the reference case, but wind projects, in order to claim the credit, are built earlier than market conditions would otherwise support [68].

In general, likely rooted in linguistic entanglements, the imbalance between the marginal benefit of transparency and the marginal cost of complexity in regulation has elevated the risk of misperceiving the social implications of energy regulations. For example, in the US, "... statutory and regulatory concessions to fossil energy inevitably distort how the costs of bringing new energy technologies to scale are perceived. Costs for both fossil and renewable resources are clearly mis-calibrated, with social costs of fossil energy still unaccounted for in terms of price, and environmental and health benefits of renewable energy going mostly unrecognised in economic terms [69]". Indeed "To date, energy regulators have at times operated within their silos without fully considering how their regulations interact with — and often conflict with—approaches adopted by other regulators [69]". In particular, the Inflation Reduction Act of 2022 ("IRA"), seeking to transform the US energy landscape through incentives promoting clean energy technologies in the electric power, transportation, and buildings sectors [70], does not seem to be immune to linguistic entanglements and the inefficiencies and inequities they tend to bring forth. The IRA provides an opportunity for additional financial incentives if clean energy projects are located in an "energy community" ostensibly suffering from the transformation of the energy landscape [71]. Under the IRA, one of the definitions of an "energy community" relies on the location's unemployment rate and share of fossil fuels in local tax revenue [71]. However, due to the lack of clarity in the relevant IRA provisions, the qualifying regions cover a massive 39% percent of total US land area, yet hardly correspond to areas considered to actually have such energy communities (e.g., most or all of North Dakota, Wyoming, and Oklahoma, in which fossil fuel production is a crucial aspect of local economies, are excluded) [71]. Moreover, it is not straightforward to ascertain the revenue obtained by local governments from fossil fuels [71]. For these and other reasons, therefore, there is non-trivial risk that IRA semantic structures inadvertently disregard the energy communities "likely to be hardest hit by a transition to a net-zero energy system [71]".

Nevertheless, a balance has to be found between, on the one hand, the scope for freedom and creativity in operation or investment decisions under alternative regulatory arrangements and, on the other hand, the natural inclination for coordination externalities in the electric power industry. Onshore or offshore wind projects, for instance, can claim the ITC instead of the PTC, but offshore wind projects are assumed to claim the ITC (rather than the PTC) because their capital costs are higher than those for onshore wind projects [72]. In other words, consistent with their economic characteristics, offshore wind projects are expected to creatively engage in self-selection in response to policies affecting investment decisions. Yet generation and transmission are complements and substitutes in operation and expansion, and there are many challenges associated with the design or implementation of incentives for attracting investments [73]. In particular, network connections and corresponding investments are specific to individual projects [65]. It would be ideal for cost-optimal transmission grid extensions to harvest renewable energy at sites where wind or solar availability is high [74], but the immense investment costs related to the establishment of offshore wind energy facilities could weaken the resolve to address the coordination externalities between generation and transmission investments.

In the US, the qualifying deadlines or phase-out schedules of ITC/PTC have been changed several times since their establishment in 1992 [64]. The stock of infrastructure, as a consequence, would likely have various vintages of investments, each of which reflects the innovation and learning, in essence, the vitality of animal spirits, in response to the adjustments in policy support over time. However, an element of durability in policy may be needed to moderate the adverse impact of regulatory volatility on investment decisions. There is evidence, for instance, that the enactment of a renewable portfolio standard in the US encouraged a smaller increase in renewable energy investments in states with a history of regulatory reversals [75]. Under conditions of asset specificity, a perception of regulatory instability not only restrains investments, but also undermines regulatory efficacy [75].

Investments required under a particular regulatory policy may be specific to the policy (in much the same way that investments required under a contract between firms may be specific to the contract), and if the policy (contract) changes, the value of the assets specific to the policy (contract) is markedly reduced [75].

Indeed, the inadvertent mutation of policy durability to rigidity risks the codification of linguistic entanglements under the law. Consider, again, the PTC. Prices for wholesale electricity, predominantly in bilateral spot markets in the US Pacific Northwest, are sometimes negative because certain generators, such as nuclear, hydroelectric, or wind, are unwilling or unable to cut output temporarily when demand is weak [76]. Various reasons have discernibly encouraged generators to operate continuously even if supply outstrips demand, such as technical or cost recovery factors in the case of nuclear plants; compliance with environmental regulations (e.g., the control of water flow maintaining fish populations) in the case of hydroelectric plants; the PTC attracting payments for sold electricity in the case of renewable energy generators (mostly wind); and maintenance or fuel-cost penalties on shut-down or start-up decisions in the case of large steam turbine plants (usually fossil fuel) [76]. In other words, part of the supply inflexibility resulting in negative prices is due to the provision of the PTC for renewable energy generation. There is evidence, in fact, that wind plants claiming the ITC are incentivised to generate at least 10% less electricity than those claiming the PTC [77]. However, there is also evidence in four of the largest US electricity markets that marginal emissions tend to be higher (not lower) when electricity prices are negative [77]. In other words, an output subsidy, such as the PTC, effectively encourages electricity production, but could be less efficient than a Pigouvian tax for the control of carbon [77].

The EU's policy on supporting marine renewables energy is another illustration of policy optimisation. The overall aim is for the EU to align itself with the Paris Agreement. The Climate Law, which forms the core of the EU's Green Deal and enshrines a target of reaching carbon neutrality by 2050, will demand a large scaling-up of offshore renewable energy [69]. This can be met under the recast, 2018 Renewables Directive [70]. This directive introduced a new, binding, and renewable energy target for the Union as a whole for 2030 of at least 32% of gross final energy consumption. The trajectory towards this target has its reference points in 2022, 2025, and 2027. Under the Energy Union governance regulation [71], the Commission may take early corrective action to close the gaps in meeting the reference points of the renewables trajectory, effectively to optimise the policy portfolio. A new EU-level renewable energy financing mechanism will be set up to reduce the cost of capital for renewable energy projects and enhance regional cooperation between Member States and between Member States and third countries, through joint projects, joint support schemes, and the opening of support schemes for renewable electricity to producers located in other Member States.

Pursuant to the principle of subsidiarity, in the main, the Union-wide target is to be met through Member States' action. The Commission, through its state aid policy, is encouraging Member States to optimise national renewable energy support schemes, for instance, to consider alternative instruments and phase-out the current system of direct support as maturing low-carbon technologies become cost-competitive. That could be supplemented by the accelerated implementation of cross-border offshore wind projects that are interconnected among North Seas riparian States to accelerate the cost-efficient deployment of offshore wind energy [78]. The sovereign rights of these states under UNCLOS are essentially re-structured in a self-enforcing contract in order to incorporate and unify their rights of use over the shared resource. This is the basis for developing transboundary market arrangements (i.e., electricity market rules and governance) to ensure an efficient utilisation of grid and market resources and address legal uncertainties. These will need to address novel questions of distributional effects of such projects on costs and revenues of market actors and repercussions on national renewable energy support schemes in order to incentivise efficient investment.

The 2002 EU hydrogen strategy prioritises "green" hydrogen from electricity that is renewably generated [79]. This will be supported across the value chain by the European Clean Hydrogen Alliance, a collaboration between public authorities, industry, and civil society, and which is effectively an optimised state aid policy. To ensure the availability of clean hydrogen for industrial sectors such as steelmaking, the Commission intends to promote so-called carbon contracts for difference ("CCfD") that would remunerate investors by paying the difference between the CO_2 strike price and the actual CO_2 price on the EU carbon market. Importantly, the policy portfolio in the EU could eventually shift in emphasis to carbon pricing determined under the EU emissions trading system [80].

Thus, as these examples from the US, the UK, and the EU demonstrate, it is ideal to establish a policy portfolio for supporting marine energy resources, optimising it to evolve with conditions in global energy markets, developments under the law of the sea, and frameworks for international investment protection.

5. Policy Exit and International Investment Law

As noted above, we have articulated a set of maxims constituting a coherent framework for the rationale, adjustment, lucidity, and exodus of state action in the context of low-carbon marine energy policy under the international law of climate action, the law of the sea, and international investment law. This has enormous legal implications for a state contemplating a massive change in or complete withdrawal of policy on which major commercial decisions have been premised.

Under the governance of marine resources set out in Section 3, international investment protection law may stand in the way, or at least create legal predicaments for governments. In particular, the record of international case law, as pointed out above, is rather mixed as a source of clear guidance as to when the support policy can be ended lawfully. There is a need to go further and seek a firmer conceptual grounding. Exit from policy support for investments in clean marine energy becomes a case for the idea of an efficient breach of contract and the associated procedural and substantive aspects of policy optimisation. Our maxims assist both governments and investors not only to better understand when policy exit would be efficient, as well as equitable, but also to design and manage their legal relationships over time accordingly.

An efficient breach of contract is a figure of the law and economics literature that helps to conceptualise a paradox of legal certainty and efficiency. (Private law) contracts create legal certainty for the parties that promises will be kept and the initial efficient bargain will be realised. Yet circumstances my change, and under certain conditions, the overall efficiency of both parties may be greater if the contract is not carried out, that is, it is breach-able with impunity.

This helps address the core problematique of policy exit. This problematique is not abstract. It plays out in the concrete reality of government policy measures taken with a view to incentivising material investor action. This policy, as we demonstrate, will be enshrined in general laws and be applied to investors by public bodies through administrative law-instruments. However, the ensuing relation between the two parties is close and individualised enough that it can be seen as a quasi-contract for analytical purposes. The concept of an efficient breach can then be applied to understand that there are conditions where the initial bargain is outweighed later, with the consequence that the promised support ought to be stopped or altered. This, in turn, opens the door to identifying the conditions under which the policy support is indeed being optimised, striking the appropriate balance between legal certainty and economic efficiency (welfare maximisation). These conditions are procedural and substantive.

First, procedurally. In the law of investment protection, there is a dilemma between legal certainty for the foreign investor bringing much needed investments and flexibility for the host government to optimise policy in light of changing circumstances. The appropriate scope for regulatory change that does not entail the need to compensate the investor is under serious debate and scrutiny both legislatively and judicially. Legislatively, the modernised

treaties themselves now provide that: (a) the host state will have regulatory autonomy as a legitimate interest; (b) the withdrawal of a subsidy by itself does not entail compensation; and (c) the state has a wide margin of appreciation up to the limit of arbitrariness. This is part of the new investment protection-cum-trade agreements that the EU is currently negotiating with Vietnam, Japan, Singapore, and Mercosur.

Of course, there are many other bilateral treaties that do not enshrine such flexibility. In such cases, another way of securing flexibility is to insert a relevant clause into the contract that the government and the investor will conclude in order to govern their investment relationship. Indeed, the investment contracts that a host government will conclude with a foreign investor are an underused tool. They should contain a clause that spells out both the power of the host state to end any policy support and the conditions under which it would do so. The 2018 EU Directive on Renewables charts another procedural avenue for exit from policy support. Article 6 of that directive provides that the member state may adjust the level of support in accordance with objective criteria, provided that such criteria are established in the original design of the support scheme [81].

This begs the substantive question of why a state should exit such policy, and hence, why the investor should expect it to happen, rather than how. Our maxims address this very question of why. They provide a set of decision-making tools for governments and investors on when and under what circumstances policy support could and should be rationally withdrawn. Governments can rely on these tools in the exercise of their discretion. Investors can form reasonable expectations of alternative courses of government action, enhancing the security of their business planning.

Furthermore, our maxims strengthen the protection of foreign direct investments in a rational manner. They indicate the conditions under which policy exit is optimal. That maxim is for the investor to keep generating bona fide economic benefits but not to engage in rent-seeking. Another exit, either formally or informally, would not be optimising the policy. For example, Mexico's policy supporting offshore renewable energy projects grants credits that can be sold to large energy consumers required by law to buy a certain amount of renewable energy. Yet, in 2019, the Energy Secretariat also granted clean energy credits to state-run renewable energy projects. Six foreign and Mexican renewable energy companies have launched legal action in Mexican courts against the rule change, arguing that it would severely dilute the value of existing credits and harm clean energy investment [82]. It is doubtful that this exit from a policy of attracting private investment would meet the three maxims.

6. Conclusions

This article proposes an optimisation analysis from the perspective of efficiency and equity of regulatory policy. It articulates three maxims to strengthen the substance, process, and timeline of marine energy law and policy. A main finding is that our maxims will give coastal states guidance on whether a support policy is justified initially and when it is justified to exit such a policy, and on the instrumentalities. At the same time, they inform investors as to the conditions for such changes. States, investors, or civil society groups alike will appreciate that, in the aspiration for social welfare maximisation, the continuous optimisation of carbon pricing, subsidy provision, or other elements of the policy portfolio is rational.

This article provides the fundamental insight that states have a portfolio of policy options, and another is that their optimal use is a function of time. Policies may be started and ended as economic, political, or legal conditions change.

Such policy optimisation is taking place within an existing governance structure based on international law. Support policy ultimately must be enshrined in law to be effective. Law, then, has several functions. It is a driver of change, as is the case for the Paris Agreement demanding of states to increase the use of clean marine energy sources in the transition to a low-carbon economy. It is an enabler of change by providing competences and instruments for transboundary cooperation. Additionally, it is a mechanism for the

control of such change. One legal implication for international investment protection within the law of the sea is that coastal states may have to establish a policy exit clause in contracts for investments in their EEZs or continental shelves.

Our maxims assist in diffusing the tension typically arising across efficiency, policy flexibility, and regulatory autonomy, on the one hand, and legal certainty for business planning, on the other, in the context of marine energy law and policy. The lesson arising from the discussions above is that much of the damage due to suboptimal regulation is avoidable. Our maxims provide both the foundational concepts and practical steps. The menace of inefficiency or inequity largely depends on whether regulatory frameworks, seeking to correct market failure and operating under the principle of subsidiarity, respect the boundaries between one social organisation and another. A continuous and well understood process of policy portfolio optimisation maximises the scope for social benefits by controlling the hazard of rent seeking or state failure and introducing the idea of a sunset clause in policy. Finally, the optimal amount of linguistic detail in regulation not only strikes a balance between the marginal benefit of transparency and the marginal cost of regulatory complexity, but also facilitates the exercise of creativity and innovation in the pursuit of social welfare maximisation through continuous policy portfolio optimisation.

Marine clean energy resources illustrate these points well, both because states are now focusing on them in the transition to a low-carbon economy and because they are governed by a complex regulatory regime composite of international and domestic law. It would be interesting to explore situations in which the continuous optimisation of the policy portfolio would have helped to overcome inefficiencies or inequities and what the relevant regulatory arrangements and embedded linguistic entanglements in the law have been.

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