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SPECIAL ISSUE ARTICLE

Synergy-as-principle in global climate regulation

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Abstract

Isolated policy interventions are unlikely to effectively address a highly complex and cross-cutting issue such as climate change. Such issues require more integrated or holistic approaches. The concept of searching for synergy across multiple objectives could then achieve better outcomes than a default position of trade-off and collision. This contribution construes a novel principle of synergy to structure integrated decision-making in global climate regulation through law. This article grounds its argument theoretically in the analysis of global regulation. It first develops the rationale of a regulatory principle justifying synergetic choices in rule-design and rule-application. It then sets out a typology of regulatory synergies – reinforcing, functional, and dormant or connecting – which can be arranged on a sliding scale and delivered with appropriate policy tools. It also suggests pathways for synergy-as-principle to advance beyond an effective strategy to acquiring legal bindingness within global regulation through law. Finally, this article tests the workability of this principle in four scenarios where climate protection and adjacent objectives intersect. Beyond this analysis of global climate regulation, this article points to the deeper normative foundations capable of supporting a non-exclusionary global community.

1 | INTRODUCTION

Isolated policy interventions are unlikely to effectively address a highly complex and cross-cutting issue such as climate change. Such issues require more integrated or holistic approaches, which synergy may provide. Synergy is not an exclusively legal concept. In economics and biology, synergy indicates that a whole can be more than the sum of its parts. This concept can, so this contribution argues, form the rationale of a principle within global climate regulation. Such a principle, which justifies regulators advancing *several* objectives and structuring their decision-making accordingly, would secure better outcomes across multiple objectives than a default position of trade-off and collision. Over time, it can mature from a regulatory strategy into a shared legal principle of global regulation through law.

This article grounds this principle of synergy in the analysis of global regulation through law. This analysis assumes a functional definition of such regulation. Although regulation is an often-used term, the literature remains sparse on any definition. To begin with, regulatory objectives can be achieved through means such as nudging, or social and religious norms. But the present definition of regulation will refer to law as the primary instrument. Such regulation can then be understood as the pursuit of public policy objectives through legal directives, ranging from legislation to administrative rule-making (Adler, 2010). Law is used in the positivistic sense of state-centred law. This will generally exclude 'alternative', softer forms of law, such as indigenous laws that develop in other ways and captured within a concept of legal pluralism (Teubner, 1997). Global regulation refers to objectives shared by states and international institutions across multilevel global governance and pursued through synchronous regulatory processes.

Principles are essential to this regulation through law. Principles can generally be described as norms that have unlimited application and in this way are distinct from rules (McCormick, 2007). The function of

a principle depends on the context. In the regulatory context, principles provide a rationale that justifies regulators' decision-making in designing legal directives, selecting the objectives of the rules and the measures to achieve the objectives. Principles can be implemented in a global setting (Halpin & Roeben, 2008). In this setting, principles are disseminated horizontally between domestic legal orders and vertically between domestic law and international law. That dissemination leads to the principle being established as domestic law and international law. As a result, domestic law and international law share the same principle. This sharing will entail similar outcomes in terms of rule-making, rule-interpretation, and rule-application globally (Roeben, 2021).

Principles will ultimately determine whether the global regulation of climate change is effective and efficient. A problem then emerges. The established principles of global regulation are single-dimensional, in the sense that they prioritise one specific policy objective over all other objectives deemed to be colliding. The principle of proportionality, which is widely established in domestic laws and international law, illustrates this single dimensionality. It requires regulators to select one objective among a set of competing objectives. For instance, under the principle of proportionality, the pursuit of a selected economic policy objective must only not disproportionally impact on competing private or societal interests or objectives. Yet, such single dimensionality is not suited to navigating a complex policy field such as climate change.

This article first lays out the problem in global regulation that has relied on single-dimensional principles. It then construes a novel principle of synergy. It first identifies the rationale for a synergetic, multidimensional regulatory response in which greenhouse gas abatement, for instance, sits alongside economic stimulus, health, and energy, substituting the default position of collision and trade-offs. It then sets out a typology of reinforcing, functional, and dormant (connecting) synergies that will aid in the application of the principle. This article further describes pathways for such a principle to acquire legal bindingness. In the final part, this article exemplifies these analytic findings. It discusses several scenarios where synergetic approaches that could lead to climate protection could be combined with adjacent objectives for better outcomes.

Policy Implications

- Climate protection should be seen as a regulatory challenge across multiple dimensions and objectives. The response is governed by regulatory principles that should be shared across the global governance system to ensure a harmonising effect.
- The existing single-dimensional principles, which all prioritise one objective over colliding others, are not effective in this complex context.
- In this situation, regulators should adopt a regulatory strategy that maximises synergies. Synergy-as-principle could across multiple objectives achieve better outcomes than a default position of trade-off and collision.
- Under a rationale of synergy, regulators should consider synergetic outcomes through action in three categories; reinforcing synergies, functional synergies, and dormant (connecting) synergies.
- The increasing formalisation and authorisation of synthesis-as-principle as international, regional, and domestic law will create pathways for synergy to move from regulatory strategy to binding legal principle.

2 | CLIMATE ACTION AND THE LIMITS OF THE SINGLE-DIMENSIONAL PRINCIPLES OF GLOBAL REGULATION

The introduction to this article has emphasised that principles are an essential element of global regulation. Indeed, global regulation can be understood as a tiered normative order, where principles occupy one tier and rules another. A distinction can then be placed within the principles tier, relating to the regulatory action that principles justify. Most if not all the established principles of global regulation are single-dimensional. They justify regulators' prioritising one objective, while other objectives are assumed to be in collision with the primary objective and relegated to a secondary status. These principles thus effectuate a trade-off that at best minimises the negative impact on those other objectives. Even the principle of sustainable development may now meet this description of a single objective parameter. This single dimensionality characterises regulatory principles whether they apply generally across all or most policy areas or to a specific policy area only.

Proportionality, for instance, is a general principle that is single-dimensional and applies across all policy areas from policing to environmental regulation (Radopoulos, 2017). The rationale of the proportionality principle is that the regulator selects the priority objective and minimises the impact on colliding secondary objectives. However, it does not require the regulator to achieve any other than the primary objective. The proportionality principle implements this rationale through a three-pronged test. The first criterion of suitability demands that the selected

measure achieves the priority objective. The second criterion of necessity demands consideration of any alternative measures that could also achieve the priority objective but would be less impactful on colliding objectives. Both ensure that the selected measure is narrowly tailored. The third criterion, also called true proportionality or proportionality in a narrower sense, considers the impact on the colliding objectives, which must not be excessive.

Sectoral regulatory principles also privilege a specific objective. A non-exhaustive set of environmental principles will be discussed here as examples of such sectoral principles. They also illustrate the structural deficiencies and segmentation, and how they rather perpetuate and cement it and not resolve it, in a systematic way. These principles protect environmental goods and justify imposing restrictions on economic activity in the pursuit of that objective. The Precautionary Approach (PA), the Polluter-Pays-Principle (PPP), and the principle of Environmental Impact Assessments (EIA) are now well-established in international law, regional law, and domestic legal orders. At the international level, these were first formalised in the 1992 UN Declaration on Environment and Development - the Rio Declaration (Sands et al., 2018, Vinuales, 2020). The PA is recognised in Principle 15 of the Rio Declaration. The rationale of the PA is to justify environmental decision-making under uncertainty. The principle is implicit in much binding international environmental law. The 2024 *Advisory Opinion* of the International Tribunal for the Law of the Sea has stated this for Part XII of the UN Convention on the Law of the Sea, where it informs the due diligence obligation of States Parties regarding the prevention of the deleterious effects of carbon emissions and global warming on the marine environment. The PPP is formalised in Rio Principle 16. It protects environmental goods by directing decision-makers to adopt instruments, such as fees for permits or taxation, to internalise the environmental costs of an economic activity. The EIA principle is formalised in Rio Principle 17. It protects environmental goods such as clean air procedurally, directing regulators to adopt a procedure to assess environmental effects alongside any intended economic or other benefits. The EIA principle therefore could be said to cover several dimensions. But it can still be classed as single-dimensional, because it sees the environmental objective to be in collision with any economic or social objectives.

Single-dimensional principles explain the multiple occurrences of regime collisions and competition. This role of principles is an explanation additional to the extensive theoretical and empirical literature that cannot be discussed here. Fischer-Lescano and Teubner (2004), for instance, have used system-theoretical insights to argue that collisions are inescapable. Returning to the role of principles that this article foregrounds, regulatory principles, be they of horizontal or sectoral application, justify regulators acting along a single dimension to prioritise one objective. This can result in a specific regulatory regime advancing this objective to the possible detriment of other objectives deemed to be colliding. Even if several principles are applied together or simultaneously, a regulatory regime can result that leaves out objectives that are also affected (Morgan, 2016). The climate challenge is a case in point. The climate regime, codified in the UN Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, has been set up originally along a single dimension of reducing Greenhouse gas (GHG) emissions. It requires states to make pledges to make such reductions, the so-called Nationally Determined Contributions (NDCs). However, in more recent years, the UNFCCC had experienced an opening to include more elements than just GHG reductions, given the pressures from Parties and NGOs. These now include gender, adaptation, etc. The Paris Agreement ushered in an enhanced focus on cross-cutting issues, to the extent that decision-making by the Conference of the Parties serving as the Meeting of Parties to the Paris Agreement (CMA) now guides the decision-making in a more multidimensional way. The 2023 Global Stocktake decision among other things commits states to a just and orderly transition away from fossil fuels, which also comprises other considerations than emission reductions, such as the workforce and energy security.

3 | CONSTRUCTING A PRINCIPLE OF SYNERGETIC REGULATION

Single-dimensional principles mark only one side of the distinction placed within the normative tier of principles in global regulation. They leave the other side of that distinction as an unmarked space. The gap can be filled by other principles that are multidimensional rather than single-dimensional. This Part construes a novel principle of synergetic regulation that can guide regulators in complex, multidimension scenarios, of which climate protection is one. In complex policy scenarios, regulatory decision-making should integrate multiple dimensions to achieve better outcomes across a set of objectives that are equally important. This Part construes a principle of synergy that would enable such integrated decision-making in global regulation. it does so in three steps, building on the analytic structure of regulatory principles, setting out the rationale, then the decision-making structure, and finally the legal bindingness of the principle.

Principles embody a rationale (Halpin, 2004). The rationale of the principle is searching for synergetic

outcomes in multidimensional regulation. In law, principles – as opposed to rules – are open to the (non-law) environment (McCormick, 2007). They are capable of absorbing ideas hedged outside of the law. The idea effectively managing complex processes through synergy has origins outside of the law, namely, biology, anthropology, and economics. In these disciplines, synergy indicates that a whole can be more than the sum of its parts. Synergistic phenomena are combined (or "co-operative") effects that can only be produced by two or more component parts, elements, or individuals (Corning, 1995). In the 20th century, the idea was refreshed by Ruth Benedict, an anthropologist. She used the term synergy in writing about communities where cooperation was rewarded and proved advantageous to all. The idea was transferred to the business world by Abraham Maslow (1970). There, it has underpinned thinking about combining firms and other economic actors for greater welfare effects than could be produced by each acting alone. Campbell and Goold (2002) define it as 'links between business units that result in additional value creation', a thought further developed by Benecke (2007). At the intersection between political science and international law, Rakhyun Kim (2020) has explored these issue-trade-offs, synergies, regime-interaction, and problem-shifting. How can this non-law concept of searching for synergistic effects be absorbed into a regulatory principle? Such principles must have a rationale that justifies legal decision-making. The concept of synergy is normative and can therefore form such a rationale because it justifies regulators' choices to advance several objectives so that the whole regulatory package is more than the sum of its parts. For regulation through law, Trachtman (2013) has already pointed out that the preferred synergetic outcomes arise if regulatory action links different policy areas in ways that result in higher welfare.

3.1 | The structure of a principle of synergy

To give effect to this rationale, the principle will need to provide a decision-making structure for regulators to create synergies. In this structured process, the first step is to clarify the relevant objectives that regulators ought to consider. The second step is to clarify the relations between these objectives. The relations that exist can be typified into categories. This typology will comprise at least three categories of possible synergetic relations that can exist between objectives. These can be labelled reinforcing, functionally supportive, and dormant (connecting) synergies. Only the first of these has received some attention in the literature (Trachtman, 2013). These will be discussed in turn in the following three sections. The discussion will, however, be limited to setting out this typology analytically. The following Part III of this article will exemplify this typology in concrete scenarios.

3.2 | Reinforcing synergies

The potential for synergy arises most clearly between two policy objectives that reinforce each other (Trachtman, 2011). Where two or more objectives can be thought of as mutually reinforcing, a single measure will produce a synergetic outcome. It will at the same time remove potential or existing collisions between the two objectives. An example of such reinforcing synergies exists between climate protection and energy security. Regulatory support for fossil fuels generates a collision between the two. However, shifting the regulatory support to the renewables industry produces reinforcing synergies. It advances energy security, but it also protects the climate from harmful greenhouse gas emissions. In fact, that shift furthers synergy with the objective of public health as fossil fuels will pollute the air and damage human health. In turn, the climate and health benefits support the energy security objective. Climate protection, energy security, and health therefore become reinforcing of each other.

3.3 | Functional synergies

Another type of synergy is where two objectives are functionally connected. In a functional connection, one policy objective is dominant while others assume the function of supporting that dominant objective. They are placed in the position of securing enforceability, which will make the substantive objective more valuable, increasing overall welfare. Enforceability in this sense extends beyond judicial or administrative enforcement to cover all legal mechanisms for controlling compliance. Thus, for instance, the UN Convention on the Law of the Sea's dispute settlement mechanism can be used to enforce provisions of the global climate regime that are otherwise devoid of enforceability. Human rights treaties fulfil similar enforcement functions, where they are interpreted to integrate broader concerns that are not by themselves enforceable under international law, given that such treaties are underpinned by enforcement mechanisms, both courts – the European, the Inter-American and African Court of Human Rights – as well as the non-judicial mechanisms of the Optional Protocols to the universal human rights treaties.

3.4 | Dormant synergies

In most instances, two or more objectives are inherently separate from each other. They are neither mutually reinforcing nor in relation of functional support.

If each objective is pursued independently and to maximum effect, then this is likely to be detrimental to others. Collision between the objectives results by default. By contrast, two or more objectives must be actively connected to realise dormant synergies between them. The supporting regulatory regime must contain appropriate measures. Several types of such measures exist. One measure is the 'package' that combines several objectives into a single regulatory regime, be it composed of several pieces of legislation or a treaty. Further, transition periods, exceptions or side-payments may be appropriate measures to connect other objectives. Side-payments, in particular, broaden the regulatory regime beyond the core objective to also cover other ancillary objectives to secure the consent of certain actors, enabling the entire regime to enter into force.

3.5 | A sliding scale

Synergy aims at the integration of policy fields. Such integration may not always be feasible or desirable. In assessing a scenario, regulators will question what aspects should be taken into consideration; there is always a risk to leave something out. The principle of synergy, with the typology of reinforcing, functional, and dormant (connecting) synergies narrows the question whether it is feasible and desirable to seek synergies in all cases. This may not always be the case, objectives may have no synergetic relations, or may even be contracting one another. Yet, the typology enables regulators to screen and assess situations for potential synergy. Moreover, it is suggested that this typology implies a sliding scale. The types represent a gradual scale, where it is easier or more challenging to establish synergies regarding some categories. On this scale, reinforcing synergies is the lowest hanging fruit, whereas it might be more challenging to establish functional synergies. Referring to the typology, regulators thus can order their assessment of the possible synergistic outcomes according to their evident payoffs. The first-best solution then will be to seek reinforcing synergy. That is easiest to realise and the payoffs for one contemplated measure against two objectives are easiest to demonstrate. Functional synergies are a second priority. Connecting synergies is the third priority, and typically the most difficult to realise. On the other hand, payoffs may be greatest here.

3.6 | 'Packages' and other policy tools to organise synergetic outcomes

The above assumes that the regulator is a unitary entity. However, practical fulfilment of policy integration and mainstreaming faces specific challenges. An extensive empirical and theoretical literature (Dellmuth & Gustafsson, 2021; Jordan & Lenschow, 2010; Trein et al., 2021) discusses challenges associated with policy integration and mainstreaming regarding climate protection, including actor interests and power, divergent problem framings, lack of knowledge, and difficulties to establish interdependencies across different subsystems. In some instances, synergies might not be achievable, but even small steps might be useful in cases that more profound synergies cannot be established (Candel & Biesbroek, 2016). A fuller discussion of these theories would go beyond the scope of this article.

It suffices to say that climate policy has introduced new tools for regulators to organise integrated decision-making and overcome at least some of the problems of siloed decision-making. A key tool is the regulatory package that has emerged past at domestic, regional, and international levels. The tool has several characteristics. Under a unifying aim such as the Green Deal or similar, the regulatory package pursues expressly objectives of economic recovery, climate action, energy transition, and social justice. This instrument then advances synergistic outcomes procedurally. In the preparation stage, regulators can identify a matrix of objectives and policies, and rank planned regulatory measures for their pay-off against several objectives. At the approval stage, legislators may take a holistic view of the whole package and ensure simultaneous entry into force of the whole set of objectives and supporting regimes.

Examples of such packages can be found in the European Union, the African Union, as well as in the domestic law of the USA. The EU Green Deal, for instance, as the set of legislative proposals on the EUs climate, energy, transport, and taxation policies, has the primary objective of reducing net greenhouse gas emissions by at least 55% by 2030, compared with 1990 levels (Regulation (EU) 2021/1119). However, this instrument has worked primarily to achieve reinforcing synergies. There, the package matrix can transparently align adjacent objectives with a specific planned policy measure (see further discussion of the European Green Deal in Part III). The instrument has not yet been used to generate functional or connecting synergy but that should be done in the future. The package instrument could help identify the impact of planned measures on adjacent objectives. Where such impacts have been identified, measures to realise any dormant synergies could be identified. In international law, package deals that combine several different issues into a single treaty have been pioneered in ocean governance. The 1982 UN Convention on the Law of the Sea (UNCLOS) is an example. It also covers the causes and effects of climate change which are deleterious to the marine environment (Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law, 21 May 2024). The

2024 Treaty on Biological Resources Beyond National Jurisdiction (BBNJ), which implements UNCLOS, combines the per se unrelated issues of Genetic Marine Resources and Area-based Management and EIA. The BBNJ creates connecting synergies between these together and therefore has been aptly described as 'four treaties' (Bodansky, 2024).

A second tool is institutional cooperation across treaty regimes. The BBNJ now realises dormant synergies through such cooperation (Roeben, 2005). UNCLOS and the BBNJ treaty each have their own separate institutional apparatus – the International Seabed Authority (ISBA) which is to administer the seabed beyond national jurisdiction (the Area in Part XI of UNCLOS) and the Conference of the Parties of the BBNJ. The BBNJ now provides that its conference should not 'undermine' that of the ISBA. These two bodies thus are to ensure that the respective regulations they develop with respect to management of the seabed produce synergetic outcomes. A third instrument to create synergy between fragmented regimes in international law are advisory opinions of international courts, where these bring about consistent interpretations of common issues for all these regimes.

3.7 | Transforming synergy from strategy into a legal principle of global regulation

This section takes the final step in the construction of synergy as a principle of global climate regulation. Principles of that global regulation have a legal quality, not just a factual value. They are legally binding on regulators. Only as a legally binding principle will synergy compel compliance by regulators in every instance, and that compliance can be enforced in judicial proceedings. This frames the question that this section will be concerned with. How does synergy transition from a strategy for regulators that they may choose to apply into binding law that they must apply? Within a broadly positivistic approach, the institutional theory of law convincingly describes the process in which a legally binding rule is formed. The institutional theory emphasises that the process will often start with a factual norm that has attracted compliant behaviour. It is formalisation and authorisation that will then turn such norms of behaviour into legal principles or rules (McCormick, 2007). Formalisation occurs where a document articulates the rule or principle in legally operational terms. Authorisation arises from legal decisions, such as legislation, judicial decisions, or treaty. Formalisation and authorisation will often occur simultaneously but may also take place at separate points in a continuous process. While formalisation and authorisation are constitutive elements of all law, although each individual legal order at the international, regional, or domestic level has distinct modes of implementation.

For synergy-as-principle to acquire legal bindingness, it must follow the specific implementation modes of each respective legal order. In public international law, a norm is transformed into a legally binding principle as either treaty law or customary law. Where a treaty enshrines it, this makes the principle binding on the States Parties to that treaty (ICJ Statute, Art. 38(1)(a)). It can also become binding on all states as customary international law (ICJ Statute, Art. 38(1)(b)). A customary law principle will need to be initially formalised in a universally accepted political document, which is subsequently authorised in state practice supported by opinio juris. The outcome of the process is confirmed ultimately by the International Court of Justice (ICJ). The set of principles of international environmental law has followed this pathway. The 1992 Rio Declaration is a political document adopted with universal support. It formalised the main principles, including the EIA, the PPP, and the PA, but did not authorise them. Rather it provided the point of reference for the process of subsequent authorisations in treaty and state practice. This process has concluded for each principle at different points in time. Thus, the ICJ, in the 2002 *Pulp Mills* case, concluded that the EIA principle was now customary international law (Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010, p. 14). In its 2024 *Advisory Opinion*, ITLOS has stated that the PA is implicit in much treaty-based international environmental law and on its way to becoming customary law. Synergy would be transformed into a principle of customary international law following this pathway. Synergy has now been formalised in the UNFCCC First Global Stocktake decision that mentions synergy (UNFCCC Decision 1/CMA.5, preambular para 12; and paras 131, 163). This initial formalisation could be followed up and concretised, for instance, in one of the regular follow-up world conference outcome documents on sustainable development. The CMA's Global Stocktake decision also provides some authorisation. It rests on Art. 31(3)(a) of the Vienna Convention on the Law of Treaties (VCLT), so this decision is a means of interpreting obligations State Parties have under the Paris Agreement (Minnerop, 2020). Further decisions will need to follow for a new principle of synergy to become customary law. These may take different forms. They can be bilateral or multilateral treaties, state practice, and court decisions.

In EU law, a principle acquires legal bindingness as an unwritten general principle (Schuetze & Tridimas, 2018). These are situated at a medium rung between the primary law of the Treaties and the secondary legislation and decisions of the EU institutions. Such general principles are developed by the Court of Justice of the EU (CJEU) through consistent jurisprudence. Art. 5 of the Treaty on European Union codifies certain general principles, including proportionality, which first came into existence as unwritten general principle. The

category of the (unwritten) general principles of EU law is the pathway for synergy to transition to legal bindingness. This would occur through a string of judgements of the CJEU that recognise that principle in general terms and then progressively concretise it. Alternatively, EU legislation by the European Parliament and the Council could enshrine the principle.

As common legal structures emerge in this way, synergy would become a principle shared across the global governance system. This sharing will be grounded in a deeper normative foundation of climate protection. Across the global community of regulators at international, regional, and domestic levels, this normative foundation is the scientific consensus that climate change is anthropogenic, requiring consistent and purposeful regulatory state action and cannot be left to the market.

4 | CREATING SYNERGIES BETWEEN CLIMATE PROTECTION AND ADJACENT OBJECTIVES

The previous Part has constructed a principle of synergy capable of guiding regulatory choices from collision to synergetic outcomes. These outcomes can be typified as reinforcing, connecting, and dormant synergetic outcomes. This has been an analytic discussion because synergy has not yet matured into a legally binding principle of global regulation. This Part explores how a synergy principle could work in global climate regulation. It sets out three scenarios relating to climate protection and adjacent objectives in which reinforcing, functional, and dormant synergies could be or have been achieved. The examples are drawn from EU and international law. In these instances, regulators have or could have followed a strategy of synergy. Over time, such consistent strategy and practice will lead to the principle maturing into binding law.

4.1 | Synergetic reinforcements: Climate and energy security and conflict prevention

Climate protection and energy security are objectives potentially in collision. Certainly, under the traditional conception of energy security, grounded in the constant supply of fossil fuels, that is the case. In a situation where fossil fuels, which emit carbon in combustion, are relied on, the pursuit of energy security would be antithetical to climate protection. However, climate protection and energy security can become reinforcing if fossil fuels are phased out without a reduction in the overall energy supply.

Low-carbon energy forms support both objectives – climate protection and energy security. This is reflected in the steady increase in the renewable energy target globally within the UNFCCC regime. The First Global Stocktake decision under the Paris Agreement stipulates a world-wide target of tripling renewable energy capacity by 2030 (UNFCCC Decision 1/CMA.5, para. 28a). Regionally, the EU's Renewable Energy Directive, adopted initially in 2018, has also seen an increase in the target. In July 2021, there was a proposal to increase the renewable energy target in the EU's overall energy consumption from 32% to 40% by 2030 as part of the Fit for 55 package that sets out the EU's climate goal of reducing EU emissions by at least 55% by 2030. With the Russia-Ukraine conflict, a further increase to 45% by 2030 was proposed by the Commission in the REPowerEU Plan. REPowerEU aims to reduce the EU's dependence on fossil fuels from Russia by 'fast forwarding the clean transition and joining forces to achieve a more resilient energy system and a true Energy Union' (European Commission, 2022, p. 1). This most clearly demonstrates the direct role that low-carbon sources replacing fossil fuels have in securing energy supply. The legislative agreement of Council and the European Parliament was eventually reached for a binding target of at least 42.5% while aiming for 45%. Each member state will contribute to this common target. The Revised Directive (RED III) was published in the Official Journal on 31 October and entered into force on 20 November 2023.

Energy efficiency can protect both the climate and increase energy security. Globally, there is now a target of doubling the global average annual rate of energy efficiency improvements by 2030 (UNFCCC Decision 1/CMA.5, para 28a). Regionally, the energy efficiency first principle has been given legal strength under the EU Energy Efficiency Directive 2012/27/EU. This principle requires EU countries to put energy efficiency into consideration in their policies, plans and investment decisions within the energy sector and beyond. The strengthening of the EU Energy Efficiency Directive is part of the Fit for 55 package for meeting the European Green Deal and the REPowerEU Plan. There is an 11.7% energy efficiency target to be met by 2030. In addition, the public sector now has a greater responsibility to increase energy efficiency, which includes the annual renovation of 3% of their buildings. Companies will also be encouraged to be more energy efficient. With the REPowerEU Plan, the EU is well-placed to not only ensure greater energy security away from Russian gas supplies, but also is positioned to meet its targets under the European Green Deal (EGD).

Climate change is a cause of conflict and a threat to international stability. It is also a threat multiplier, exacerbating other causes of conflict, such as migration, food security, and access to resources (Kausch, 2021, p. 21; Bremberg, 2019). The EU Green Deal recognises global climate and environmental challenges as a 'significant threat multiplier and a source of instability'.

The EU aims to work with all partners to prevent these challenges from giving rise to 'conflict, food insecurity, population displacement and forced migration' while supporting a global just transition (EU Green Deal, 21). In that, measures to prevent climate change will also prevent conflicts, an instance of reinforcing synergies. However, there are also areas of concern due to the external impact of the EU Green Deal which have been identified and discussed to include social tensions, the conflict impact of the carbon border adjustment mechanism, and resource exploitation in conflict areas (Kausch, 2021, pp. 24–25). Potential benefits of the EU Green Deal for human security abroad include extending economic and industrial opportunity, increased climate ambition through carbon border adjustment and boosting sustainable investment via Green Taxonomy, although there is no indication that the EU is systematically factoring in the peace/conflict impact of internal climate legislation into its policy practice.

4.2 | Functional synergy: Climate and the ozone layer

Climate protection and ozone layer protection are a scenario where two objectives can be moved from collision to functional synergy. The international law-based regimes for protection of the climate and of the ozone layer both deal with greenhouse gases (GHGs) (Medvedieva et al., 2018). Both regimes have however traditionally conflicted with each other. This is primarily because the ozone layer protection regime permitted the use of hydrofluorocarbons (HFCs) as a substitute for the other ozone-depleting substances. HFCs are not ozone depleting. In contrast, the climate regime listed HFCs as a GHG which was to be reduced in line with the quantified emission limitation and reduction commitments of developed countries under the Kyoto Protocol. This conflict meant that while the climate regime based on the UNFCCC and the subsequent Kyoto Protocol to that Convention aimed to reduce HFC emissions, the ozone regime based on the Vienna Convention and the subsequent Montreal Protocol permitted continued utilisation of that gas.

This stark collision between both regimes has been settled in 2016 through the Kigali Amendment to the Montreal Protocol. The amendment entered into force in 2019 and has been ratified by 147 states and the EU. Under it, State Parties have agreed to legally binding targets aimed at ensuring gradual reductions in the production and consumption of HFCs, with developed country Parties starting in 2019 and developing country Parties in 2024 (Environmental Investigation Agency, 2016, p. 2, Morgan, 2016). The Kigali Amendment further notes that it 'will not have the effect of excepting HFCs from the scope of commitments contained in Articles 4 and 12 of the UNFCCC'. Thus, while the production and consumption of HFCs will be controlled under the Montreal Protocol, the reporting of HFC emissions will continue under the UNFCCC. The Kigali Amendment builds synergy between climate change and ozone protection regimes: States Parties to one regime agreed to include an exogenous substance to achieve the goals of another regime. It creates synergy between two otherwise conflicting positions. The amendment extends the highly effective Montreal Protocol regime for outlawing harmful gases to a new type of gas that was sitting outside of its remit. The gradual reduction in the production and consumption of HFCs under the Kigali Amendment contributes to the phasing out of HFCs under the climate regime. This extension advances the climate objective by increasing its enforceability; it is therefore a case of functional synergies. Synergy between both regimes creates an outcome that is more than the sum of its parts.

4.3 | Dormant synergy: Climate, economic growth and social justice

Climate protection may collide with social justice in that it renders workforce skills superfluous – for instance in mining or offshore drilling – or may have disproportionate effects on groups – for instance long-distance commuters, people in fuel poverty or farmers. The concept of just transitions seeks to move from collision to synergy, effectively through side-payments to groups within states or groups of states that would compensate them for their losses over other groups, thereby ensuring that the climate-driven transition is also just. Universally, the First Global Stocktake decision of the CMA prominently recognises this synergetic concept of a Just Transition (UNFCCC Decision 1/CMA.5, paras. 28 h; pp. 42, 140). Arguably, the new Loss and Damage fund serves justice horizontally between developing and developed states to enable further common climate mitigation. The EU has put that into action on the regional level. The revision of the EU emissions trading system (ETS) under the Fit for 55 legislative package to cover emissions under the building and road transport sectors is a key measure under the European Green Deal. To mitigate the adverse social impacts arising from the new ETS (also known as ETS 2), the EU adopted a regulation which establishes a new social climate fund (SCF) (Regulation (EU) 2023/955). The SCF aims to help vulnerable households, microbusinesses, and transport users meet the cost of the green energy transition in the buildings and road transport sector (Wilson et al., 2021). The funds will be made available to member states to support their policies in addressing the adverse social impacts of ETS 2 (Regulation (EU) 2023/955, preamble, para. 16). Over €72 billion in funding is

expected for the SCF between 2025 and 2032 which will be sourced from ETS credits in the buildings and road transport sectors. The EU has also introduced a regulation which establishes the Just Transition Fund (JTF) (Regulation (EU) 2021/1056). The JTF is one of the pillars of the Just Transition Mechanism (JTM) which aims at leaving no one behind and focuses on the regions and communities that are most exposed to the challenges that arise from the energy transition (European Commission, 2020, 1). Specifically, the JTF focuses 'on the economic diversification of the territories most affected by the climate transition and the reskilling and active inclusion of their workers and jobseekers' (European Commission, 2020, p. 2), alongside the InvestEU 'Just Transition' Scheme and a new Public Sector Loan Facility. The SCF and JTF represent examples of side-payments aimed at creating synergy between climate protection and social justice under the EGD. While concerns have been raised regarding these funds, they represent a step in the right direction from a synergy perspective (Tomassetti, 2023; Taylor, 2022; Akgüç et al., 2022).

Climate protection and economic growth are two potentially conflicting objectives. This necessitates consideration through a synergy lens to connect both objectives. The instrument to this effect is green public investment (GPI). This also can be examined by reference to the EU. The two main proposals on GPI are a green golden rule and an EU Climate Fund (Darvas, 2022, p. 8). The green golden rule would exempt the respective deficit accrued from deficit and debt statistics relevant to EU fiscal rules. The aim is to incentivise governments to re-allocate their spending towards GPI. A separate rule would be needed to mitigate the risk of so-called greenwashing under a green golden rule. The alternative is an EU Climate Fund, which would be financed by common EU debts to provide loans to member states at favourable interest rates to finance GPI (Pekanov & Schratzenstaller, 2023, p. 9). Both measures - an EU Climate Fund and a well-designed green golden rule – would be equivalent in terms of project selection, implementation, and control procedures (Darvas, 2022, p. 1). New regulations for the proposed Climate Fund and the green golden rule are needed to exempt the subsequent climate expenditures from EU fiscal rules in both cases. A substantial portion of the funding for green investment would have to be provided by the public sector either directly in the form of public investment, or indirectly in the form of subsidies or guarantees to encourage private investment. There is an ongoing debate around exempting green investments from the EU's strict deficit and debt rules. During the COVID-19 pandemic, the EU fiscal rules were suspended (Darvas, 2022, p. 2), which enabled EU member states to temporarily depart from the budgetary requirements of the Stability and Growth Pact (SGP) and provide fiscal support to their economies in reaction to the COVID-19 crisis (European Commission, 2022, pp. 3–4). The EU fiscal rules are set to be reintroduced with all EU member states (apart from Denmark, Luxembourg, and Sweden) to implement fiscal consolidation. To nevertheless increase GPI, budget rules need changing, with options including the exemption of green investments from deficit and debt limits calculations (Strupczewski, 2021). The fiscal framework may also be reformed to accommodate GPI (Darvas, 2022, p. 2). Despite this broad recognition of change, this has not yet materialised in regulatory action. Thus, the Fit for 55 package does not contain initiatives to make the EU fiscal framework more compatible with sustainable growth and development (Pekanov & Schratzenstaller, 2023, p. 10). In November 2022, the European Commission issued a Communication which, while widening 'the leeway for debt-financed public investment', does not separately account for GPI. This Communication further confirms that 'The Treaty reference values of 3% of GDP budget deficit and 60% debt-to-GDP ratio remain unchanged' (European Commission, 2022, p. 6). The proposal of a Climate Fund is reflected in the EU Green Deal. The Green Deal Investment Plan (EGDIP) (also known as the Sustainable Europe Investment Plan (SEIP)) was introduced as the Green Deal's investment pillar. The EGDIP addresses three aspects: funding, enabling framework, and support for implementation. In terms of funding, it has two principal financing streams totalling about €1 trillion. While over half of this sum will come from the EU budget and the EU Emission Trading Scheme (EU ETS), the rest will be sourced through the InvestEU programme. The European Parliament resolution welcoming the SEIP has however questioned whether it will, in its current form, enable the mobilisation of €1 trillion by 2030 due to the negative economic outlook in the aftermath of the COVID-19 pandemic SEIP (European Parliament, 2020, para. 9).

5 | CONCLUSIONS

Effective climate action is multidimensional but the established regulatory principles guide regulators to prioritise a single objective. To achieve more integrated, holistic decision-making in regulation, the article has construed a principle of synergetic decision-making with better outcomes than a default position of trade-off and collision. The article proposes a typology of synergetic relations between objectives that regulators can create. This distinguishes and identifies the three types of reinforcing, functional, and dormant (connecting) synergies. These categories should be assessed on a sliding scale through appropriate regulatory instruments. In the final step, the article also discusses

pathways for synergy to move from a sound regulatory strategy to the status of becoming a binding legal principle in international law, regional law, and domestic laws. The article finally has shown how such a principle works in four scenarios where the climate protection objective meets with adjacent objectives. Beyond the climate change field, the article contributes to the theory of global law, providing a framework to understand how novel principles arise and are shared by regulators across a multilevel governance system. Synergy-as-principle is but an example of a novel principle arising to meet new complex policy challenges.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in DRO at https://www.durham.ac.uk/staff/volker-roeben/#publications.

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REFERENCES

Adler, M.D. (2010) Regulatory theory. In: Patterson, D. (Ed.) *A companion to philosophy of law and legal theory*, 2nd edition. Blackwell, pp. 590–606.

Akgüç, M., Arabadjieva, K. & Galgóczi, B. (2022) Why the EU's patch 'just transition' framework is not up to meeting its climate ambitions. In: *European trade union institute (ETUI) policy brief*. Employment and Social Policy: European Economic, pp. 1–8.

Benecke, G., Schurink, W. & Roodt, G. (2007) Towards a substantive theory of synergy. *SA Journal of Human Resource Management*, 5, 9–19.

Bodansky, D. (2024) Four treaties in one: the biodiversity beyond national jurisdiction agreement. *American Journal of International Law*, 118, 299–323.

Bremberg, N. (2019) EU Foreign and Security Policy on Climate-Related Security Risks. *SIPRI Policy Briefs*, November 2019. Available from: https://www.sipri.org/sites/default/files/2019-11/pb_1911_eu_policy_on_climate-related_security_risks_0.pdf [Accessed 18 July 2024]

Campbell, A. & Goold, M. (2002) *Designing effective organizations: how to create structured networks*. Hoboken, NJ: Wiley.

Candel, J.J. & Biesbroek, R. (2016) Toward a processual understanding of policy integration. *Policy Sciences*, 49, 211–231.

Corning, P.A. (1995) Synergy and self-organization in the evolution of complex systems. *Systems Research*, 12, 89–121.

Darvas, Z. (2022) Legal options for a green golden rule in the European Union's fiscal framework. *Bruegel Policy Contribution*.

Dellmuth, L.M. & Gustafsson, M.-T. (2021) Global adaptation governance: how intergovernmental organizations mainstream climate change adaptation. *Climate Policy*, 21, 868–883.

Fischer-Lescano, A. & Teubner, G. (2004) The vain search for legal Unity in the fragmentation of global law. *Michigan Journal of International Law*, 25, 999–1046.

Halpin, A. (2004) *Definition in the criminal law*. Oxford: Hart.

Halpin, A. & Roeben, V. (2008) *Theorizing the global legal order*. Oxford: Hart.

Jordan, A. & Lenschow, A. (2010) Environmental policy integration: a state of the art review. *Environmental Policy and Governance*, 20, 147–158.

Kausch, K. (2021) *Collateral damage: how EU internal policies shape crises and conflict abroad*. Joint Research Papers No 5, December 2021.

Kim, R.E. (2020) Is global governance fragmented, polycentric, or complex? The state of the art of the network approach. *International Studies Review*, 22, 903–931.

McCormick, N. (2007) *Institutions of law: an essay in legal theory*. Oxford: Oxford University Press.

Medvedieva, M., Sopilko, I., Guliiev, A., Bilotsky, S., Nevara, L., Lovin, A. et al. (2018) Fragmentation and synergies in international climate regime. *Journal of Legal, Ethical and Regulatory Issues*, 21(3), 1–14 Available from: https://www.abacademies.org/articles/fragmentation-and-synergies-in-international-climate-change-regime-7316.html [Accessed 17 July 2024]

Minnerop, P. (2020) The legal effect of the 'Paris rulebook' under the doctrine of treaty interpretation. In: Cameron, P., Mu, X. & Roeben, V. (Eds.) *Global energy in transition: towards rules-based multilateral governance of generation, markets and investment*. Berlin: Springer, pp. 101–134.

Morgan, J.C. (2016) Fragmentation of international environmental law and the synergy: a problem and a 21st century model solution. *Vermont Journal of Environmental Law*, 18, 134–172.

Pekanov, A. & Schratzenstaller, M. (2023) *A targeted golden rule for public investments? A comparative analysis of possible accounting methods in the context of the review of the stability and growth pact*. European Union.

Radopoulos, I. (2017) The dialectical function of the principle of proportionality: a European perspective. *Kritische Vierteljahresschrift für Gesetzgebung Und Rechtswissenschaft / Critical Quarterly for Legislation and Law / Revue Critique Trimestrielle de Jurisprudence et de législation*, 100(3), 201–216 Available from: https://www.jstor.org/action/doBasicSearch?Query=au%3A%22Ioannis%20Rodopoulos%22 [Accessed 18 July 2024]

Roeben, V. (2005) Proliferation of actors. In: Wolfrum, R. & Roeben, V. (Eds.) *Developments in treaty-making*. Berlin: Springer.

Roeben, V. (2021) A concept of shared principles and the constitutional homogeneity in Europe: the case of subsidiarity. *Cardozo International & Comparative Law Review*, 4, 903–949.

Sands, P., Peel, J., Fabra, A. & MacKenzie, R. (2018) *Principles of international environmental law*, 4th edition. Cambridge: Cambridge University Press.

Schuetze, R. & Tridimas, T. (2018) *Oxford principles of European Union law: the European Union legal order: Volume 1*. Oxford: Oxford University Press.

Strupczewski, J. (2021) EU to mull changes to budget rules, debt, green investment in focus. *Reuters*, 8 September 2021. Available from: https://www.reuters.com/business/sustainable-business/eu-mull-changes-budget-rules-debt-green-investment-focus-2021-09-08/ [Accessed 20 July 2024].

Taylor, K. (2022) Europe's social climate fund too small to make a difference, critics say. *EURACTIV*, 24 November 2021. Updated 1 April 2022. Available from: https://www.euractiv.com/section/energy-environment/news/europes-social-climate-fund-is-too-small-to-make-a-difference-critics-say/ [Accessed 20 July 2024]

Teubner, G. (1997) Legal pluralism in world society. In: Teubner, G. (Ed.) *Global law without a State*. Brookfield: Dartmouth.

Tomassetti, P. (2023) *Social climate fund: a giant with feet of clay?* Brussels: European Trade Union Institute. Available from: https://www.etui.org/news/social-climatefund-giant-feet-clay [Accessed 12 June 2023]
Trachtman, J.P. (2011) Fragmentation, Coherence and Synergy in International Law. *Transnational Legal Theory*, 2(4), 505–536.
Trachtman, J.P. (2013) *The future of international law: global government*. Cambridge: Cambridge University Press.
Trein, P., Biesbroek, R., Bolognesi, T., Cejudo, G.M., Duffy, R., Hustedt, T. et al. (2021) Policy coordination and integration: a research agenda. *Public Administration Review*, 81(5), 973–977.
Vinuales, J. (2020) The protection of the environment. In: *Cassese's international law*, 3rd edition. Oxford: Oxford University Press.
Wilson, A., Widuto, A. & Pari, M. (2021) Social climate fund: Fit for 55 package [EU Legislation in Progress][Policy Podcast]. *European Parliamentary Research Service*, 10 November 2021. Available from: https://epthinktank.eu/2021/11/10/social-climate-fund-fit-for-55-package-eu-legislation-in-progress/ [Accessed 18 July 2024].

DOCUMENTS

1982 UN Convention on the Law of the Sea, 1833 UNTS.
2023 Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ) (not yet in force).
2015 Paris Agreement, 3156 UNTS.
Decision 1/CMA.5, 'Outcome of the first global stocktake' (FCCC/PA/CMA/2023/16/Add.1, 15 March 2024).
Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999, and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652, OJ L 2023/2413.
Directive (EU) 2012/27 of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, OJ L 315/1.
European Commission, 'Proposal for a Regulation of the European Parliament and of the Council establishing the Just Transition Fund', 14 January 2020, COM(2020) 22 final.
European Commission, 'Proposal for a Regulation of the European Parliament and of the Council establishing a Carbon Border Adjustment Mechanism', 14 July 2021, COM(2022) 564 final.
European Commission, Communication from the Commission to the European Parliament, the European Council, the European Economic and Social Committee and the Committee of the Regions, 'REPowerEU Plan', 18 May 2022, COM (2022) 230 final.
European Green Deal Investment Plan (Sustainable Europe Investment Plan) – Q1 2020. Available from: https://www.europarl.europa.eu/legislative-train/theme-a-european-greendeal/file-european-green-deal-investment-plan. [Accessed 13 July 2023].
European Parliament, resolution of 13 November 2020 on the Sustainable Europe Investment Plan – How to finance the Green Deal (2020/2058(INI)), OJ 2021/C 415/04.
European Union, 'A Global Strategy for the European Union's Foreign and Security Policy', June 2016.
Global Conference on Strengthening Synergies Between the Paris Agreement on Climate Change and the 2030 Agenda for Sustainable Development: Maximising Cobenefits by Linking Implementation of the Sustainable Development Goals and Climate Action' (Conference Summary), United Nations 2019.
Regulation (EU) 2021/1056 of the European Parliament and of the Council of 24 June 2021 establishing the Just Transition Fund, OJ L 231/1.
Regulation (EU) 2021/1119 'European Climate Law', OJ 2021 L 243/01.
Regulation (EU) 2023/955 of the European Parliament and of the Council of 10 May 2023 establishing a Social Climate Fund and amending Regulation (EU) 2021/1060, OJ L130/1.
Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a Carbon Border Adjustment Mechanism, OJ L 130/32.
United Nations General Assembly, Report of the United Nations Conference on Environment and Development (Rio de Janeiro, 3–14 June 1992), 'Rio Declaration on Environment and Development', A/CONF.151/26 (Vol. I), 12 August 1992.

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