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Constructing a Legal Framework for Carbon Capture and Storage in New Zealand: Approaches to Legislative Design

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Abstract

In 2009 the International Energy Agency called attention to the need for states to regulate carbon capture and storage activities. The New Zealand Government has responded to this call by, among other things, commissioning a report on the regulation of CCS. This report, authored by Professor Barry Barton, Kimberley Jordan and the author of this paper, was launched in December 2013.^a This paper starts by providing a brief overview and update of the New Zealand legal and regulatory position on CCS. The bulk of the paper then seeks to address in more detail one particular issue - that of legislative design for a fledgling CCS regime.

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1. Introduction

This paper concerns the regulation of carbon capture and storage (CCS) technology in New Zealand. After describing recent developments in New Zealand, it addresses a question that may not be central to most discussions around the regulation of CCS or new technology in general, but is nevertheless vital in creating a system of governance that is principled, comprehensive, integrated, user-friendly and efficient. This question is how the regulation of a new technology such as CCS can be best be structured. More specifically, given that CCS requires legislative intervention, the paper concerns how the regulation of CCS can best be designed within an existing

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^a The full report can be viewed at <http://www.waikato.ac.nz/law/research/centre-for-environment,-resources,-and-energy-law/news-and-events/items/launch-of-carbon-capture-and-storage-designing-the-legal-framework>.

legislative structure. For example, should aspects of regulation be incorporated into existing legislation? Should some aspects be explicitly removed from present regimes? Should a new Act be created to regulate aspects that do not comfortably fit within existing regimes, or should such regimes be extended to address any lacunae? Should different legislative regimes operate in parallel, and to what extent?

The detailed answer to these questions may differ depending on one's perspective. However, it is important to remember that the development of new law does not occur in a vacuum. Fitting novel activities within existing frameworks, creating exceptions to regulatory regimes or developing significant new areas of law inevitably has ripple effects on surrounding legal regimes.[1] No matter how new law is constructed, it will create tensions and uncertainties around its boundaries. The task of regulators and law makers is to locate these boundaries in the most defensible places according to the goals that they wish to achieve, and to define them with clarity to avoid uncertainty, inefficiency and avoidable litigation. This paper offers a perspective on how this may be done. Although it concerns CCS in the New Zealand context specifically, it may be hoped that it offers an example that will be of value in the wider debate over the regulation of CCS within existing legal systems, particularly where smaller states with no history of CCS are looking to regulate it in the future.

2. CCS in New Zealand: recent developments

A reader of this paper will no doubt be well versed in the complexities of CCS. Nevertheless, the paper would not be complete without a description of the basics of the technology. The process itself is neither new nor conceptually difficult. CCS is designed to constitute one among a number of tools to mitigate anthropogenic climate change. It does so via the capture of greenhouse gas emissions from point sources, the transportation of gas streams to an injection site, and injection into a geological formation for permanent storage. A number of variants on this basic process exist. For example, streams can be transported in a number of ways, the gas may originate from the stripping of CO₂-rich natural gas rather than an industrial emissions, and a geological formation is a general term designed to cover several different potential storage options.[2]

In any of its variations, CCS has features that are different from other industries in New Zealand. Its purpose is to inject and store, rather than to extract. Although CO₂ is not inherently harmful or toxic to people or the environment, the volumes of CO₂ used in CCS are much greater than in other industries, it can form acids if mixed with water,[3] and can be an asphyxiant at high concentrations.[4] When stored underground, however, it might not have any appreciable effects. While marine CCS might appear to be conventional "dumping" in the sense that the gas is being treated largely as a waste product and abandoned, the injector retains active control over it. CCS also challenges the monopoly that extractive industries have so far had on the use of subsurface formations.

A domestic legal framework that addresses CCS specifically is not yet in place in New Zealand, although an operation would be subject to restrictions under more general legal regimes concerning environmental effects and health and safety.^b The technology has not yet been undertaken in New Zealand, even on a trial scale. This puts New Zealand in a privileged position of being able to give thought in advance to the nature of a legal regime for CCS, without the spectre of a specific project in the background. It is the intention of the New Zealand Government to remove any legal barriers to CCS deployment.[5]

Research into the geological, technical and regulatory issues associated with developing CCS in New Zealand has occurred in the past few years.[6] Several suitable storage sites have been identified, and there is some general industry interest in the technology.[7] Notable, in the regulatory context, is a recent and relatively comprehensive report commissioned by the Ministry of Business, Innovation and Employment (MBIE) by a team including the author of this paper, and led by Professor Barton of Te Piringa at the University of Waikato (the CCS Report).[8] The CCS Report detailed a number of legal barriers to CCS in New Zealand, and made recommendations as to how

^b Only one passing and vague reference to CCS is to be found in New Zealand regulation, namely marine dumping regulations under the recently enacted Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012. This reference simply reflects the wording of the London Dumping Protocol with which the Regulations are required to comply, and does not amount to a genuine attempt to regulate the technology.

these may be overcome and how a legal framework could be developed. It is not the intention of this paper to go into any great detail regarding such recommendations. The CCS Report made a variety of recommendations on the key areas where regulation is required. Perhaps unsurprisingly, it concluded that the current law is inadequate. Environmental legislation in particular contains a variety of barriers to the deployment of the technology, which requires amendment. The marine context presents some hurdles and uncertainties distinct from the terrestrial context, partly due to the requirements of and treatment of CCS under international marine law.[9] Furthermore, the unique features of the technology warrant not only specific changes and additions to existing environmental, health and safety and property law, but also the development of new law to respond directly to these features. Prominent among this new law is the call for a specific permitting regime for CCS projects, a means for the detailed, flexible and ongoing regulation of operational matters and site stewardship, and mechanisms for the resolution of conflict between sub-surface interest holders.[10]

Of particular relevance to the balance of this paper is Chapter 2 of the CCS Report, which is concerned with the adequacy of existing law to regulate CCS. In part, that Chapter addresses the extent to which current legislative regimes can accommodate new regulation needed for CCS, and the extent to which they are appropriate to govern the aspects of CCS already caught by those regimes. Chapter 3 also considers the scope and design of a CCS Act, relying in part on conclusions reached in Chapter 2 as to the proper scope of existing legislation.

Although this paper draws upon a number of ideas from the CCS Report, it approaches the issue of legislative design from a different angle. In particular, it seeks to rationalise its conclusions based on a unifying idea of what the paper describes as a purposive-incorporative approach. While the CCS Report concluded, on balance, that the environmental regulation of injection and post-injection should be removed from resource management legislation and incorporated instead in an industry-specific Act, this paper offers another possible approach. In doing so, it does not impugn the validity of the conclusions reached in the Report, but rather offers an alternative avenue for reform in an area where a variety of approaches are possible. The CCS Report itself acknowledges that a similar conclusion (to the one presented here) is an option that possesses strengths that outweigh its weaknesses.[11] This paper seeks to provide a more robust foundation for this option.

Given the above points, the paper should not be taken as representing the views of the New Zealand Government, MBIE, or the co-authors of the CCS Report. Rather it represents the evolving thoughts of the author, which are reflected in the development of a related doctoral thesis.[12] The author expresses grateful thanks to the co-authors of the Report, which provides a valuable base for further discussion.

3. Designing legislative frameworks

Questions of legislative design arise in many contexts. When an aspect of human behaviour is deemed desirable to be made subject to restriction, legislative action is a common response. Some behaviours are restricted by a number of regimes; for example, a petroleum mining company must comply with (among other things) environmental restrictions,[13] health and safety requirements,[14] and specific mining legislation.[15] Where subsequent changes to such regimes are seen as necessary for legal or policy reasons, it is usually fairly obvious where those changes should occur. There is seldom any need to rethink the entire legislative structure under which an industry is regulated.

The question of legislative design finds particular purchase in the context of novel technologies like CCS. Here, activities are dissimilar enough to those aspects of human behaviour already regulated to warrant more than minor amendments to existing regimes, yet at the same time may bear some similarities to, or impact on, existing industries. Some aspects of new activities may not fit easily or logically within any given regime, or may arguably belong in more than one. As a result, an activity like CCS is more likely to force law makers to revisit the fundamental foundations upon which legislative structures are built.

3.1 Why does CCS require legislative intervention?

It is not the ambition of this paper to canvas all those features of CCS that are dissimilar to other industries, or to recommend how substantive legal issues associated with the technology should be resolved. For example, CCS raises substantive issues around ownership of an injection formation and injected gas. Under New Zealand's current law it is debatable whether ownership rests with the Crown, the landowner, or the injector. A variety of recommendations as to ownership are also possible, depending on, among other things, the relative importance given to a variety of interests. Such questions are beyond the scope of this paper, but are addressed in the CCS Report. An equally important question, however, and one on which at a high level this paper seeks to shed some light, is where such substantive questions should be answered. Using the above example, should a clarification of ownership rights occur under legislation developed to deal with CCS specifically? Should it be found in an Act concerned with the establishment or protection of general property rights? Or should it be included in legislation that governs persons who are likely to dispute such questions of ownership (such as mineral permit holders)?

One assumption on which this paper proceeds is that clarification regarding substantive legal issues is required through the legislative or at least delegated legislative process. This ensures that legal uncertainties and barriers are resolved in a manner that promotes certainty (to regulators, investors, and the public), transparency, and public involvement. The corollary of this is that the common law and industry self-regulation are generally inadequate to address the issues posed by an industry like CCS.[16] Although the common law is, of course, capable of (for example) extending existing legal principles concerning property to encompass injected CO₂ streams and formations, it would be inefficient and discouraging to investment to rely on litigation to answer such questions. Furthermore, the common law is, by its nature, reactive. It is incapable of imposing a pro-active permitting regime for CCS, which is likely to be required in light of the activity's potential conflicts with other sub-surface interests like mining. Nor could it establish or fund the regulatory agencies needed to implement and enforce such regimes. One further assumption is worth noting at this juncture, even if it may appear self-evident. This paper assumes that CCS is at least to be enabled in some form at a policy level, rather than be prohibited altogether. If it were to be prohibited, the scope of discussion would be reduced to the rather less edifying question of where such a prohibition should be located.

3.2 Scope of Discussion

The discussion in this paper is, by necessity of length, limited in a variety of ways. Firstly, it seeks to present a high level discussion of legislative design for CCS by analysing a limited number of general yet important regimes, namely those regimes concerned with environmental and operational matters, property law, the imposition of legal liability, and health and safety regulation. It does not aim to present detailed recommendations for particular legislative amendments, engage in any form of regulatory drafting, or seek to identify all areas in which regulation is required. Further, given that no applications are currently planned for CCS, the paper assumes that it is desirable to establish a regime generally applicable to CCS proponents rather than project-specific legislation such as enacted in Western Australia.[17] There are some benefit of using project specific legislation as a testing ground for effective regulation,[18] but it does not send a signal to investors that New Zealand is open for business, while the lack of a clear general regulatory ecosystem may also provide uncertainty and delay for applicants and regulators under other regimes.[19] It is notable that amendments to existing onshore petroleum legislation in Western Australia are currently in train to provide for a general legal framework for CCS.[20]

Discussion is also limited to New Zealand law, although occasional references are made to comparator jurisdictions (primarily Australia and Canada, being common law jurisdictions with a history of CCS regulation). The paper is also confined to the injection and post-injection phases of CCS, where the most difficult legal issues arise (and, by extension, where there are most questions over where new law is most appropriately located). Furthermore, discussion is limited to what may be termed the regulation "of" CCS rather than regulation "for" CCS. The former concerns restrictions that are required in order to ensure that a proposal for CCS, once it occurs, is successful and has effects that are appropriately controlled. The latter involves a more policy-oriented goal, in that it contemplates regulation that will determine the extent to which CCS is encouraged or discouraged (for example, through tax concessions, the treatment of CCS under emissions trading regulations, or "CCS ready" obligations). In the absence

of a significantly higher price on emissions, such measures will be required for CCS to be realised; case law under resource management legislation has determined that conditions seeking to impose such measures on emissions producers are unreasonable given the costs involved.[21]

The paper first delineates certain spheres of regulation required for CCS. It addresses, in general terms, the options available for the development of legislation concerning the technology, and the problems associated with them. It suggests that a number of practical considerations and principles support the use of what is here labelled a purposive-incorporative approach to a legislative framework for CCS. The paper then analyses the spheres of regulation already identified, and settles on the best location for each using this approach. It dwells most on the environmental and operational spheres of regulation, being those areas where most difficulties arise.

4. Legislative design: incorporation or creation?

4.1 Spheres of regulation

Carbon capture and storage, like other industries, requires regulation across a wide range of “spheres” or topics. The approaches of states to how these spheres are divided are different. Three broad ways exist by which regulatory spheres in an industrial context can be divided: along lines that are project specific, industry-specific, and thematic. The first has already been discounted as an undesirable and ad hoc approach for a jurisdiction in New Zealand’s position.

It is a common feature of most legislative systems that at least some spheres are what may be labelled “thematic”. Thematic legislation is designed to respond to particular species of problem irrespective of the specific context in which it arises. For example, it is not uncommon for a single Act to impose health and safety standards across all industries. This is the case in New Zealand.[22] Although the particular content of lower level health and safety regulation made under that Act may differ in order to respond to the peculiarities of specific activities, the framework legislation (and its basic purpose) applies equally to all. Some thematic regimes are wider than others, in that some will encompass a broad range of human behaviour. For example (as a generalisation), the scope of New Zealand’s resource management framework legislation is wide enough to restrict any activity that has a potentially adverse effect on the natural or physical environment.[23] Other thematic regulatory spheres in New Zealand relate to the use and transportation of hazardous substances,[24] the construction of buildings,[25] the conveyance of real property,[26] and general legislation relating to limitations on legal liability.[27] They apply not to specific persons or classes of persons, but rather apply broadly within a defined area or theme of the law. Some legislative regimes are supplemented or complemented by the common law (or vice versa), particularly in the spheres of property law and legal liability. The scope of some thematic spheres is geographically restricted to specific areas.[28] While thematic regulatory spheres also encompass legislation concerning, for example, the general criminal law or taxation, such general regimes require no material changes for the effective regulation of CCS, and are not discussed here.

In contrast, other regulatory “spheres” are not thematic and are designed to regulate behaviour based on the particular character of persons or groups of persons. In the industrial context, such spheres may be described as industry-specific. For example, most provisions of mining legislation in New Zealand restrict only those engaging in the prospecting, exploration or mining of minerals,[29] and there exists a specific Act restricting those undertaking the supply of natural gas.[30] Similarly, electricity providers and port companies are subject to their own industry legislation,[31] while airfield operators are generally subject to specific legislation governing each site rather than the industry as a whole.[32]

Of course, the distinction between thematic and industry-specific regulatory spheres is not one that is absolute. Even broadly applicable resource management legislation can be framed as a sphere of regulation that applies to a group of persons: those conducting activities having harmful effects on the environment. However, the basic distinction remains useful, in that the two concepts represent opposing ends of the legislative design spectrum. Each has its merits. Thematic legislation promotes consistency and equality for all participants in the system, ensures holistic regulation targeted at a problem rather than an applicant, and can enhance the accessibility of the regime to

the public. Industry-specific legislation ensures that the problems associated with the behaviour of particular groups of persons are addressed effectively and in a targeted manner, can promote streamlined decision making, provides clarity for applicants, and gives greater potential for decision making by those with technical expertise in that industry. As the breadth of the class of persons restricted by a particular Act increases, it becomes, accordingly, more thematic and less industry-specific.

Once it is recognised that such a spectrum exists, the important question from a legislative design perspective is how a coherent and workable set of industrial regulation can be, or has been, produced.[33] Although both forms of legislation have benefits, a system will be less effective if there has been no holistic consideration of how the forms should fit together. For example, the benefits of a strongly thematic regime such as New Zealand's Resource Management Act 1991 (RMA), which applies to all industries based on their effects rather than their identities, would be undermined if specific industries were exempted and instead made subject to their own system of environmental permitting.^c Similarly, an activity would be governed inefficiently and potentially inconsistently if an industry were subject to detailed industry-specific regulation while also being subject to overlapping restrictions under thematic legislation.

The coherency of this larger framework is as important as that within individual statutes. Admittedly, it may be stretching reality to claim that any legislative ecosystem is completely "coherent". The multi-party nature of parliamentary politics in New Zealand means that coherency may sometimes be abandoned in favour of consensus when a bill reaches select committee stage, or where there are practical reasons for a bill to be progressed quickly through the legislative process. However, the fact that the legislative system is at least workable is testament to the fact that underlying it is a generally consistent approach to the relationship between thematic and industry-specific regulation. Irrespective of the merits of the design choices that have been made, it can be observed that New Zealand's historical approach to industrial legislative design has been characterised by a mix of thematic and industry-specific regimes. It is important that new laws "fit into the general fabric of the existing law." [34] The ways in which these spheres interact is not always clear and is sometimes complex, but some features can be discerned.

Firstly, regulatory spheres that are common (or potentially common) to all industries are generally contained within thematic legislation. Such restrictions apply to all industries. This category includes those regimes identified earlier: resource management, health and safety, hazardous substances, real property, construction and limitations on liability.

Secondly, as mentioned above, geographically-specific regulatory spheres have been developed within some of these themes. Some of these amount to overlays that impose requirements or restrictions above and beyond general thematic frameworks. For example, the Conservation Act 1987 provides the Minister of Conservation substantial powers to prevent or restrict activities occurring within the conservation estate, in addition to RMA restrictions.[35] Other geographically-specific legislation creates geographical *exceptions* to thematic frameworks in specific areas. For example, the Marine and Coastal Area Act provides that a protected customary right holder does not require planning permission under the RMA to exercise those rights within a defined area.[36] Generally speaking, the more recent examples of these kinds of enactments are complemented by express cross-references in the legislation from which they make exception.[37]

The enactment of broadly thematic legislation has created a *de facto* presumption that regulation, as a general rule, is not to occur totally on an industry by industry basis. In other words, New Zealand's approach has clearly not been to enact a separate Act to regulate all matters relevant to a particular industry, and this would not now be practically possible without the repeal of thematic legislation and meticulous development of new frameworks for individual industries. Removing a limited number of specific industries from thematic regimes, as circumstance required, would not be beyond the realms of practical possibility. But although the legislative system has some

^c While it is true that New Zealand's corpus of "environmental" law in a loose sense is fragmented by being comprised of a large number of statutes (Environment Act 1986, Sch), this does not detract from the fact that the RMA applies across all industries and forms the core of the framework requiring authorisation for activities that have adverse environmental effects.

history of removing specific geographical areas from thematic regimes, there is no comparable tradition of making exceptions based on the identity of industry participants. Some thematic regimes make specific provisions, within those Acts, for certain industries based on identity (such as the aquaculture industry within the RMA),[38] but it would be unusual to remove an industry from the scope of the regimes themselves.^d

Thirdly, where additional regulation of an industry (beyond the scope of thematic regimes) has been seen as necessary, this has generally been achieved by enacting separate legislation specific to that industry. It has not tended to be achieved by inserting industry-specific provisions into thematic regimes, by extending the scope of those regimes, or by making exceptions to those regimes. In other words, where there has been a lacuna in a thematic regime, and that lacuna applies only to a particular class of persons, industry-specific legislation has traditionally been enacted to fill it. One observation of this tradition of “filling the gaps” is that the boundaries of regulatory spheres have been determined largely by the purpose(s) of existing thematic regimes. Where a particular industry requires detailed regulation that is beyond the scope of such purposes, industry-specific regulation has been introduced. For example, although considerations relating purely to the removal of minerals were originally contained within a separate part of the Resource Management Bill, these were removed prior to its enactment.[39] Although regulating the rate of extraction of Crown owned minerals was clearly still desirable as a means by which the Crown would exercise its proprietary rights in the resource, restrictions were instead placed in a separately created Crown Minerals Act 1991 (CMA) with a more suitable legislative purpose (it is difficult to manage the removal of a finite mineral resource “sustainably”).[40] Telecommunications operators are also now subject to legislation governing competition and other matters, in response to issues peculiar to that industry above and beyond those governed by the Commerce Act,[41] while regulation of the gas supply industry has required detailed provisions beyond the health and safety and environmental purposes of thematic legislation.[42]

The boundaries between thematic and industry-specific regimes is not always perfectly defined, which is to be expected in a system that is governed by pragmatic considerations and characterised by constant change. For example, *one* purpose of the Gas Act 1992 is to protect the health and safety of the public.[43] The CMA has also recently been endowed with a new provision referring briefly to the environmental capability of an applicant (although it only refers to the ability of an applicant to meet the requirements of other Acts, and does not create additional substantive obligations).[44] Similarly, the Fisheries Act is concerned with the effective and efficient utilisation of the fisheries resource, but only to the extent that it is environmentally “sustainable”.[45] Despite these minor overlaps, the general approach to legislative boundaries based on the purpose of thematic regimes has been relatively consistent.[46] Consequently, a mix of thematic and industry-specific legislation has created a fragmented system of regulation; an applicant has to engage with more than one Act when doing any given activity.

While the International Energy Agency (IEA) has identified alternative options of developing dedicated CCS legislation or utilising existing legislation, these are simply two ends of a spectrum.[47] Under New Zealand’s approach to legislative design, some aspects of CCS may be better regulated under existing legislation, while others may be better sited in industry-specific legislation. One does not, of course, need to adhere slavishly to the traditions of an existing system when developing new industrial law for novel activities like CCS. However, ignoring a legislative structure and principles that have been relatively carefully constructed is perilous.[48] In the context of designing new law for CCS, the stability and relative coherency provided by this tradition needs to be balanced with any practical factors that may weigh against using it.

4.2 A purposive-incorporative approach

While there are different ways in which boundaries can be drawn between legislative regimes,[49] the observations made above lead to a number of useful presumptions when designing regulation for a new industry and resolving associated boundary issues. In this paper, the set of presumptions is labelled a “purposive-incorporative” approach to legislative design.

^d Fisheries management is an exception, because it falls within the sustainable management purpose of the RMA yet under s 30(2) is removed from restriction under the Act.

The approach is “incorporative” in the sense that it involves a general presumption that aspects of a new activity requiring regulation should be incorporated into existing regimes as far as possible. This recognises that it is potentially confusing and destabilising for widespread exceptions to be made to existing thematic regimes, which form the foundations of industry regulation in New Zealand and of which industry, regulators and the public have experience and understanding. Consistent with this, the IEA has suggested that the first step in determining whether new legislation is required for CCS is to assess the extent to which adequate modifications can be made to existing regimes.[50]

A presumption of incorporation leads to the question: to what extent *is* incorporation possible? How should this be determined? In response to these questions, the approach proposed is “purposive” in the sense that it presumes that it is the purpose of thematic regimes that should generally determine the boundaries of that regime. This is consistent with New Zealand’s general experience of industrial regulation. There are two natural consequences of such a presumption. Firstly, an aspect of an activity that falls within the purpose of a regime should be subject to that regime. Secondly, an aspect that does not fall within an Act’s purpose should not then be restricted by its provisions. One should not find restrictions on or the detailed regulation of an activity in places where one would not expect to find them.^e In such cases it may be necessary to develop industry-specific regulation. Again, this is consistent with the IEA suggestion that gaps be identified by comparing the aims of existing regimes and CCS regulation.[51] The approach also presumes that, although the purpose of an Act can be subject to legislative amendment, it should not be artificially extended so as to create potentially conflicting or non-cohesive aims for those responsible for its administration.^f

The presumptions associated with this purposive-incorporative approach are supported by international experience, in that existing frameworks have generally been utilised for the transport and capture phases of CCS where the industry poses few unique issues.[52] More generally, the value of building on existing regulation or law has been recognised in the literature.[53]

The presumptions are also supported by practical considerations. Many of these already underpin the drafting of legislation in New Zealand, and are expressed in formal guidelines developed by the Legislation Advisory Committee.[54] The location of new regulation should encourage public and industry understanding and acceptance of the law,[55] suggesting that existing, well understood regimes should continue to be used as far as possible.[56] The accessibility of regimes (and overall legislative system) should be enhanced.[57] Consistency across the law is also important,[58] as is transparency and predictability.[59] Where existing legislation is of general application (thematic), it is preferable not to duplicate such provisions in new legislation.[60] Creating industry-specific exceptions may undermine the coherency, transparency, and public accessibility of thematic regimes. Further, regulation should not be overly complex, and complicated or uncertain boundaries with other legislation or the common law should be minimised.[61] It is also important also to consider who administers the legislation. To reduce conflict and promote efficiency, it may be desirable to minimise as far as possible the number of regulatory bodies responsible for the oversight of an industry.

The Interpretation Act provides expressly for a text and purpose approach to statutory construction.[62] This has implications not only for how an Act is interpreted, but also where new provisions should be included. Thus while it may be best to extend existing legislation to address lacunae, this would only be the case where that legislation is designed to solve problems of the same nature.[63] Regulation designed for one purpose should not be found in an Act with a different purpose, even if those purposes are arguably compatible. To do so would be confusing to the reader, and may result in a skewed interpretation of provisions in light of the Act’s purpose, especially considering that this purpose is viewed in light of the Act as a whole.[64]

^e New Zealand is not, for example, subject to jurisdictional complications arising from a federal structure. Jurisdiction over specific areas has resulted in CCS being regulated in locations that may not be particularly obvious, such as in federal legislation concerned with safe drinking water in the USA (Safe Drinking Water Act 42 U.S.C. §300f et seq. (1974)).

^f While the “sustainable management” purpose of the RMA may itself be seen as involving conflicting considerations, a weighing of factors fits comfortably within the concept of sustainable management. In contrast, sustainable management would not be consistent with the promotion of a particular industry or the management of finite minerals, which cannot be managed “sustainably”.

The purposive-incorporative approach described above does not remove difficulties associated with determining the boundaries of legislative regimes. It simply locates them differently. In a system characterised by industry-specific legislation, there are more likely to be issues concerning exactly when a particular activity fits within the definition of the activity regulated under that regime. For instance, if the environmental effects of a mining activity are governed under a more restrictive legislative purpose than that of a scientific research project, there may be arguments over the exact threshold where removal of samples for testing becomes an exploration activity (and therefore subject to mining legislation). In contrast, in a system characterised by thematic legislation, there are likely to be issues over the competing jurisdiction of regulators. More than one Act may apply to the same specific aspects of an activity. The purposes of these Acts may pull in different directions, and if both apply at once then this may result in overlap, inefficiency and inconsistent messages being sent to industry. Most importantly, it is not suggested here that a purposive-incorporative approach is absolute. It involves presumptions that may be overcome by other considerations, if justified. Considerations most likely to do so are related to the extent to which this system would produce ineffective or inefficient regulation of a novel industry like CCS. Legislation must not only be acceptable and fair, but also effective and technically sound.[65]

4.3 Spheres of regulation for CCS

As identified earlier, CCS requires regulation in a number of areas. A number of these are common to all or many industries. Others pose more specific problems. The IEA in its 2010 Model Regulatory Framework identified 29 areas of regulation essential to domestic legal systems dealing with CCS.[66] Of those relating to the regulation of the injection and post-injection stages, key areas include the classification of injection streams, property issues, the resolution of competing claims to resources through a permitting process, environmental protections, health and safety measures, public participatory processes, the detailed and ongoing operational management of a CCS site, and long-term responsibility and liability. Particular attention was called to the need to regulate boundary issues between enhanced petroleum recovery (EPR) and CCS, which in some cases can occur in conjunction or in sequence.[67] While New Zealand does not have a strong tradition of EPR, this may change in the future.[68]

For the purposes of this paper, four broad spheres of regulation are identified and analysed. These generally encompass the substance of the issues extracted from the IEA framework above, although for present purposes are arranged differently to that framework. They are: the permitting of environmental and operational matters (for convenience, addressed together), the regulation of health and safety, the clarification of private property rights and the imposition of liability. These spheres encompass the areas likely to contain the most contentious substantive legal questions in New Zealand, and therefore are the ones requiring a decision as to their location.

5. Environmental and operational regulation

This chapter addresses the issue of where environmental and operational regulation of CCS should occur within New Zealand's legislative structure. It first explores the difference between environmental and operational regulation, then identifies why this presents problems in the context of CCS, before going on to present a perspective on reform.

5.1 Differences between environmental and operational matters

New Zealand's resource management law is overwhelmingly statutory. It is found primarily in the RMA (which applies on land and to 12 nautical miles from the coastal baseline) and the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act). The regimes are roughly comparable to each other in approach, although the former is much more detailed than the latter. For present purposes, it is sufficient to identify that the regimes are thematic, in that they are effects-based rather than industry-specific. In general terms, any activity that causes adverse effects on the environment, broadly defined, is eligible for restriction under the sustainable management purposes of the Acts.[69] Given the similarities in approach between the Acts for legislative design purposes, from this point on reference is made only to the RMA. Other "environmental" legislation exists, but is to a large extent limited to specific geographical areas[70] or designed to impose additional restrictions[71] and is not addressed in detail here.

Since the inception of the RMA, decision makers under it have shown an increasing tendency to impose relatively detailed conditions in resource consents and designations. All such conditions are required to have an environmental purpose, and at base aim to avoid, remedy or mitigate the effects of such activities.[72] The RMA has been described as a “one stop shop” in planning matters (although this is debated)[73] and as involving a shared body of resource management assumptions.[74]

Some industries are also subject to additional industry-specific legislation. There are a wide variety of reasons for an industry to be regulated above and beyond the scope of an existing thematic regime. It may simply be an ad hoc response to a topical issue. Some legislation addresses adverse effects that are currently specific to that industry (for example, the perceived failure of previous regimes to regulate competition within the telecommunications market).[75] Other legislation can be characterised as being “operational” (or “technical”). Behind the detailed provisions of such legislation can usually be seen a desire for certain industries to operate not only in a manner that avoids or mitigates harm *from* its activities, but in a manner that is effective, efficient and successful in its own right. The industries are seen as providing a sufficiently important or unique good or service for them to be regulated more prescriptively than would be the case if they operated only under the open market and thematic legislation. For example, this is reflected in the CMA, where the efficiency and effectiveness of the mining industry is important to maximise royalties to the Crown, over and above any environmental impacts under the RMA. The Gas Act 1992 has a purpose (among other things) of providing for the supply of natural gas[76] and aims to provide a mechanism for resolving disputes peculiar to that industry.[77] Similarly, the Electricity Act 1992 provides (among other things) for the supply and use of electricity[78] and the Electricity Industry Act 2010 outlines the structure of that industry. The Fisheries Act, while its purpose is tempered by considerations of sustainability, strives foremost for the effective utilisation rather than conservation of the fisheries resource.[79]

A number of difficult substantive legal issues concerning CCS arise in the resource management and operational contexts.[80] For example, there are questions over the extent to which the existing environmental legal framework can adequately ensure that ongoing monitoring and maintenance occurs, the extent to which the purpose of the RMA can truly regulate the “sustainable” management of CCS operations, the appropriateness of characterising CCS as a dumping or a discharge under the RMA, and the absence of an operational permitting process to ensure industry best practice and resolve competing claims for pore space. The environmental and operational contexts also present difficult issues in terms of legislative design. The two spheres are closely related.

Thus while the RMA is concerned with managing the environmental effects of activities, operational legislation is generally underpinned by a concern for the effectiveness or success of industries and the allocation of rights. However, the difference between “operational” and “environmental” regulation is not always clear-cut or visible. In part this may be due to the artificiality of this distinction, and is in part reflective of an imperfect and politicised legislative system. Some “operational” regulation appears to be underpinned in part by environmental considerations.[81] Conceptually, there may be some legitimate overlap between the spheres of regulation, and this makes it challenging to delineate clear boundaries between frameworks. The fishing industry has been mentioned above and is an obvious example; fisheries are a natural resource under the RMA yet are excluded from management under that Act and instead managed sustainably under the Fisheries Act.[82] Other legislation relating to New Zealand’s wild animal “resource” continues to fill similar resource management shortcomings in the RMA.[83] Furthermore, while the purposes of the Gas Act and the CMA are not “environmental”, they are included within a list of legislation in relation to which the Ministry for the Environment is required to provide advice to the Government.[84] This reflects the fact that the effective regulation of operational aspects of an industry may also have implications for the environment.

The boundary between the spheres of environmental and operational regulation is particularly difficult to define in the context of CCS injection. The technology is relatively unusual in that, while its operational purpose is to cause a positive effect on the environment, it does so by discharging a contaminant into the sub-surface and can cause a number of adverse environmental effects.[85] Fisheries management is excluded from the RMA with little difficulty, because a taking of the resource generally involves no related activities that require consent. The injection of CO₂, however, falls squarely within the Act’s general definition of a discharge (or dumping in the marine

context), is directly prohibited unless authorisation is obtained under the Act, and is linked to a wide set of other activities for which consent is required.

5.2 Purely environmental matters

It is worth noting that the above boundary issues arise largely from the injection and post-injection phases of CCS, and relate particularly to the specific act of discharging CO₂. For example, the RMA has little bearing on the detailed operational standards required for capture facilities, pipeline design, or construction of injection facilities. Similarly, operational requirements would have little bearing on local authorities' consideration of appropriate land uses, earthworks, related discharges, traffic management and water takings, because these are incidental and not directly concerned with the success of CCS. Therefore the wholesale removal of all environmental regulation of CCS from the RMA would be an excessive response to any overlap or inefficiency. The RMA requires authorisation for a number of incidental activities, notably land use, subdivision, coastal occupation, related industrial discharges, and the use of water. There is no compelling reason for these aspects of CCS to be removed from the RMA and placed in a different Act. They are neither new nor difficult to manage, and many are in fact common to a number of industries (including the oil and gas industry). This conclusion is consistent with a purposive-incorporative approach, in that there is a presumption that the regulation of an industry that falls within the scope of the purpose of an Act is to be incorporated or retained it (in the absence of compelling reasons against). The retention of the land use regulation of CCS within the RMA is also supported by the practical utility of enabling CCS operators to become requiring authorities under RMA processes (which means operators could compulsorily acquire land for the purposes of injection where required).[86]

Similarly, there exists no compelling reason to remove CCS from the scope of those geographically specific environmental regimes that restrict activities above and beyond the RMA. Such legislation is designed more to give an additional layer of central government control and prevent inappropriate activities in specific, nationally important areas, rather than to regulate such activities in detail. If CCS warranted an exception from any of these regimes, then the appropriate location for such an exception would be within those regimes.

5.3 Environmental shortcomings of the resource management framework

It is unquestionable that the injection phase of CCS also requires robust environmental regulation, due to its potential effects. However, the RMA currently appears incapable of providing this, due to a number of limitations. These arguably suggest that it would be inappropriate to regulate the unique environmental effects of injection under the RMA, which should instead be treated as a matter which belongs in CCS-specific operational legislation. It is beyond the scope of this paper to address these limitations of the RMA in detail, given they amount to substantive issues, but a summary will suffice to illustrate their significance for the question of legislative design.

Firstly, the RMA contains a provision by which local authorities are prevented from considering the impacts on climate change of discharging greenhouse gases to air.[87] In practice, this may prove a barrier to the grant of resource consent, because a consent authority may be barred from taking into account the positive effects of CCS on the climate.[88] Secondly, applicants may be faced with inconsistent policies and rules on CCS depending on the region and district in which it is undertaken. The scale of underground formations and the migratory nature of injection streams means that formations may often straddle such boundaries. This may suggest that a more holistic and centralised approach is required to environmental permitting.[89]

Thirdly, the RMA has an inbuilt policy preference for renewable energy generation. CCS has the potential to undermine this preference, by perpetuating the viability of emissions intensive energy sources like coal or oil, and may therefore be less likely to receive consent. (In practical terms this is unlikely, given New Zealand's preponderance of renewable generation and likelihood CCS capture would occur rather in the heavy industrial context). Other sections of the Act generally highlight the fact that the RMA has not been designed with technologies like CCS in mind, and its application would be somewhat awkward. For example, s 107 of the Act prohibits activities that would cause a conspicuous change in the colour or clarity of water (except in exceptional circumstances). CCS may well have this effect in some cases, which may in fact benefit the chemical trapping

process,[90] but would do so in a subsurface context where such changes would never be seen. Fourthly, CCS may require a flexibility or responsiveness in regulation to enable an operator to respond to changing geological circumstances and technological developments. Currently, changes to consent conditions need to be approved through a formal variation process, which can be time consuming and expensive.[91]

Fifthly, and perhaps most importantly, the ability to impose conditions on CCS projects is limited, particularly in relation to the need for long-term site stewardship. CCS requires monitoring and maintenance for a much longer period than currently provided for, potentially for hundreds of years.[92] Currently, neither a consent holder nor a regional council[§] is compelled to engage in long-term monitoring on a site specific basis, which contrasts with the strict requirements imposed internationally on CCS projects.[93] Although land use consents and designations do not expire unless specified in conditions,[94] these do not apply in the marine context and a land use does not meaningfully capture the nature of CCS injection. Coastal permits and discharge permits under the RMA more comfortably reflect the act of injection, but are limited to a maximum duration of 35 years.[95] While conditions under such permits do not automatically become unenforceable upon the expiry of consent if their purpose is to give effect to the consent,[96] equally they are incapable of imposing active obligations that only arise after a consent's expiry and are not tied to defined requirements for rehabilitation or site closure. Although renewal is possible, a consent holder cannot be compelled to renew a consent and there is no certainty that a renewal, if applied for, would be granted.[97]

Upon closer consideration, however, these limitations of the RMA do not support a conclusion that the regime as a whole is an unsuitable location for the regulation of the environmental effects of CCS injection. They can be addressed appropriately through legislative amendment or the development of suitably directive policy documents under the RMA. While the climate change provisions of the Act are a potential barrier, jurisdiction remains at a national level to overcome the prohibition.[98] Similarly, while national level regulation may be needed to resolve inter-regional inconsistencies (for example, in the composition of an injection stream), the RMA enables this through the implementation of national environmental standards and national policy statements. These can deem certain provisions to be inserted directly into regional and district plans, without the need for a Schedule 1 plan change process.[99] The Act's preference for renewable energy is unlikely to be problematic given that CCS capture is unlikely in practice to occur within the non-renewable energy sector, but could in any case be simply resolved through the development of national level policies balancing the benefits of renewables with the environmental merits of CCS. In terms of provisions that provide an awkward fit for CCS, simple amendments could be made to remove any unintended barriers. For example, a provision prohibiting discharges to water that would result in a conspicuous change in colour or clarity could be overcome by exempting the deep subsurface from this restriction.

In relation to the formal variation procedure required for changes to conditions, some flexibility is possible through the use of management plans. The detailed management of a project does not need to be provided for directly through resource consent conditions. Thus, while conditions must contain clear objectives or outcomes that a management plan is required to achieve,[100] and these can be changed only through a formal variation, it seems possible for conditions to provide for less formal mechanisms by which detailed management plans can be amended (as long as amendments require only expert certification as a process condition rather than a substantive decision).[101] Recent large infrastructure projects have utilised conditions that enable such plans to be amended through certification by regulatory authorities.[102] However, there are some questions over the extent to which this would be adequate to provide the responsiveness needed for effective CCS operations.[103] For example, substantive changes may be required that require the (currently unlawful) exercise of "discretion" rather than expert "certification",[104] and if a finalised management plan is approved as part of the consenting process there appears to be no scope later to amend it without a change to conditions.[105] This is one reason that the CCS Report concluded that the RMA is an inappropriate site for the regulation of the environmental impacts of injection and storage.[106]

[§] General state of the environment monitoring is required under s 35 of the Act, but this does not require site specific monitoring and is for a different purpose to the monitoring of a specific activity.

That said, the need for flexibility in ongoing environmental regulation is not a debate unique to CCS, but also one relevant to other long-term, technology intensive activities (the duration of CCS, and the comparative uncertainty surrounding the extent of subsurface formations, simply makes it a particularly notable example).[107] When placed in this broader context, the issue is not strictly one of legislative design, but rather one involving policy choice. On one hand, elastic regulation without onerous procedures for amendment is valuable from an industry (and regulator) perspective. However, on the other hand, if an activity that has been subjected to conditions via the public participatory requirements of the consenting process is to be substantively altered, some transparent and participatory process is needed to maintain public confidence in the regime. It is not the aim of this paper to resolve this debate, although it is likely to fall in favour of greater flexibility in the context of CCS and comparable activities. However, it does illustrate that the need for ongoing flexible environmental regulation is not necessarily a reason to withdraw CCS (as opposed to other industries) from the scope of the RMA, and that amendments to provide for additional or reduced flexibility could fit comfortably within the existing framework depending on the policy position taken. For example, amendments could provide for a change in the circumstances in which a consent authority can initiate review, or a more flexible, streamlined and non-notified process by which a consent holder could apply for a change to a condition under s 127.

The resolutions above involve actions either directly envisaged by the Act or that remain squarely within the scope of sustainable management. Thus on a purposive-incorporative approach, and in the absence of any compelling practical reason to do so, it would appear to be undesirable to remove the regulation of injection from the RMA on these grounds. While the duration of conditions is a more difficult problem, in that ongoing monitoring and maintenance and the imposition of liability may be required for decades (if not longer) beyond that currently provided for,[108] the extension of this duration to manage environmental effects would not unduly stretch the purpose of the Act. There is no conceptual reason why sustainable management requires only limited duration consents or a temporal cap on liability. This is reflected by the general duty imposed under the Act on all persons to avoid, remedy or mitigate the adverse effects of their activities at all times and irrespective of any resource consent, and complementary enforcement provisions (although such a general duty would obviously not be an appropriate substitute for the detailed requirements of consent conditions).[109] Furthermore, this issue can be placed within its wider context, in which calls are being made for an increase in consent duration for other complex or long-term projects.[110] Landfills in particular may warrant a longer term view in terms of environmental monitoring after closure.

5.4 Operational limitations of the resource management framework

While the above amendments are clearly “environmental” in nature, the RMA when applied to CCS is more fundamentally limited in other ways. Good legislative design involves identifying clearly the true purpose behind all aspects of regulation,[111] and CCS injection and post-injection require detailed and flexible operational regulation, not all of which is for environmental reasons. Operational standards are important to ensure that CCS is effective and efficient,[112] even if this has no real impact on the environment. Under s 108 of the Act, a condition must be related to a resource management purpose, fairly and reasonably relate to the activity consented rather than ulterior concerns,[113] be intra vires the powers of the consent authority, and not be unreasonable.[114] Logically, a condition must also amount to the most appropriate condition to achieve the purpose of the RMA.[115] Although the Courts may in effect fill gaps in legislation to give effect to the intention of Parliament, they cannot construct new law outside the purpose of an Act (which ultimately expresses the scope of Parliamentary intent). There is no need here to identify all operational features of CCS that fall outside the RMA and require further regulation. A few examples will suffice to illustrate the point.

Firstly, a gradual leakage of CO₂ from a storage formation may cause no local negative environmental effects. However, preventing such leaks would be essential for CCS to be effective in achieving its aim of mitigating climate change. The reason that the prevention of leakage is a concern beyond the scope of the RMA is explained in a moment, but it is notable that the literature has also tended to recognise a general difference between “traditional” environmental impacts and the secure storage of CO₂. [116]

Secondly, the manner in which CCS is conducted would also be important for New Zealand to meet existing and potential future international responsibilities in relation to emissions and climate change. Thirdly, CCS would affect the ability to use a storage site for other things in the future, in that it effectively amounts to a permanent and practically irreversible^h use of pore space. As such, there would have to be a more nuanced permitting process,[117] beginning at the prospecting phase and ending with a transfer of responsibility, that took into account not just the environmental effects of injection, but also wider public policy questions over competing claims to subsurface and surface resources[118] and the wider public interest in having CCS (as a “public” good) occur.[119] The RMA cannot provide for rights under existing consents to be overridden by applications for other activities,[120] and cannot override interests contained in a permit issued under the CMA. A precedent for a permitting process that is sensitive to wider concerns than environmental effects is that under the CMA, which considers among other things the efficient allocation of minerals, good industry practice, and financial return to the Crown.[121]

Fourthly, in the interests of the efficient use of finite resources, it may also be necessary to implement a regime by which unitisation of pore space is possible, and under which CCS proponents are compelled to cooperate in the joint management of a formation to ensure efficient use.[122] Fifthly, if it were considered desirable to vest storage formations in the Crown (in response to potential issues with gaining surface estate owner approvals and incurring widespread liability for trespass), it would be necessary to implement a framework by which the Crown could make discretionary decisions to manage this property in a transparent and principled manner. Sixthly, given the likely necessity of Crown assumption of long-term liability, the Crown would have a direct interest in how operations were conducted and should therefore have some ability to oversee this.

It may be irrelevant from an environmental perspective whether CO₂ were trapped efficiently, yet this would be of vital importance in ensuring the technology’s success.[123] Similarly, the composition of injection streams and the selection of a storage site may warrant environmental regulation to some degree, but other considerations here would be purely operational in nature. For example, the presence of inert impurities in injection streams may cause no appreciable impact on the sub-surface environment, but may reduce the efficiency of injection.[124] Site selection may depend on whether a storage complex has the capacity to store the intended quantity of CO₂, which would be essential to the success of a CCS operation but largely irrelevant to the environmental impacts of injection.[125]

One may naturally conclude that all such operational matters should be regulated outside the resource management framework, because they fall outside the purpose of the RMA. However, while this environmental-operational division may have proved relatively straightforward in the context of Crown minerals, CCS presents a more difficult scenario. In the context of petroleum mining, for example, operational requirements (which ensure, among other things, that extraction is efficient and effective) and environmental regulation have comparatively little overlap.[126] This is largely because the impact of the extraction of finite minerals is not itself subject to the RMA.[127] Questions of how the mineral should be extracted most effectively or equitably are left squarely within the CMA regime. In the context of CCS, however, the environmental regulation and operational requirements of injection present substantial overlap in those matters that must be considered, because CCS involves a discharge (or, in the marine context, dumping) to the subsurface. This is an activity squarely within the scope of the Act.[128] The effectiveness and efficiency of the petroleum industry is therefore not directly concerned with a justiciable environmental effect, whereas the effectiveness and efficiency of CCS operations depends directly on the discharge and permanent disposal of a contaminant.

The key conclusion here is that a significant degree of inefficiency, overlap and potential regulatory conflict is presented by an approach to CCS injection that separates operational and environmental matters into two different legislative regimes. Although many operational considerations concerned with the effectiveness of CCS would not be strictly “environmental” in nature, an environmental regulator would be obliged to consider and decide on many aspects of injection that would also be important in ensuring that CCS was effective in achieving its climate change mitigation aim. For example, both regulators would require adequate site selection and characterisation of a storage

^h While it may be possible to remove sequestered CO₂, the intention is for storage to be permanent. Removal would likely be prohibitively expensive and may not be possible in all cases.

formation to ensure predictable migration pathways,[129] seek to resolve the impact of injection on pre-existing petroleum reserves (if CCS were to occur in this type of formation), and require measures to prevent the leakage of CO₂ that would harm the local environment. Regulatory requirements may well be different and inconsistent. In essence, extensive parts of the same activity would be regulated under two different statutes and by two different regulators, who would consider many of the same things.[130]

While some inefficiency in a legislative system is unavoidable, the extent of this overlap seems, *prima facie*, undesirable. Two alternative solutions present themselves. On the one hand, both environmental and operational regulation could be placed within an amended RMA. Alternatively, environmental regulation of injection and post-injection could be removed from the RMA and placed, along with operational regulation, in a separate Act.

5.5 Does an operational permitting regime belong in environmental legislation?

Siting the regulation of injection itself, and the ongoing management of this activity, is less straightforward. As mentioned above, the first option to address such overlap is to retain environmental regulation within the RMA, but to supplement this by inserting operational regulation alongside it in that Act. At first glance, this would appear to be consistent with the overall scheme of the RMA. The overriding purpose of CCS is to have a positive effect on the global environment. This sits comfortably within the balanced sustainable management purpose of the Act (in contrast with the unambiguously pro-mining purpose of an Act like the CMA).[131]

However, to see the RMA as a statute designed simply to advocate for or protect the environment in a boundless array of ways is to misread its purpose. In regulating the activities proposed by specific applicants, the Act is inherently passive or reactive. Councils have a duty to establish methods to achieve the integrated management of resources.[132] But the statutory functions of councils cannot be read to include the detailed regulation of environmentally “beneficial” activities to the extent that this is not related to the effects *of* those activities.[133] A consent authority cannot compel an applicant to apply to undertake an activity, and cannot substantially amend the nature of a proposal once it is before it.[134] Its goal is simply to assess an existing proposal against the yardstick of sustainable management, and grant consent (subject to conditions that are within the scope of the proposal) if this is satisfied.

Furthermore, even if an application is granted, this does not confer on a consent authority jurisdiction to ensure that the activity is effective (or even achieves its goals at all). In a mining operation, a council cannot compel the grantee to exercise its consent (it simply lapses if not exercised) or to undertake operations in a way that is more profitable or efficient. The fact that an activity overall can be perceived as being beneficial to the environment, even if this is its primary purpose, is irrelevant. Thus, equally, a council could not compel a CCS operator to begin operations or to direct that injection occur in a way that ensured the best outcome for the global climate. Conditions can be imposed only to address the effects *of* an activity, not to regulate to ensure its success (whether this be measured in economic or environmental terms). A condition that imposes measures above and beyond what is required to mitigate the effects of an activity is unreasonable and *ultra vires*. [135] This basic point is highlighted by the fact that activities that are beneficial for the environment yet have no (or *de minimis*) adverse effects, such as the installation of a heat pump rather than the building of a fireplace, or a decision to walk to work rather than use a car, could clearly not be restricted or otherwise regulated under the RMA.

A less obvious example, from the forestry industry, also illustrates the generally reactive character of the RMA and the inappropriateness of including detailed operational regulation within it. Like CCS, commercial forestation has a number of environmental benefits, along with potential adverse effects (for example, noise, vibration, and amenity effects). A consent authority could impose conditions to mitigate (for example) any adverse effects on amenity by planting only in certain areas, or to mitigate effects on the destruction of native flora by requiring offset planting elsewhere.[136] However, the fact that the project would have a positive environmental impact on climate change would not entitle a consent authority to hijack the management of the forest by requiring that a certain kind of tree, which absorbed more carbon, be planted instead of plants that provided a better yield of timber. It could not

ensure that the positive effects of an activity be enhanced to their full potential if this were not in response to the adverse effects of that activity.ⁱ

One final analogy can be drawn between CCS operations and landfills, which *prima facie* appear very similar. One may ask why CCS requires operational regulation beyond the RMA, yet landfills do not. Both involve the deliberate and permanent disposal of a waste product into the sub-surface. To answer this question, one needs to revisit why activities require regulation: to respond to problems. Environmental regulation is necessary for landfills because they have actual and potential environmental effects. Further operational regulation is not required, because the only problems presented by landfills are environmental.^j The success of a landfill is measured in terms of the extent to which it causes adverse environmental effects, because the activity does not itself seek to achieve a positive effect on the environment. A successful landfill is one that is contained, does not leach, does not produce offsite odour, and can be remediated with little impact on subsequent activities. In other words, regulation is concerned with re-establishing the status quo as far as this is possible. This fits within the RMA's scope, which is concerned with addressing the effects of an activity rather than ensuring that the positive effects of activities are achieved. In contrast, CCS requires additional regulation to ensure that it actively delivers positive effects above and beyond that needed to address its local adverse environmental effects.

It has been suggested above that the aim of CCS is to achieve positive effects for the environment that are not linked to the mitigation of its potential adverse effects. One complication is that, while this characterisation is correct, its purpose can equally be characterised as the prevention of an adverse effect. The operational effectiveness or success of CCS is determined largely by the extent to which leakage of sequestered CO₂ to the atmosphere is prevented. Conceptually, climate change is an "effect" that falls within the wide definition of this term in the RMA,[137] and any discharge of a contaminant that has the potential to cause this effect can be regulated under it in order to mitigate the risk of it occurring.[138] This is in contrast to the forestry industry, where "success" (in the climate change context) is the attainment of a positive effect (the active removal of CO₂ from the atmosphere) and cannot be characterised as the prevention of an adverse effect. While positive effects (to the extent that they are not required for mitigation) cannot be actively regulated under the RMA, the whole point of the Act in the consenting context is to address the adverse effects of activities (including through the prevention of such effects).

Therefore, although the success of an environmentally beneficial activity is not ordinarily the domain of resource management regulation, in the CCS context "success" doubles as the prevention of an adverse effect. Most operational matters requiring regulation to ensure the success of CCS could arguably, in principle, also justifiably be included in the RMA on the grounds that they are designed to prevent the leakage of CO₂ as a potential environmental effect of the activity. Case law shows that a grant of consent to discharge into a defined and controlled area (such as an oxidation pond or storage bladder) does not automatically authorise a discharge to the wider environment, and enforcement action can be taken under the Act in such scenarios.[139]

However, in practice, treating the escape of sequestered CO₂ as an effect under the RMA presents difficulties. The Act currently provides that consent authorities are prohibited from considering the effects that the discharge of greenhouse gases have on climate change.[140] While this is not itself a barrier from a legislative design perspective (such a prohibition could simply be removed in the CCS context using regulation making power), more fundamental difficulties stem from the practical considerations underlying the prohibition. In short, the management of activities causing climate change has consistently been eschewed by the Courts prior to the prohibition being enacted in 2004, despite the fact that climate change was an effect that was technically recognised as being within the jurisdiction of a consent authority.[141] Issues with establishing a causative link between relatively infinitesimal local emissions and the effects felt from a changing global climate have rendered such effects, effectively, beyond the jurisdiction of consent authorities.[142] In the early 2000s the Courts repeatedly called for national level regulation to address the problem, which came in the form of the emissions trading scheme framework that accompanied the 2004

ⁱ Although the positive effects of an activity can be considered in a consent authority's decision as to whether consent is granted, and s 7(b) of the RMA requires consideration of the efficient use of resources, such effects cannot be subject to management through conditions if they are not directly linked to adverse effects.

^j Although the adequate *provision* of landfills is governed under the Local Government Act 2002, s 11A.

prohibition. In the context of CCS, this means that there would be only tenuous jurisdiction to impose operational conditions that aimed to prevent the escape of sequestered CO₂ to the atmosphere. It would not be an “effect” that could in practice be restricted, because conditions cannot impose measures above and beyond what is required to mitigate the established potential effects of an activity.[143] Therefore, while climate change is an “environmental” effect of the emission of greenhouse gases, it has unique features that render it practically unsuitable for restriction under the RMA. The IEA has also tended to draw a distinction between pure “environmental” effects of CCS on one hand, and the effects of leakages on the global climate (which warrant separate attention) on the other.[144]

Along with being limited by its reactivity, the structure of the Act is ill-equipped to accommodate operational provisions that actively seek to give preference to particular industries. Applications are by default assessed on a first in, first served basis, and while planning and policy provisions can prohibit or highlight the relative merits of different activities in different areas, and can provide for other methods of resource allocation,[145] there is no suitable mechanism to determine whether a different applicant’s current or potential proposal would “better” amount to sustainable management.[146] Applications cannot be declined on the basis that a more environmentally sustainable project will or may require the same resources in the future. Nor can the relative attributes or competence of applicants be considered.[147] Potential competition for pore space between the petroleum and CCS industries should be managed not on an ad hoc basis, but rather be subject to an active tendering or bidding process by which a range of considerations (not only environmental, and including the wider public interest) could be considered and compared.[148] Although not all petroleum formations would be suitable for CCS, and while CCS can utilise non-petroleum formations, there would likely be significant overlap, especially given the potential for cost and infrastructure sharing between the industries. A tendering process would complement (and could be done in conjunction with) the competitive bidding system under the CMA. The fact that relevant considerations exceed those within the concept of sustainable management suggests that this process would be an uneasy fit under the RMA.

It would, of course, be possible for Parliament to amend the RMA expressly and include operational as well as environmental regulation of CCS within it. However, if this occurred, the purpose of the RMA would have to be widened considerably, to include the detailed management of activities that are seen as “beneficial” to the environment. This would upset the coherency of the Act’s single purpose,[149] in that a goal of operational success may sometimes come into conflict with the sustainable management of the local environment. It would further upset the structure and universality of the RMA through the ad hoc insertion of industry-specific provisions. It would also set a dangerous precedent, in that the RMA may end up as a series of disparate and lengthy Parts, each concerned with the detailed regulation of a specific industry. Furthermore, adding operational provisions to the RMA would result in a behemoth of a statute, leading to it becoming user unfriendly,^k and would be confusing to readers who may not expect to find such regulation in a thematic resource management regime.[150]

The conclusion reached above reflects the presumptions involved in a purposive-incorporative approach. While the prevention of the adverse effects of activities on climate change is within the scope of sustainable management, experience has shown that the climate effects of relatively small or slow leakages of CO₂ in practice fall outside the purpose of the Act, and cannot realistically be restricted. Furthermore, the active operational regulation of environmentally beneficial industries is ill-suited to the RMA, which is designed to address the adverse effects of activities rather than ensure their success. The coherency of the Act’s purpose would be undermined by incorporating new operational regulation within it.

5.6 Does the environmental regulation of injection belong in CCS-specific legislation?

The only immediately obvious alternative to the problem of inefficiency in the regulation of injection and post-injection is to remove environmental considerations from the RMA and include them in a separately created operational regime for CCS. This would avoid the need to extend the purpose of the RMA to accommodate operational regulation. An operational regime could have a purpose of managing the operational and environmental aspects of CCS injection. Some have mooted the idea that CCS legislation should be a code governing all aspects of

^k For example, The Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Aus Com) contains 791 sections and 8 schedules.

the activity, as this would streamline the process and allow better returns on (and thus encourage) investment.[151] Mandatory compliance with both the CMA and RMA already serves to elevate costs associated with mining.

However, although CCS injection is unique and has not been contemplated specifically by the RMA, the removal of one industry from the jurisdiction of planning and consent authorities under the RMA would be unprecedented, the only exception being the fisheries industry.¹ This exception may in part be explained by historical and practical reasons, in that fisheries management has for a number of decades been subject to a specific regime and regulator concerned with utilisation rather than conservation, that the fisheries industry has had a powerful lobby, and that the management of fugitive animals does not sit well within the idea of local control presumed under the RMA.

Jurisdictions that have included some environmental regulation of CCS within Acts dealing with specific industries (such as Alberta in Canada and the Australian Commonwealth) have a stronger tradition of including environmental provisions within industry-specific regulation, notably within the petroleum sector.[152] Similarly, while Norway has some experience of separate environmental safeguards being subordinated to interests within sector-specific legislation,[153] New Zealand's industrial legislation has (either expressly or implied by silence) not removed the need for separate authorisation to be obtained under the RMA (except fisheries).[154] Victorian onshore state legislation has taken an approach whereby the environmental effects of injection are to some extent managed in a CCS-specific Act,[155] with a stipulation that certain environmental planning statutes do not apply to CCS projects (reflecting the position in petroleum legislation).[156] However, as in Queensland state legislation, all other environmental requirements remain unaffected by the Act and continue to apply.[157] The position is broadly similar under offshore Victorian legislation.[158] Future legislation in New South Wales looks likely to retain the need for prior planning approvals to be obtained under separate environmental legislation.[159]

A number of objections can be made to removing environmental protections from the RMA in the New Zealand context. Firstly, the RMA directly contemplates the regulation of activities involving discharges and dumping. There may be a perception of double standards if regulations had to be developed for different industries,[160] especially if different regulators were responsible for each regime. The use of thematic regimes promotes consistency of regulation across resources, an idea that has generally underpinned the Australian approach to industrial legislative design.[161] Removing injection would cause conflict with local planning, by removing the control of discharges from regional and territorial authorities, and more generally undermine the idea of subsidiarity, which dictates that communities should have the right to control and shape the patterns of activities that have local effects.[162] The existence of two regimes under which environmental authorisations would have to be obtained could cause confusion for applicants and tensions between different decision makers. Creating or duplicating a regime to regulate the environmental effects of injection would be expensive and time consuming. While it may legitimately be claimed that CO₂ is not a "waste" in the usual sense (for example, under the EU Waste Directive, CCS streams have specifically been excluded from this definition),[163] the RMA is intended to govern not only "wastes" or "harmful" substances but rather a broad range of substances likely to change the physical, chemical or biological condition of a receiving environment.[164] The RMA regime certainly already envisages the kinds of impact assessments and risk management identified as essential by the IEA.[165]

Secondly, the RMA has a robust and established regime for public participation for large projects,[166] which the IEA has highlighted as a key aspect of regulation needed for CCS.[167] It has become the focal point for legitimate opposition to proposals. In part, this is due to the Act's wide ranging purpose and definition of effects, which is capable of drawing together those with a wide and divergent range of views into a single process under a single Act. It would be confusing and complicated for the public, and accordingly imperil transparency and efficiency, if environmental participatory processes were split or duplicated along industry-specific lines. Legislation should be developed so that those affected by it will understand it,[168] and environmental legislation affects the wider public as much as it does applicants. This is not to say that the process should be run by local

¹ Aquaculture is subject to specific additional provisions within the RMA, industries using hazardous substances are subject to additional technical requirements outside the RMA framework, and the removal of sub-surface minerals is outside the scope of the purpose of the Act, but these industries are not exempt from regulation of matters within the purpose of the RMA.

government; the RMA already provides for the Environmental Protection Authority (EPA) to administer the process where nationally significant projects are called in by the Minister for the Environment.[169]

Thirdly, there may be a tension within the purpose of operational legislation if it were to include environmental protections. Performing CCS in a manner that is efficient and effective may not always be consistent with the sustainable management of resources on the local level where adverse impacts are felt. As illustrated by the purpose of the CMA, operational measures required to enable, facilitate or encourage an industry do not always sit comfortably with the idea of sustainability.[170] Of course it would be possible to word the purpose of such legislation so as to facilitate the technology to the extent it is environmentally sustainable, but some may suggest that this would amount to a fox guarding the henhouse. Sustainability may be better served by a separation of powers.

Fourthly, removing injection from the scope of the RMA would cause a complicated interface between operational legislation and the RMA, because it would be difficult to define what effects of the activity could and could not be considered under each regime. Similar uncertainties have arisen around the delineation of climate change considerations removed from local authority jurisdiction.[171] Consenting decisions under the RMA are characterised by a wide range of considerations. Discretionary activities are not meant to be assessed in an artificial or narrow manner, which is highlighted by the Act's wide and non-exhaustive definition of an effect. If a decision maker could not consider the injection of CCS streams, considerable uncertainty would result. For example, when faced with an application for a land use consent to engage in CCS (rather than a discharge permit to inject), could a consent authority consider the injection of CO₂? Injection and storage constitute the land use itself, because they are essential rather than incidental to the activity. If injection could be considered, then local authorities would retain considerable jurisdiction over CCS and the purpose of removing injection from the RMA would be defeated. But if it could not be considered, then one may ask: what is the land use that *is* able to be considered by a local authority?

Furthermore, it would be difficult to determine whether injection amounted to CCS (in which case the RMA would not apply) or EPR (in which case the RMA would apply). It may not always be clear which one is occurring, or the degree to which each is occurring.[172] Using the RMA for both would enable joint CCS-EPR projects to be treated holistically over their lifespans and consistently according to the effects they had on the environment. In contrast, removing only CCS from the Act may result in inconsistent treatment of the environmental effects of EPR and CCS, and an awkward or artificial transition between them in projects that involved both. Given that early CCS projects may be likely to occur in conjunction with petroleum operations, the need to engage with different regimes may be off-putting to investment.

These examples illustrate the problems one encounters when seeking to carve out exceptions from a thematic regime that is designed to take a holistic view of activities. Such artificial distinctions are broken down in practice under the RMA by bundling the required applications to enable them to be heard together,[173] and by treating compatible industries as a single activity. It may prove prohibitively difficult to set a legislative delimitation of the boundary between injection and other activities, because it challenges the thematic way in which the RMA is intended to operate. There is a danger also that the all-sectors approach of the RMA would be undermined if specific industries were exempted. One can foresee that an ambitious purpose of "sustainable management" would ring hollow if it applied only to some activities.

Again, the conclusion reached above reflects the presumptions involved in a purposive-incorporative approach. The purpose of the RMA clearly extends to regulating the environmental effects of injection as a discharge or a dumping, and therefore there is a strong argument to incorporate this regulation into the Act. Not doing so would undermine the coherency of the thematic regime, and create uncertain boundaries that could encourage litigation.

5.7 Addressing overlap and inefficiency

The desirability of retaining the environmental regulation of injection in the RMA, while at the same time excluding operational regulation from it, is set against a formidable counter-argument identified earlier: having environmental and operational legislative frameworks operating in parallel would create a great deal of inefficiency

and overlap. Almost all new legislation addresses matters that are already touched upon by aspects of existing law,[174] but this is particularly noticeable in the case of CCS. Potential inconsistencies between operational and environmental provisions and added costs to industry may prove prohibitive to investment. It would also simply shift, rather than remove, legal boundary issues. Rather than having to determine when a consideration related to “injection”, authorities would have to decide if an issue were “operational” or “environmental”.

A purposive-incorporative approach offers a set of presumptions in the interests of maintaining the stability and workability of existing thematic frameworks, but only so far as practicable.[175] The presumptions must be weighed against the need to regulate novel industries like CCS effectively and efficiently. Whether the inefficiencies of retaining the environmental regulation of CCS injection within the RMA override the difficulties with boundary definition and legislative coherency if it were to be removed is to some extent a matter of degree and policy preference.

However, two further points can be made before such a policy judgment is required. Firstly, the extent of any “inefficiency” is determined by one’s understanding of this concept. Secondly, there are ways to mitigate inefficiency and boundary issues that do not involve the removal of injection from the RMA.

One may see considerable inefficiency in having separate regimes regulating the environmental and operational aspects of injection. However, while there would be significant overlap in terms of what would need to be considered under the two regimes, there would be little overlap in their purposes. Other industries are regulated effectively along similar lines. For example, pipelines carrying natural gas require consent under the RMA and authorisation under health and safety legislation, while they also need to comply with the industry-specific standards in the Gas Act. Each of these different regulators is required to consider, for example, how the design of a pipeline would prevent the gas escaping. In a sense this is inefficient, in that three regulators are considering the same activity. But New Zealand’s system of thematic legislation means that each regulator approaches the problem from a specific viewpoint, and is driven by a specific and coherent purpose. This tunnel vision is valuable in allowing each statute, and each regulator, to champion a particular issue within an area of expertise. It reduces, for example, the risk that considerations of the effectiveness of an industry would devalue health and safety or environmental factors. While there is clear value and efficiency gains in rationalising separate legislation into one Act where they have similar purposes,^m this does not justify the integration of regimes where their purposes are fundamentally different. Given that the existing system of industrial regulation in New Zealand is arranged on thematic rather than industry-specific lines, it is not necessarily inefficient to add legislation with a purpose that does not overlap with existing thematic regimes. It is, in fact, consistent with previous approaches whereby industry-specific legislation fills the gaps left by the purposes of thematic regimes.

A purpose of ensuring the effectiveness of CCS would have little overlap with the sustainable management purpose of the RMA. This is because the concept of sustainable management has proven incapable of regulating emissions that impact on the global climate and because it has not been extended to the detailed regulation of specific industries (whether climate friendly or not). Not only does this point to the inappropriateness of including purely operational regulation under the RMA, it also suggests the existence of a relatively easily identifiable and defensible boundary between the two regimes. It is comparatively simple to determine whether an aspect of an activity impacts on the sustainable management of resources, and whether it relates to the effectiveness of the operation in mitigating climate change. It may legitimately do both (for example, the manner of injection). There is already a large body of case law under the RMA outlining the scope of the Act’s purpose, and any regulation with an aim outside of this could be considered “operational”. It is not necessarily inefficient for different goals to be achieved by different regulators simply because they consider the same activities. A process is generally understood to be most efficient if it achieves its aims or outputs with the lowest costs or inputs, so one’s understanding of efficiency depends on the aims one wishes to achieve.[176] Efficiency is not simply about minimising costs in the abstract. Removing injection from the scope of the RMA may reduce application costs to industry, but one may ask: at what potential cost to the environment, public participation, and legal certainty and coherency?

^m For example, the integrated management achieved under the RMA by the rationalising a number of pre-existing resource-specific statutes.

In light of this approach, one can revisit the perceived “limitations” of the RMA identified earlier in this paper. For example, the limited duration of discharge and coastal permits under the Act means that, currently, there is no legal basis for the ongoing management of CCS sites post-closure. International experience has shown a need for post-closure stabilisation periods of 15 years or more.[177] Although there may be some justification for extending this duration and associated liability on grounds of environmental management (as there are with other long-term industries), the purpose for which long-term monitoring (and long-term liability and transfer) is required specifically for CCS (as opposed to an activity like a landfill) is operational: to prevent the escape of CO₂ to the atmosphere and ensure the technology is successful. There may, therefore, be no need to amend the RMA to extend consent duration on these grounds, or to impose such onerous ongoing responsibilities on local government. Long-term monitoring and maintenance obligations, coupled with provisions governing liability, the provision of bonds and insurance, and the long-term transfer of responsibilities from an injector to the Crown, may comfortably be located under CCS-specific legislation instead.

5.8 Practical measures to mitigate overlap

Although it is suggested that there is little conceptual overlap between the purposes of legislation concerned with the environmental effects of CCS and that concerned with the operational success of the technology, and that there is value in keeping such considerations separate, some inefficiency remains. For example, separate regimes would naturally lead to two different decisions being made at different times and which would utilise separate administrative resources. An applicant may invest time and money into two processes to find that, while one authorisation is granted, the other is subsequently declined on other grounds. This is a natural result of a division of functions according to the purpose of legislation. However, there would be a number of ways to mitigate this inefficiency in practice.

Firstly, national policy statements and national environmental standards under the RMA could be made to ensure that the approach of lower level regional plans to injection were not inconsistent with the fundamental operational requirements of CCS legislation. Secondly, a single process could be implemented for obtaining authorisations under the RMA and a separate operational permitting regime. Applications could be submitted at the same time, and be processed by a single administrative body (the EPA is a logical choice). Thirdly, decisions could be made by a single body constituted for that purpose, utilising a single set of resources. This body could call on expert evidence but be guided by different statutory criteria under each Act. This would prevent an application being treated inconsistently under the different Acts and prevent conflict between decision makers or consent conditions. The Board of Inquiry process already established under the RMA presents a useful precedent for the use of a non-political decision-making body, capable of considering a wide range of considerations, and comprised of a mixture of expert commissioners in the context of nationally significant projects.[178]

Fourthly, once a decision had been made, ongoing regulatory control could be exercised by two agencies, with different mandates according to the purposes of the relevant legislation. Consistent conditions should reduce any conflict here, but the Acts could also require that the agencies cooperate, share information and expertise (particularly regarding the monitoring of plumes), conduct reviews at the same time, and form a joint panel for certification of any changes. There has been some experience with cooperation in recent years under the RMA for complex projects requiring both regional and territorial authority consent.[179] Particular care would need to be taken during the injection and site closure phases, where both the RMA and operational regulation would apply, but similar interfaces have proven to be workable in the petroleum context.

Finally, in recent years there has been increasing statutory recognition of the need to draw express links and boundaries between thematic regimes. For example, the EEZ Act and the Maritime Transport Act contain explanatory provisions outlining clearly the matters that are governed by each Act.[180] A similar “flagging” approach could usefully be implemented in the RMA and operational CCS legislation, referring to the need to obtain authorisation under the other Act and providing expressly for the alignment of processes.[181] This would provide greater clarity to applicants as to the wide range of authorisations required for a specific industry, which can otherwise be eroded by the use of thematic legislation.

Considering the measures identified above, it is tentatively suggested that inefficiencies associated with the continued regulation of injection within the RMA may not outweigh the benefits of a purposive-incorporative approach to legislative design. Ultimately, this weighing is a matter of degree and policy choice, and concluding otherwise remains a valid alternative. However, it seems feasible that the RMA, with some amendments to address matters within its existing purpose, could legitimately retain its thematic, “all-sectors” character in regulating the adverse environmental effects of CCS injection and post-injection without undermining the effectiveness of CCS regulation. The danger otherwise would be to set a precedent for the environmental effects of activities to be managed on an industry-specific basis, fundamentally changing New Zealand’s thematic approach to industry regulation. Operational requirements should be imposed in separate legislation to ensure (among other things) that the technology is successful in achieving its climate change mitigation aims, to avoid the need to extend the purpose of the RMA. As a final note, this approach would not necessarily prevent an *additional* layer of environmental restrictions being imposed on CCS projects if required, as long as this was clearly signposted within the RMA (comparable to the powers of the Minister of Aquaculture).[182] This would not erode the existing framework under the RMA or create complex boundary issues, but it may present additional cost and uncertainty to industry.

5.9 Where does an operational regime belong?

It has been suggested above, and in the CCS Report,[183] that the operational regulation of CCS is best placed outside the RMA. However, this does not resolve the question of where exactly this should be sited. In particular, two alternative options present themselves: firstly, operational regulation could be included in a separately developed Act for CCS. Secondly, it could be placed in the industry-specific CMA, which regulates the petroleum industry with which CCS has much in common.

At present, the CMA could not regulate CCS.[184] Its restrictions apply only to extractive industries,[185] and a liberal text and purpose approach to statutory interpretation still cannot extend to giving words meaning that they cannot reasonably bear.[186] In any case, the purpose of the CMA is also limited to mining, and the Courts are not entitled to extend or guess at any wider purpose or take a strained ambulatory approach to include fundamentally different activities.[187]

Employing a purposive-incorporative approach to legislative design, it makes little sense to seek to include CCS within the Act as it stands. That said, it would be possible to extend the purpose of the Act to include CCS. International approaches have been varied on this point. Some Australian state legislatures have enacted CCS-specific statutes,[188] and the trend within the European Union has been for CCS to be governed in separate legal regimes from those regulating pure EPR.[189] Other Australian states,[190] the Australian Commonwealth[191] and Alberta[192] have extended existing minerals legislation to cover CCS. While commentators have generally lamented the lack of consistency in approach in Australia, it has been observed that where stand-alone CCS legislation has been enacted it has closely mirrored existing petroleum legislation.[193]

Including CCS within the purpose of a revised CMA would have some practical advantages. Firstly, it could provide for an alignment between the permitting systems for CCS and petroleum mining.[194] The integration of a competitive tendering or block offer process would recognise the potential for competition and co-operation between the industries in exploring for suitable formations, and allow issues to be resolved clearly and efficiently under a single regime (and potentially by the same decision maker).[195] There is substantial overlap in the nature of CCS and petroleum activities in the exploration phase, and to provide for it separately would be duplicative.[196] Secondly, the use of the CMA would recognise that CCS may be likely (at least in the short term) to occur in conjunction with petroleum extraction and utilise many of the same resources (for example, offshore platforms). In fact, early deployment of CCS may simply double as, or be a continuation of, CO₂-EPR, which is already managed under the CMA. Using the CMA for CCS would allow for more holistic oversight of what is in essence a single activity performing two separate functions, and provide for unitisation agreements.[197] It would allow a more integrated transition between the operational requirements of “pure” EPR and “pure” CCS, and provide a more certain and visible avenue for any abrogation of property rights of mining permit holders that may be required to enable CCS.[198] Thirdly, the approach would recognise that most regulatory expertise needed to govern CCS

operations is contained within the department already responsible for petroleum extraction.ⁿ The efficiency gains of incorporating CCS regulation within existing petroleum legislation, and the risks of inconsistency if two separate regimes co-existed, were influential in the design of offshore Australian Commonwealth regime.[199]

Although these factors support the extension of the CMA, a number of considerations weigh against doing so. The purpose of the CMA may lose its coherency if it were extended to CCS. The CMA currently is, fundamentally, a tool for the Crown to manage its property interests in minerals in a transparent and non-arbitrary manner, and to encourage investment in the mining sector.[200] While it would be possible in principle for the Crown to regulate CCS on the basis of its ownership of pore space (if such ownership were expressly provided for by statute), it would be difficult for the CMA to promote both mining and CCS. Although there is some compatibility in the purposes behind mining and CCS, the fundamental aim of the technologies is different.[201] Mining law seeks to utilise a finite resource for economic benefit (including to the Crown),[202] while CCS law would be designed to mitigate anthropogenic climate change.[203] Even EPR, which may be similar to and compatible with CCS (as demonstrated by the Weyburn project in Canada), is undertaken for very different purposes and seeks to minimise storage.[204] The two are uneasy bedfellows, in that mining may in many cases eventually result in the climate change effects that CCS is designed to prevent. There would be a tension between the property management role of a mining regulator and a CCS regulator's role as trustee of the wider public good.[205]

If the purpose of an extended CMA were to promote or ensure the effectiveness of both industries equally, considerations may pull in fundamentally conflicting directions. This may be particularly so where a formation is not suitable for both extraction and injection and a choice must be made, or where one activity had adverse impacts on the other (for example, where CCS made petroleum resources unrecoverable).[206] While it is certainly possible for the industries to be reconciled and governed under a single Act (as has been done in parts of Australia), doing so presents a risk that CCS will be perceived as being an offshoot of, or subject to, the petroleum industry, rather than a climate change mitigation tool in its own right.[207]

Furthermore, governance of CCS under the CMA would reflect the short-term likelihood that CCS would occur in formations containing petroleum resources. However, this will not necessarily be the case. For example, it would make little sense for the CMA to regulate the injection of CO₂ streams into a deep saline aquifer that contained no Crown minerals as defined in the Act, or injection into the water column (if this became authorised under international law). CCS would also require more detailed management, much longer monitoring and maintenance periods, and different technical requirements compared with the petroleum industry (especially in terms of site characterisation). While the Act could provide for joint processes to mitigate boundary issues, it would in effect result in two separate parts to an Act, each addressing a different industry, and artificially joined by a vague or incoherent purpose. To ensure a clarity of purpose consistent with New Zealand's "gap filling" industry-specific legislation, it would be more logical from a legislative design perspective to regulate each industry under its own stand-alone Act.

Another more practical consideration is that the addition of CCS regulation to the CMA would result in a large and complex Act, which may be more difficult to navigate for those petroleum proponents not concerned with CCS. Australian Commonwealth petroleum legislation required substantial expansion to address CCS.[208] One may legitimately query whether all future industries that seek to utilise the subsurface would simply be regulated within an ever-expanding CMA. Furthermore, the Canadian experience with acid gas disposal as an offshoot of the petroleum industry, under which CCS regulation has initially occurred in Alberta,[209] finds no parallel in New Zealand. There is no comparable existing regime under the CMA that has provided detailed regulation of injection of waste materials, while the temporary storage of natural gas has important differences to CCS.^o

On balance, a purposive-incorporative approach to legislative design suggests that the operational regulation of CCS should be located in a stand-alone CCS Act rather than an expanded CMA. The boundaries between the CMA and operational CCS legislation would, of course, need to be provided for expressly and precisely in each Act

ⁿ New Zealand Petroleum and Minerals within the Ministry of Business, Innovation and Employment.

^o It involves hydrocarbons, it is temporary in duration, it is not a waste material, and it is incidental to mining.

(particularly in the boundaries between EPR and CCS). It would be possible to provide such boundaries by providing for a joint permitting process under both Acts, and for decisions as to unitisation, prioritisation and the protection of industry-specific interests to be made by a single decision maker or by two decision makers in consultation with each other.[210]

It is worth noting finally that legislative change does not occur in a vacuum. Political considerations and the strength of various industry lobbies, rather than objective assessments of legislative design, may determine to a large extent where regulation is sited. In particular, it may be affected by whether the petroleum or coal industries view CCS as an opportunity or a threat in the New Zealand context. The petroleum industry may be subject to less disruption if any future amendments to the law on CCS were confined to a different statute, but it is possible that safeguards may be seen as being more effective if located within mining legislation. In Alberta, the provincial Government's wish to retain firm control over CCS projects resulted in much CCS regulation being sited under the auspices of legislation concerned primarily with economic and property matters (administered by the Department of Energy),[211] rather than legislation traditionally concerned with the regulation of energy activities (and administered by a largely independent quasi-judicial agency).[212]

6. Regulation concerning health and safety, property, liability and hazardous substances

The most difficult questions of legislative design are likely to arise in the environmental and operational contexts. However, it is worth commenting also on the appropriate site of other regulation required for CCS. In particular, substantive legal clarifications, amendments and additions will be necessary in a number of other regulatory spheres, which, for convenience can be summarised as the property, liability and health and safety spheres. Of these spheres, health and safety regulation is primarily a creature of statute, while liability and property law are a mixture of statute and common law. It is not necessary to recount all substantive legal issues that are likely to arise in these spheres, but a few are provided as useful examples.

6.1 Health and safety

In keeping with New Zealand's tradition of thematic regulation of industrial activities, health and safety restrictions are imposed primarily under the auspices of a single Act that applies irrespective of the industry in question: the Health and Safety in Employment Act 1992 (HSEA). While some specific industries are singled out for more detailed management using delegated legislation under this Act,[213] the purpose of the Act applies to all places of work and is wide enough to encompass all activities performed in a CCS project.[214] This presents an admirably responsive system for the regulation of novel industries, in that there is no need for wholesale legislative amendment to respond to the dangers to people posed by a new kind of activity. Furthermore, it already allows a degree of flexibility essential in CCS operations, in that it is standards or outcome based rather than being prescriptive.[215] There is similarity in the dangers presented by the petroleum industry and those presented by CCS, although the use of pressurised CO₂ in large volumes may require additional targeted safeguards.[216] This could be achieved through the development of regulations under the HSEA, which could closely model or be added onto existing regulations addressing petroleum activities.[217]

On a purposive-incorporative approach, it is presumed that the thematic regime of the HSEA should apply to CCS within its purpose. To do otherwise would undermine the coherency of the regime in a similar way already described in the context of the RMA. In order for the HSEA to apply to CCS, there is no need to extend its purpose in a way that would imperil its coherency or make its boundaries uncertain. That said, arguably its purpose should be extended to reflect the fact that CCS operations should be subject to its requirements even once a site has ceased being a place of work, although this is a general criticism of the HSEA regime in the context of any industry that has ongoing implications for health and safety after work ceases. An alternative "filling the gaps" approach would be to include any such additional regulation required for health and safety reasons within a CCS Act (as has been done in the Gas Act). However, extending the thematic health and safety regime would make regulation more visible, and would reduce the need for complex interfaces between two regimes having overlapping purposes.[218]

There may be some overlap between the operational requirements of CCS legislation and the HSEA. Many of the considerations relevant to safeguarding the safety of people would also be relevant to ensuring the success of storage (for example, the prevention of sudden leakages from pipelines or formations). Health and safety regulations already take a detailed approach to questions of designing and constructing infrastructure like pipelines and offshore platforms.[219] However, as discussed earlier in the environmental context, there is value in each regulator approaching the issue from a particular viewpoint, and this is the necessary consequence of maintaining a thematic approach to regulation. This can be seen, for example, in the additional operational requirements under the Gas Act for purposes beyond health and safety.[220] Slow leakages of CO₂ may not threaten the health and safety of people in the vicinity, but would be vital in ensuring the success of CCS.

Furthermore, this overlap does not present the degree of inefficiency that some may perceive in the overlap between operational and environmental regulation. CCS poses no issues above and beyond those general inefficiencies already present in the separate regulation of the operational and health and safety aspects of mining activities.[221] If anything, it would be more inefficient to provide for a separate and potentially competing health and safety framework and regulator for CCS activities, which may then occur in conjunction with a petroleum operation that would be subject to different regulatory requirements. Thus there appears to be no compelling reason to disturb the presumptions of a purposive-incorporative approach. Naturally, as is desirable for the regulation of all industries, provision should be made for the sharing of information between environmental, operational and health and safety regulators and the streamlining of application and inspection processes.

6.2 Property and liability

In the property context, legal clarification is required as to who owns injection formations and injected CO₂, along with clarity over third party access and the need for landowner approvals.[222] It is reasonably clear that such clarifications should occur within separate CCS-specific legislation. While New Zealand has existing thematic legislation concerned with property, such provisions would not fall within their schemes or purposes (or any reasonable extension of those schemes or purposes).[223] Most provisions would simply amount either to a clarification or an overriding of the common law in the particular context of CCS. There may, in the interests of clarity, be some grounds for consequential amendments to existing thematic property statutes (for example, a requirement in the Land Transfer Act 1952 that the presence of injected CO₂ be noted on a title to property).[224] Furthermore, if a decision were made to resolve ownership issues by vesting the entirety of the deep subsurface in the Crown, there may be a case for including such a provision in the Property Law Act 2007. However, this would not justify the inclusion of CCS-specific property matters within such general regimes. No other industry is treated in this manner. A useful precedent for this approach can be seen in the CMA, which is an industry-specific statute that simply vests ownership of certain minerals in the Crown.[225]

Principles of civil liability in New Zealand relevant to CCS are largely contained within the common law (in particular, tort law concerning nuisance, trespass and negligence).[226] Exemptions from or limitations to the liability of a specific industry like CCS would not fall comfortably within the purposes of existing statutory regimes, so should not be incorporated within them. One would expect rather to find such exceptions within dedicated CCS legislation. The same holds true for provisions governing the transfer of liability from an operator to the Crown, which do not currently exist and are required only for CCS. In terms of the temporal scope of liability, the Limitation Act 2010 is relevant. Here, a policy choice would have to be made as to whether CCS operators should be shielded from “stale” claims, and whether the relevant “act or omission” under that Act would be injection or the subsequent escape of gas. Such clarifications would fall within the purpose of the Limitation Act and would thus be appropriate within it,[227] although New Zealand has some experience with limiting specific forms of regulatory liability within the regimes creating that liability.[228]

Issues of civil liability can also exist where specific causes of action are created by statute (regulatory liability). In such contexts there is a strong case, for reasons of transparency and accessibility, for locating any industry-specific exemptions from or amendments to this liability within the statute that created it (together with a cross-reference in industry-specific legislation). The Maritime Transport Act is one such example, where operators of marine activities can be liable for environmental damage.[229] Similarly, the RMA imposes liability for breaches of

consent conditions, which follows naturally from jurisdiction to impose such conditions.[230] Financial liability may also result from the leakage of CO₂ under the Climate Change Response Act 2002.[231] The IEA has generally supported the extension of existing regimes concerning liability.[232] However, if a different form of regulatory liability were considered desirable due to the unique risks posed by CCS, there could be no objection to including this within dedicated CCS legislation. To do so would be consistent with New Zealand's approach to industrial regulation and the purposive-incorporative presumptions promoted in this paper. For example, the imposition of long-term liability and responsibility in CCS legislation would be needed for operational reasons to ensure that a CCS project were effective in achieving its climate mitigation aims.[233]

6.3 Hazardous substances

It is worth noting, briefly, one other legislative regime, concerned with the regulation of hazardous substances: the Hazardous Substances and New Organisms Act 1996 (HSNO Act). At present, the core activities of CCS would not trigger restrictions under this Act, because CO₂ (even when in supercritical phase) likely does not amount to a hazardous substance as defined in regulations.[234] It would be possible for it to be extended to do so without legislative amendment, but when considered in light of other substances identified as hazardous, this seems inappropriate.[235] Furthermore, detailed environmental provisions can be imposed under the RMA, health and safety requirements can be imposed under the HSEA, and operational provisions can be contained within CCS legislation. It would complicate the regulatory landscape to introduce another layer of requirements or another regulatory agency where this was not necessary for the effective and complete regulation of the technology. However, this does not detract from the fact that compliance with the HSNO Act would be required where CCS operations involved the incidental use of substances that *were* classified as hazardous.

The HSNO Act is of relevance not only in its direct application to CCS, but also for its unusual place within New Zealand's system of industrial legislation. Although it may be comfortably described as a thematic regime, in that it applies irrespective of the industry in question, it has somewhat of a hybrid purpose involving both environmental protection and the protection of human health and safety.[236] This reflects the fact that its specific, detailed and prescriptive requirements arguably do not fit comfortably within the more general thematic regimes of the RMA or HSEA, that it requires centralised management, and that a specialist regulator is required in its administration and enforcement.^p In a way, it can be seen as an example where considerations of the effectiveness of regulation have required that purposive-incorporative presumptions be overcome, given that there is a substantial overlap in purpose between this Act and the RMA and HSEA. Although activities involving hazardous substances are arguably analogous to CCS, in that both require detailed regulation above and beyond those provided by more general regimes, it is also telling that compliance with the HSNO Act does not remove the need to comply with the RMA or HSEA. Thus while it is inconsistent with the presumption that existing regimes should be used as far as their purposes allow, it does not create difficult boundary issues; it is simply an additional level of regulation where hazardous substances or modified organisms are involved.

7. An holistic view of legislative design: what is a workable system?

The purposive-incorporative approach to legislative design presented in this paper provides presumptions in the interests of retaining the integrity of an existing system of legislation. It presumes that the regulation of an industry should be sited within existing regimes as far as possible, and that the boundaries of such regimes should be determined by their statutory purposes. General adherence to such a pattern of behaviour can be perceived in New Zealand's system of industrial legislation in the past few decades. While the purposes of existing regimes may be extended or amended under this approach, this should not be done at the expense of their coherency. However, this is not an approach that is advanced as being inflexible or absolute. Law makers must always respond to the particular features and circumstances of the activity in question, to ensure it is regulated effectively and efficiently.

The regulatory history and existing structures of a jurisdiction are important in determining where regulation should be sited.[237] In jurisdictions characterised by a greater focus on industry-specific legislation, problems of

^p Previously the Environmental Risk Management Authority, now the Environmental Protection Authority.

legislative design may be less pronounced; CCS is a relatively novel technology, and all aspects of it could justifiably be governed under a stand-alone Act (although some boundary issues with petroleum legislation would still need to be addressed). The position is more difficult in jurisdictions with a history of thematic legislation, or a mix of thematic and industry-specific legislation. New Zealand falls into this category. Here, there are more likely to be issues over whether considerations of efficiency and effectiveness should override the presumptions of a purposive-incorporative approach.

There is comparatively minor overlap and inefficiency in the regulatory spheres of property, liability, and health and safety, and no persuasive reason either to extend these thematic regimes or to remove CCS from their existing scope. Any inefficiencies can be addressed by careful interfacing of legislative boundaries and provisions for joint administrative process. However, there is substantial overlap between regulation required for environmental reasons and regulation needed to ensure CCS operates functionally and successfully. The CCS Report recommended that, for this reason, the environmental governance of injection and post-injection be removed from the scope of the existing resource management regime. This paper suggests that, while this is a valid conclusion, other options are also available. One such view is that the benefits of retaining environmental regulation within the RMA can be seen to outweigh its drawbacks, and there are means by which inefficiency can be mitigated. This conclusion, however, may depend on the fundamental goals one brings to an assessment of inefficiency.

A number of aspects of CCS that require regulation fall outside the purposes of existing thematic regimes, and there is a need to construct an industry-specific Act to address these lacunae. In particular, the detailed operational regulation of CCS, the provision of a fair and transparent permitting process, and clarification of property rights and liability are measures responding to unique features of the industry and therefore belong within such an Act. New legislation should aim to provide legal certainty to applicants, regulators and the public, and also to enable or facilitate (or, if it is the policy position, encourage)[238] the deployment of the technology in an effort to mitigate anthropogenic climate change.

The above discussion may be relevant to other small states such as New Zealand, which do not yet have regulatory regimes designed with CCS in mind, but for which CCS is a technology on the horizon. Although every jurisdiction will have different laws, and thus the solutions to the issue of legislative design for CCS will be different, it is hoped that this paper may be useful in furthering an understanding of the nature of the problem where states have implemented thematic approaches to industry regulation.

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 - [3] International Energy Agency. *CO₂ Capture and Storage: A Key Carbon Abatement Option*. Paris: IEA; 2008. p. 123; International Energy Agency. *Carbon Capture and Storage Model Regulatory Framework*. Paris: IEA; 2010. p. 40.
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 - [6] Stagpoole V, Bushe H, Milner M. *Opportunities for Underground Geological Storage of CO₂ in New Zealand. Report CCS-08/4 – Offshore Waikato Region*. GNS Science; 2009. See also King PR, Bland KJ, Funnell RH, Archer R, Lever L. *Opportunities for Underground Storage of CO₂ in New Zealand: Report CCS-08/5 – Onshore Taranaki Basin Overview*. GNS Science; 2008. See also www.gns.cri.nz/Home/Our-Science/Energy-Resources/Oil-and-Gas/Research/Outputs-and-Outcomes.
 - [7] As reflected in the membership of New Zealand's CCS Partnership. Particularly notable is the following report: Transfield Worley Ltd. *CCS in New Zealand: Case Studies for Commercial Scale Plant: Final Report*. 2010.
 - [8] Barton B, Jordan K, Severinsen G. *Carbon Capture and Storage: Designing the Legal and Regulatory Framework for New Zealand*. Hamilton: University of Waikato; 2013.
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Hamilton: University of Waikato; 2013. Ch. 9.

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[11] Barton B, Jordan K, Severinsen G. *Carbon Capture and Storage: Designing the Legal and Regulatory Framework for New Zealand*. Hamilton: University of Waikato; 2013. p. 42.

[12] Victoria University of Wellington. Completion date anticipated to be late 2015.

[13] In particular, the Resource Management Act 1991 and/or the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012.

[14] Health and Safety in Employment Act 1992.

[15] Crown Minerals Act 1991.

[16] Legislation is necessary to regulate activities in a modern industrial context: Legislation Advisory Committee. *Guidelines on Process and Content of Legislation*. 2001. pp. 9, 144. See also an Australian perspective in: Ministerial Council on Mineral and Petroleum Resources. *Carbon Dioxide Capture and Geological Storage Australian Regulatory Guiding Principles*. Canberra: MCMPR; 2005.

[17] Barrow Island Act 2003 (WA).

[18] International Energy Agency. *Carbon Capture and Storage Model Regulatory Framework*. Paris: IEA; 2010. p. 24. See also Gibbs M, McCormack P. *Greenhouse Update*. Blake Dawson; 10 October 2008. p. 21.

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[21] *Environmental Defence Society v Taranaki Regional Council* EnvC A084/2002, 6 September 2002, [53].

[22] Health and Safety in Employment Act 1992.

[23] Resource Management Act 1991, ss 3, 5, 9-17. Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act ss 4, 10, 20.

[24] Hazardous Substances and New Organisms Act 1996.

[25] Building Act 2004.

[26] Land Transfer Act 1952.

[27] Limitation Act 2010.

[28] Particularly in the environmental sphere in such legislation as the Conservation Act 1987, Marine Reserves Act 1971, Antarctica Act 1960, Antarctica (Environmental Protection) Act 1994, Hauraki Gulf Marine Park Act 2000, and Reserves Act 1977.

[29] Crown Minerals Act 1991.

[30] Gas Act 1992.

[31] Electricity Act 1992, Electricity Industry Act 2010, Port Companies Act 1988.

[32] For example, the Auckland Airport Act 1987, and Wellington Airport Act 1990.

[33] Barton B, Jordan K, Severinsen G. *Carbon Capture and Storage: Designing the Legal and Regulatory Framework for New Zealand*. Hamilton: University of Waikato; 2013. p. 29.

[34] Legislation Advisory Committee. *Guidelines on Process and Content of Legislation*. 2001. p. 10.

[35] Conservation Act 1987, Part 3B.

[36] Marine and Coastal Area (Takutai Moana) Act 2011, s 52.

[37] For example, Conservation Act 1987, s 17P and Resource Management Act, s 4(3).

[38] Resource Management Act, Part 6A.

[39] See Nolan D, editor. *Environmental and Resource Management Law*. Wellington: LexisNexis NZ; 2011. pp. 478-479. See also *Report of the Review Group on the Resource Management Bill*. 11 February 1991. pp. 77-78.

[40] Crown Minerals Act 1991, s 1A (prior to 2013, see the long title of the Act).

[41] Telecommunications Act 2001, ss 3, 18.

[42] Gas Act 1992, s 1A, Health and Safety in Employment Act 1992, s 5.

[43] Gas Act 1992, s 1A(c).

[44] Crown Minerals Act, s 29A(2)(d).

[45] Fisheries Act 1996, s 8.

[46] In some cases it is spelt out expressly: for example see Telecommunications Act 2001, s 3 where it is expressly stated that the Act does not limit the RMA.

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- [71] For example, see the Forests Act 1949, Part 3A for restrictions on the harvest of indigenous timber.
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- [100] *Mount Field Ltd v Queenstown Lakes District Council* [2012] NZEnvC 262, [76]-[83].
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for the Mackays to Peka Peka Expressway, Final Report Volume 2: Conditions, conditions DC.7A, DC.9.

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