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Governing Climate Change: Towards a New Paradigm for Risk Regulation

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This article argues that the ascent of climate change on the EU regulatory agenda signals a new era of risk regulation and calls for the establishment of a new paradigm for risk regulation. Climate change is altering the EU's conception of environmental risks and its design of regulatory responses. In contrast to conventional risk regulation, climate change regulation must prioritise the risks of business-as-usual over the risks of change, must target systemic change instead of stability, and must favour the virtues of integration and orchestration over those of individualisation and compartmentalisation. There is an important role for risk regulation scholarship to analyse this shift and its consequences for regulation, such as the relocation of legitimacy needs and the emergence of new risks of regulatory failure. Such an enterprise would both reinvigorate risk regulation scholarship and offer a vital contribution to the European Union as it tackles the momentous challenge of climate change governance.

INTRODUCTION

The European Union has a well-established reputation as the world's most forceful advocate for the adoption of internationally binding climate change commitments. The EU has moreover chosen to lead by example and has adopted an impressively diverse arsenal of regulatory measures that together aim to reduce its own carbon footprint by at least 20 per cent by 2020.

This article analyses the core features of the regulatory approach as it emerges out of the sprawling body of climate change legislation and argues that they constitute a significant, in many ways radical, departure from the EU's conventional approach to environmental regulation. Until now, the EU's legal response to environmental and health problems, from biodiversity loss to chemical toxicity, has been heavily dominated by the risk regulation paradigm. The risk regulation paradigm sets the tone for how the EU as a regulatory authority conceptualises the environmental impacts of human activity, for the articulation of its regulatory mandate and for the design and implementation of regulatory strategies in fulfilment of this mandate. The analysis will show that, while climate change is unequivocally recognised as a major environmental risk, it is a risk that is differently understood from those that form the traditional subject of EU risk

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regulation. Consequently, climate change as a regulatory challenge makes different demands of the EU as a regulator: climate change regulation must target systemic change rather than stabilisation, and regulatory strategies must facilitate integration and orchestration over itemisation and compartmentalisation. The climate change regulatory regime will also display different vulnerabilities from those that characterise EU risk regulation, calling for a rethink of the function and variety of EU legitimation strategies.

The outcomes of the analysis have fundamental implications for the study and practice of risk regulation. Scholars in the area are confronted with the reality that the established risk regulation paradigm is of limited use to understand and guide regulatory efforts to control the most important environmental risk of our time. If scholarship is to play a constructive role in supporting the EU regulatory enterprise, it needs to develop a new paradigm for a new era of risk regulation. Enhanced awareness within EU regulatory circles of the particular nature and needs of climate change regulation can be a pivotal asset towards the further development and implementation of a regulatory regime that offers the best chance of effectiveness and minimises the risks of regulatory failure.

The first section of this contribution sets out the general features of the established risk regulation paradigm. We then move into the analytical heart of the article by examining, firstly, how risk regulation operates in practice in the European Union and, secondly, by comparing and contrasting the discourse, agenda, and strategies of EU risk regulation to those that characterise EU climate change regulation. The final section assesses the outcomes of the preceding analysis. It draws attention to regulatory blind spots that are likely to develop as a consequence of insufficient awareness of the particular context of EU climate change regulation, and discusses the risk that the EU might revert to tried and tested risk regulatory strategies, which have functioned reasonably well in the past but would be ineffective in the battle against climate change. On a positive note, the assessment identifies scope for synergy and mutual learning between conventional risk regulation and climate change regulation, arguing that experiences gained in one area could be productively deployed in the other. The article concludes with a plea for the further articulation of a new risk regulation paradigm that adequately reflects the character and scale of the environmental risks that society faces today.

THE RISK REGULATION PARADIGM

Risk regulation has become such a staple of contemporary law and policy that it barely needs an introduction. In order to discern the distinctive features of EU risk regulation, however, as well as the particularities of risk within the climate change field, it is useful first to contemplate, in general terms, what we mean when we talk about 'risk' as a catalyst for regulation, what the agenda is of risk regulation, and how regulation seeks to achieve its targets.

We qualify a particular situation or activity as a risk when we are aware of the possibility of undesirable consequences. To gauge the seriousness of the risk, we in the first place take into account the likelihood of negative impacts and the

anticipated magnitude of impacts.[1] Risk regulation is the exercise of public authority (however broadly construed) with intent to affect the likelihood and/or magnitude of socially undesirable events ('social bads').[2]

As an expression of likelihood, or probability, risk is inherently future-oriented.[3] In German jurisprudence of the 1980s to early 1990s, risk was often defined by reference to the concept of 'danger'.[4] Following a 'danger-based' approach, we acquire experience about the negative impacts of certain goods or activities and modulate our behaviour on the basis of that experience.[5] A risk-based approach, in contrast, seeks to anticipate negative consequences, bypass experience, and modulate behaviour on the basis of predictions.

Presenting future negative occurrences as potential adverse *effects*, or impacts, implies a premise of causation – an assumption that the negative consequence, whatever it may be, happens *because* we engage or omit to engage in a certain activity.[6] I risk getting wet because I go for a walk under a threatening sky; polar bears are at risk of extinction because we are not doing enough to mitigate climate change. The theoretical possibility of a solution is what separates a problem from a calamity. Similarly, the theoretical possibility of choice distinguishes risk from the fickleness of fate. Risk, therefore, implies some degree of free will and ability to act; if harm is absolutely certain and inevitable, whatever we do or wherever we go, the risk evaporates. By extension, risk regulation assumes the possibility of exercising at least some degree of influence, with at least some degree of authority and persistence, on the likelihood and scale of undesirable events occurring.

Of equal relevance is that risk does not have a wholly negative connotation; it is perceived against a backdrop of opportunity.[7] There are, firstly, the benefits to be enjoyed if potential adverse effects do not materialise, such as the joys of a brisk walk in dry weather, or the professed value added of a more abundant and reliable

1 H. Rothstein, M. Huber and G. Gaskell, 'A Theory of Risk Colonization: the Spiralling Regulatory Logics of Societal and Institutional Risk' (2006) 35 *Economy and Society* 91, 92.

2 cf C. Hood, H. Rothstein, and R. Baldwin, *The Government of Risk. Understanding Risk Regulation Regimes* (Oxford: OUP, 2004) 3. It should be noted that the definition of regulation generally, and risk regulation in particular, is both evolving and contested. For a critical discussion of both, see J. Black, 'Decentring Regulation: Understanding the Role of Regulation and Self-regulation in a "Post-regulatory" World' (2001) 54 *Current Legal Problems* 103; and 'The Role of Risk in the Regulatory Process' in R. Baldwin and M. Lodge, *Oxford Handbook on Regulation* (Oxford: OUP, 2010) 302.

3 T. Giddens, 'Risk and Responsibility' (1999) 62 MLR 1, 3.

4 D. Cansier, 'Gefahrenabwehr und Risikoforsorge im Umweltschutz und der Spielraum für Ökonomische Instrumente' (1994) 7 *Neue Zeitschrift für Verwaltungsrecht* 643; K.-H. Ladeur, 'Von der Gefahrenabwehr zum Risikomanagement im Stoffbezogenen Umweltrecht' in G. Winter (ed), *Risikoanalyse und Risikoabwehr im Chemikalienrecht* (Germany: Umweltrechtliche Studien, 1994) 241–263.

5 C. Joerges, 'Law, Science and the Management of Risks to Health at the National, European and International Level – Stories on Baby Dummies, Mad Cows and Hormones in Beef' (2001) 7 Colum J Eur L 2; K.-H. Ladeur, 'Deregulating Environmental Law in a Perspective of Stimulating Knowledge Generation' in U. Collier (ed), *Deregulation in the European Union. Environmental Perspectives* (London: Routledge, 1998) 43.

6 M. Douglas, *Purity and Danger: An Analysis of the Concepts of Pollution and Taboo* (London: Routledge, 1990).

7 Giddens, n 3 above, 3–4.

food supply after switching to genetically modified crops.[8] Secondly, responding to risk creates opportunity costs: we forego the option of exploiting the resources put towards risk mitigation in an alternative way.[9]

Consequently, within this conceptual framework, any quest to 'eliminate risk', whether through regulation or other means, becomes illusory. Not only does society willingly tolerate and even encourage a certain amount of risk-taking,[10] but any attempt to cut out risk altogether is doomed to failure, as risk responses themselves create countervailing risks.[11] By not going for a walk, I might put my health and fitness levels at risk, whatever the weather. Evidently, risks differ in likelihood and magnitude, but the complete absence of risk remains a theoretical impossibility.

Risk regulation goals and strategy

Our understanding of risk as future-oriented, impressionable, and double-edged informs the agenda and strategies of risk regulation. Risk regulation does not aspire to eliminate risk but to substitute acceptable for unacceptable risk. To accomplish this, risk regulation carves up the amorphous totality of risks we are exposed to into discrete, manageable segments, and it engages with these segments to the exclusion of others.[12] If not, the task of weighing risks against opportunities, which enables the determinations of acceptable/unacceptable risk that drive risk regulatory decision-making, would become unending and futile. Risk regulation, therefore, is as much about risk construction as it is about risk control.

The construction of risk within the regulatory process requires considerable efforts in information production, selection, and collection, in order both to delineate the categories of risk that the regulation recognises, and to weigh and ultimately determine the acceptability of identified risks. To this end, risk regulation deploys techniques of information gathering, classification, and risk assessment, and maps out decision-making procedures that link assessments to control options.[13] The atomisation of risk into an extensive but discrete range of selected harms, caused by specific forms of action or omission, fosters the individualisation of risk governance responsibility: it enables the identification of causal agents that become the target audience of risk regulation, and furthers the establishment of risk regulatory authorities working with a circumscribed mandate and interacting primarily with well-defined social groups (hazardous waste transporters, hedge fund managers, dangerous dog owners, consumers, nuclear facilities, etc).

8 M. Quaim and D. Zilberman, 'Yield Effects of Genetically Modified Crops in Developing Countries' (2003) 299 *Science* 900.

9 See, eg, C. Sunstein, *Free Markets and Social Justice* (Oxford: OUP, 1997) 298–317.

10 N. Baird, 'Tolerance for Environmental Risks: the Influence of Knowledge, Benefits, Voluntariness, and Environmental Attitudes' (1986) 6 *Risk Analysis* 425.

11 J. Graham and J. Wiener, 'Confronting Risk Tradeoffs' in J. Graham and J. Wiener (eds), *Risk vs. Risk* (Cambridge, Mass: Harvard UP, 1995).

12 N. Pidgeon and C. Butler, 'Risk Analysis and Climate Change' (2009) 18 *Environmental Politics* 670, 673.

13 Hood et al, n 2 above.

The communication tools vary, ranging from commands to incentives to ethics-based encouragements. Control options, in turn, run the gamut from decisions to 'wait and see', requests for further data production and/or advanced assessment, to information disclosure requirements, monitoring provisions, standard-setting, and mandatory restrictions.

In the context of information production and processing, it is important to contemplate the relation between risk and uncertainty. Often, and particularly since the ascent of the precautionary principle, risk and uncertainty are treated as qualitatively different, even juxtaposed, notions. Risk, it is said, qualifies situations where sufficient information exists to make a probabilistic assessment of likelihood and magnitude of harm.[14] Uncertainty, in contrast, occurs where indications of harm exist, but there is insufficient data to conduct a 'proper' risk assessment.[15] This distinction may serve as a rough and ready delineator of the remit of certain regulatory regimes, but it is essentially flawed. For one, it ignores that the information required to conduct a risk assessment does not exist 'out there', but is at least partially generated within the context of regulation. Secondly, as defined above, the distinction is entirely subservient to the mode of conceiving of risk assessment.[16] However, it is extremely valuable as a reminder that risk regulation involves the creation of fictional certainty; unknown future events are translated into known probabilities and thereby become actionable.[17] The regulatory response, too, implies the acceptance of a fictional or at the very least unexamined certainty, namely that rules can have a pre-determined impact on risk. Risk regulation does, however, tend to recognise the fragility of its belief system, and correspondingly creates opportunities for the integration of new information, for review and adaptation within regulation.[18]

Before moving on to a discussion of risk regulation as it is practiced within the EU, it should be acknowledged that this rather bloodless portrayal of the key features and dynamics of risk regulation masks a reality riddled by controversy. Longstanding disagreements over the quality of the information on which risk assessment and management should be based, over the dividing line between acceptable versus unacceptable risks, and over the choice of regulatory control techniques, have turned the field of risk regulation into an ideological battleground. Risk, as apparent from the preceding discussion, is a product of perception. Whose perception matters, or matters most, therefore becomes a crucial issue for regulators to wrestle with. Countries with advanced risk regulatory regimes tend heavily to favour expert-based identifications and assessments of risk, giving rise to critiques that alternative, 'lay' perceptions are overlooked to the

14 Commission Communication on the Precautionary Principle COM(2000)1 final, 2 February 2000; V. Heyvaert, 'Facing the Consequences of the Precautionary Principle in European Community Law' (2006) *European Law Review* 185; Black, 'The Role of Risk in the Regulatory Process' n 2 above, 310.

15 cf P. O'Malley, 'Uncertain Subjects: Risk, Liberalism and Contract' (2001) 29 *Economy and Society* 462.

16 cf E. Stokes, 'The EC Courts' Contribution to Refining the Parameters of Precaution' (2008) 11 *Journal of Risk Research* 491, 494.

17 cf N. Luhmann, *Risk: A Sociological Theory* (Berlin: De Gruyter, 1993).

18 cf T. L. McDaniels And R. Gregory, 'Learning as an Objective within a Structured Risk Management Decision Process' (2004) 38 *Environmental Science and Technology* 1921.

detriment of regulatory quality and legitimacy.[19] The tensions caused by the construction and integration of risk information into regulation run deeper and wider, however, than the familiar 'science v public' dilemma. Wider, because risks never affect all segments of the population and the natural world alike. The process of risk identification is therefore simultaneously one of selection, involving controversial normative judgement. Deeper, for even if full agreement existed about what kind of information should inform risk assessment and, consequently, management, this does not preclude debates about how this information should be generated, or about the regulator's role in gathering, processing, and acting upon this information.[20]

RISK REGULATION IN ACTION: THE EU EXAMPLE

The European Union has developed a rich expertise in the practice of health and environmental risk regulation. The heartland of the EU risk regulation enterprise undoubtedly resides within the realm of market regulation, more specifically product and technology regulation. A quick survey of the study of EU risk regulation as an academic enterprise offers a robust confirmation: scholarly contributions overwhelmingly draw on case studies from areas such as GMO, pharmaceuticals, food safety, and chemicals regulation.[21]

The close connection between EU risk regulation and market regulation is hardly surprising, as the EU was first confronted with the question of health and environmental risks in its efforts to harmonise market conditions to foster the free circulation of goods across national borders. As early as 1967, the EU promulgated harmonised standards for the classification, packaging, and labelling of dangerous substances.[22] This was a thoroughly market-facilitating endeavour, but one that nonetheless set the frame within which chemical risk discourses would later

19 M. Everson and E. Vos, 'European Risk Governance in a Global Context' in E. Vos (ed), *European Risk Governance. Its Science, its Inclusiveness and its Effectiveness* (Connex Report Series Nr 6, 2008) 10–15; S. Rayner, 'Democracy in the Age of Assessment: Reflections on the Roles of Expertise and Democracy in Public Sector Decision-Making' (2003) 30 *Science and Public Policy* 163; J. Applegate, 'A Beginning Not an End In Itself: The Role of Risk Assessment in Environmental Decision-Making' (1995) *University of Cincinnati Law Review* 1643; S. Jasanoff, *Designs on Nature: Science and Democracy in Europe and the United States* (Princeton: Princeton University Press, 2005).

20 See E. Fisher, *Risk Regulation and Administrative Constitutionalism* (Oxford: Hart Publishing, 2007).

21 See, for instance, writings on EU risk regulation by David Vogel (eg, D. Vogel, 'The New Politics of Risk Regulation in Europe' LSE Centre for Analysis of Risk and Regulation Working Paper (2001) 5–7 at http://www2.lse.ac.uk/researchAndExpertise/units/CARR/pdf/DPs/Disspaper3.pdf (last visited 1 August 2011)), Elizabeth Fisher, *ibid*, Ellen Vos, n 19 above and n 41 below, Ragnar Lofstedt, n 40 below, Bill Durodié, 'Plastic Panics: European Risk Regulation in the Aftermath of BSE' in J. Morris, *Rethinking Risk and the Precautionary Principle* (Oxford: Butterworth-Heinemann, 2000) 141, Christian Joerges, n 5 above, Veerle Heyvaert, notes 23 and 35 below and Alberto Alemanno, n 24 below. The European Journal of Risk Regulation identifies European law and policy on chemicals, nanomaterials, pharmaceuticals, pesticides, food and feed, cosmetics, industrial accidents and public health as the central focus of its research. See http://www.lexxion.de/en/zeitschriften/fachzeitschriften-englisch/ejrr/about-ejrr.html (last visited 1 August 2011).

22 Directive 67/548/EEC on the approximation of laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous substances [1967] OJ Nr 196/1.

unfold.[23] Trade conflicts over the compatibility of national risk regulation with the dictates of Articles 34 and 36 of the Treaty on the Functioning of the European Union also supplied the backdrop for the European Court of Justice's first musings on the nature of risk and its role in regulation.[24] Conflict is in many ways disruptive, but it is grist to the mill of academic scholarship. Trade and marketing disputes, revolving around goods ranging from beef to beer to slimming pills, have fuelled academic, regulatory, and even civil society's interest in risk regulation in no small measure.[25] Thus, the EU's understanding of risk regulation, and of its role as a regulator, matured in a context of trade and economic competitiveness, which imbued the EU regulatory agenda, strategies, and instrumental choices with some pronounced idiosyncrasies.

Over the years, the EU acquired a broader environmental agenda, venturing into areas that are less emphatically defined by their connection to the single market project, such as environmental impact assessment, waste regulation, and nature conservation. These areas typically are not thought of as EU risk regulation '*pur sang*', but they are nonetheless influenced by the risk-orientation that shapes EU product and technology regulations. They also display a comparable understanding of what EU regulation should aspire to achieve in terms of environmental protection, and of the strategies and techniques to be pressed into service towards this aim.[26]

What, then, are the key features of the EU approach to risk regulation? A first point of note is that EU regulation is intensely engaged in the aforementioned practice of carving up risk into discrete, manageable segments. The concept of risk in EU risk regulation is narrowly construed. As a rule, risks are understood as the physical negative side-effects of entrepreneurship. This approach is tellingly exemplified in regulation of trade in genetically modified food and feed, which interprets risk as the likelihood of adverse health or environmental effects, and staunchly abstains from engaging with broader debates on, for instance, the likely cultural impact of GMO farming, the consequences of a permissive or restrictive GMO policy on the global political economy, or the morality of genetic engineering.[27] For the purposes of EU regulation, risk is inconceivable outside the European

23 cf V. Heyvaert, *Coping With Uncertainty. The Regulation of Chemicals in the European Union* (PhD dissertation, European University Institute, Florence, Italy, 1999).

24 A. Alemanno, 'EU Risk Regulation and Science: The Role of Experts in Decision-Making and Judicial Review' in Vos, n 19 above 38–39.

25 Case C-180/96 *UK* v *Commission* [1999] ECR I-2265; Case 178/84 *Comission* v *Germany* [1987] ECR 1227; Joined cases T-74/00, T-76/00, T-83/00, T-84/00, T-85/00, T-132/00, T-137/00 and T-141/00, *Artegodan* v *Commission* [2002] ECR II-4945. We witness a similar phenomenon at the international level, see, inter alia, G. Shaffer and M. Pollack, *When Cooperation Fails. The International Law and Politics of Genetically Modified Food* (Oxford: OUP, 2009); A. Lang and R. Cooney, 'Taking Uncertainty Seriously: Adaptive Governance, Alien Invasive Species and the WTO' (2007) 18 *European Journal of International Law* 523; J. Scott, 'The European Regulation of GMOs and the WTO' (2003) *Columbia Journal of European Law* 213; I. Cheyne, 'Risk and Precaution in World Trade Organization Law' (2006) 40 *Journal of World Trade* 837.

26 cf Black, who observes a similar influence of risk on environmental regulation at the UK level, in Black, 'The Role of Risk in the Regulatory Process' n 2 above, 305.

27 See Regulation (EC) No 1829/2003 on genetically modified food and feed [2003] OJL 268/1. See also Lee on the construction of nanotechnological risk within EU regulation, M. Lee, 'Risk and Beyond: EU Regulation of Nanotechnology' (2010) 35 *European Law Review* 799.

economic context. Differently put, risk becomes the concern of EU regulation as a consequence of there being economic activity with a cross-boundary impact. This is most apparent in the case of EU product regulation, which lays down health, safety, and environmental standards in a context of intra-EU trade facilitation. But it equally resonates in many landmark pieces of EU environmental regulation, which govern the environmentally adverse consequences of economic and industrial activity *if* they are potentially transboundary.[28]

A connected point relates to the concept of foregone opportunities in EU risk regulation. These too are the subject of a distinctly economic interpretation, referring to both the costs of bearing higher regulatory burdens, and foregone economic growth. The acceptability of risk, therefore, not only is a function of the likelihood and magnitude of narrowly interpreted adverse effects, but is also co-determined by economic considerations.[29] This feature, again, characterises both the core of EU (technological) risk regulation and the broader domain of environmental regulation.[30]

The confined discursive space goes some way towards explaining the EU's behaviour as a risk regulator, as well as its choice of regulatory techniques. It would be a serious stretch to portray the EU as an expansive, confident risk manager, secure in the knowledge that its perception and values accord with those of the European public, and happy to cut any Gordian knots on the way. The prerequisite of an inter-State economic impact creates a perennial need for justification of EU risk control strategies. This is compounded by the insistence built into EU law, *inter alia* by way of the subsidiarity principle, that EU risk regulation should be qualitatively superior to what the national level can offer.[31] The agenda of EU risk regulation is, therefore, as preoccupied with the task of justifying decision-making, as it is with substituting acceptable for unacceptable risk.

The narrowness of EU risks, the inter-State context, and the pronounced need for self-justification crystallise into a distinct EU risk regulation pathology, characterised, firstly, by a rigorously itemised approach to risk management.[32]

28 M. Lee, *EU Environmental Law: Challenges, Change and Decision-Making* (Oxford: Hart Publishing, 2005); J. Jans and H. Vedder, *European Environmental Law* (The Netherlands: Europa Law Publishing, 2008). See, eg, preamble 29 of Directive 2008/01/EC concerning integrated pollution prevention and control [2008] OJL 24/8; preambles 17 and 23 of Directive 2000/60/EC establishing a framework for Community action in the field of water policy [2000] OJL 327/1; and para 5 of the preamble to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora [1992] OJL 2006/7.

29 See European Commission Impact Assessment Guidelines 2009, SEC[2009]92, 15 January 2009, 27.

30 See, for instance, the references to technical feasibility, economic viability, social and economic impacts as factors for Member States to consider when deciding on the application of or deviation from the waste hierarchy in Art 4(2) of Directive 2008/98/EC on waste [2008] OJL312/3, and the exception of 'overriding public interest, including those of a social or economic nature' to the prohibition on plans or projects posing an environmental risk to special conservation areas (Article 6(4) of Directive 92/43/EEC, n 28 above).

31 D. Chalmers, 'Gauging the Cumbersomeness of EU Law' (2009) 62 *Current Legal Problems* 405.

32 On the link between oversight, accountability, and risk regulation, see Huber, Rothstein, and Gaskell, n 1 above, 96.

Not only does EU regulation painstakingly circumscribe the remit of risk through a strict focus on physical and monetisable adverse impacts, it also reviews identified risks substance-by-substance, technological application-by-application, product-by-product and, within the wider field of EU environmental regulation, installation-by-installation and/or project-by-project. The REACH Regulation on chemicals, for instance, displays a pronounced degree of itemisation. It sets up an institutional framework and procedures for substance evaluation that zero in on the risk particularities of singular chemicals, but are not equipped to generate or even fully integrate information on synergistic effects caused by exposure to chemical compounds.[33] Within EU risk regulation, itemisation fosters the representation of risk as containable and therefore non-threatening to aspirations of economic growth through free enterprise.[34]

Moreover, itemisation facilitates the involvement of regulatory addressees. Under the auspices of EU risk regulation, processes of risk identification and, increasingly, assessment, management, and even communication are characterised by an advanced degree of privatisation.[35] Besides alleviating the public financial burden of risk regulation – a key consideration for a regulator as cash-strapped as the EU – privatisation fulfils vital legitimising functions towards the regulatory addressees, who are co-opted within the regulatory process and regain some degree of self-determination, albeit within tightly drawn parameters, over risk control.

The pressing demand for justification makes the EU deeply beholden to the fiction of certainty in risk decision-making. Regulatory outcomes must appear as the necessary consequences of decision-making, taken in accordance with the dictates of good governance. The 'necessity need' explains the enormous effort EU regulation expends on the organisation and normalisation of information-gathering.[36] Inescapably, risk assessments are based on estimations and predictions, but EU regulation seeks to boost the credibility of its inputs by insisting on their production, in prodigious amounts, through rigorously standardised and

33 Regulation (EC) No 1907/2006 concerning the registration, evaluation, authorisation and restriction of chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC [2006] OJL 396/1.

34 cf Pidgeon and Butler, n 12 above, 673; M. Granger Morgan, M. Kandlikar, J. Risbey, and H. Dowlatabadi, 'Why Conventional Tools for Policy Analysis are often Inadequate for Problems of Global Change' (1999) 41 *Climatic Change* 270, 273–274.

35 See, eg, the extensive risk assessment management operator responsibilities under the Seveso II Directive (Council Directive 96/82/EC on the control of major accident hazards involving dangerous substances [1997] OJL 10/13), and the chemicals manufacturer, importer and user responsibilities under REACH as discussed in V. Heyvaert, 'Regulating Chemical Risk: REACH in a Global Governance Perspective' in J. Eriksson, M. Gilek, and C. Ruden (eds), *Regulating Chemical Risk: Multidisciplinary Perspectives on European and Global Challenges* (New York: Springer, 2010); and E. Fisher, 'The "Perfect Storm" of REACH: Charting Regulatory Controversy in the Age of Information, Sustainable Development, and Globalization' (2008) 9 *Journal of Risk Research* 541, 548.

36 cf C. Boswell, 'The Political Functions of Expert Knowledge: Knowledge and Legitimation in European Union Immigration Policy' (2008) 15 *Journal of European Public Policy* 471.

independently verified processes.[37] EU legislation, case-law and policy documents are studded with repeated assurances that, even in areas of pronounced uncertainty, risk decision-making must and will happen on the basis of the 'best available information.'[38] The European Courts have moreover been at pains to confirm, in cases from *Pfizer* to *Gowan*, that the precautionary principle should not be understood to absolve decision-makers from the duty to identify and assess risks on the basis of the most reliable scientific data available.[39]

Adherence to good governance, in turn, is secured through the formal incorporation of governance standards, such as openness and participation, into risk regulatory regimes.[40] Thus, EU risk decision-making procedures direct attention towards the regimented and away from the discretionary aspects of decision-making.[41] They present regulatory measures as the logical and rational conclusion of information-gathering and assessment processes conducted beyond the EU decision-maker's (particularly the Commission's) influence.

The wedge between the stages of risk assessment and risk management, as well as the artificiality of this particular divide, are familiar features of EU risk regulation.[42] However artificial, the separation performs a vital function in amplifying the effect of necessity of regulatory outcomes, and allowing the Commission as decision-maker to project the image of a dispassionate, neutral arbiter of exogenously generated information, rather than an unconstrained regulatory force.[43] The quest for apparent neutrality might also go some way towards explaining the EU's well-documented tendency to 'proceduralise' over time the interpretation of decision-making principles, such as the proportionality principle and the precautionary principle.[44]

The EU's understanding of risk as a regulatory trigger is, therefore, narrow, highly compartmentalised, and perceived against a backdrop of economic activity with inter-State ramifications. EU risk regulation aims both to reconcile its understanding of health, environmental, and economic objectives within decision-making on acceptable risk, and to legitimise this decision-making. The pursuit of these objectives dictates reliance on a regulatory methodology that is

37 cf C. Hood and H. Rothstein, 'Risk Regulation under Pressure: Problem Solving or Blame Shifting?' (2001) 33 *Administration and Society* 21, 40.

38 Commission Communication on the Precautionary Principle, n 14 above; Case C-236/01 *Monsanto Agricoltura Italia SpA* v *Council* [2003] ECR I-8105; Heyvaert, n 14 above.

39 Case C-77/09 *Gowan Comércio Internacional e Serviços Lda* v *Ministero della Salute* judgement of 22 December 2010, not yet reported, at pt 75. See also Case T-13/99 *Pfizer Animal Health SA* v *Council* [2002] ECR II-3305; and E. Stokes, n 16 above, 497–501.

40 R. Lofstedt, F. Bouder, J. Wardman and S. Chakraborty, 'The Changing Nature of Communication and Regulation of Risk in Europe' (2011) 14 *Journal of Risk Research* 409.

41 cf E. Vos, 'EU Food Safety Regulation in the Aftermath of the BSE Crisis' (2000) 23 *Journal of Consumer Policy* 227, 234.

42 Everson and Vos, n 19 above, 11.

43 Lofstedt, n 40 above, 412.

44 J. Corkin. 'Science, Legitimacy and the Law: Regulating Risk Regulation Judiciously in the European Community' (2008) 33 *European Law Review* 359; Heyvaert, n 14 above, 196; V. Heyvaert, 'Trade and the Environment: Proportionality Substituted?' (2001) 13 *Journal of Environmental Law* 392; Case C-473/98 *Chemikalieninspektionen* v *Toolex Alpha AB* [2000] ECR I-5681; Case C-309/02 *Radlberger* [2004] ECR I-11763; Case C-320/03, *Commission* v *Austria* [2005] ECR I-9871.

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geared towards the creation of actionable 'facts', that maintains a strict functional and institutional separation between fact-finding and decision-making, and that displays a highly formalised approach to good governance.

EU RISK REGULATION AND CLIMATE CHANGE REGULATION CONSIDERED

Having confronted environmental risks from biodiversity depletion to nanoparticle exposure, the EU now faces up to the risks of climate change. This section inquires whether and to what extent EU climate change regulation is similar to or differs from conventional EU risk regulation, both in terms of the risk discourse that anchors the regulatory enterprise, the formulation of regulatory objectives and the regulatory strategies deployed.

The climate change regulation package

The EU approach to climate change aims to respond to the need for both mitigation and adaptation, and emphasises the importance of integrating climate change considerations into other EU law and policy areas. Under the Kyoto Protocol,[45] the EU committed to an overall reduction of eight per cent of greenhouse gases (GHG) compared to emission levels in 1990.[46] For the period of 2012 to 2020, the EU has set a target of a 20 per cent reduction compared to 1990, with an option to increase to 30 per cent if its efforts are matched by comparable emissions reduction commitments from other developed nations, and by adequate contributions from economically more advanced developing nations, 'according to their responsibilities and respective capabilities'.[47]

In terms of regulatory instruments, the jewel in the EU crown is undoubtedly the emissions trading regime,[48] as laid down in the 2003 Emissions Trading

45 Kyoto (Japan), 10 December 1997 (entered into force 16 February 2005) (1998) *International Legal Materials* 22.

46 Council Decision 2002/358/EC concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder [2002] OJL130/1.

47 European Parliament and Council Decision 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas reduction commitments up to 2020 [2009] OJL140/136. See also Commission Communication on 20 20 by 2020. Europe's Climate Change Opportunity COM(2008)30 final, 23 January 2008. At the point of writing, the prospects for the 30 per cent option being taken up are slim: the 2010 Cancun negotiations produced modest results on issues such as climate funding, forest protection and technology sharing, but stopped short of a renewed agreement on binding emission reduction targets. See Decisions adopted by COP 16 and CMP 6 at http://unfccc.int/2860.php (last visited 1 August 2011). The recent republican party win in the US congressional elections further dampens the prospects of the US government signing up to an ambitious Kyoto II in the coming year. See D. Keating, 'US Election Leaves EU Isolated on Climate Policy' *ENDS Europe* 5 November 2010.

48 Whether we are talking about diamonds or rhinestones is disputed. A full discussion of the legitimacy and effectiveness of emissions trading as a climate change mitigation instrument exceeds the ambitions of this article, but see, eg, G. Winter, 'The Climate is no Commodity: Taking Stock

Directive (ETD) and ensuing amendments.[49] The ETD, which requires Member States to determine and allocate allowances for the emission of specified greenhouse gases[50] to industrial operators active in energy-intensive sectors such as oil refinery, iron and steel production, pulp and paper,[51] as well as to develop and maintain an infrastructure to enable trade in emission allowances, has been the subject of intense academic scrutiny. I refer to the existing body of literature for detail,[52] confining the present discussion to some observations that are pertinent to the ensuing analysis. It is important to remember that the ETD is, first and foremost, an efficiency tool in pursuit of environmental targets that were set outside the confines of the Directive itself, namely, the aforementioned eight and 20 (respectively 30) per cent emission reduction goals, which were adopted in a European Parliament and Council Decision.[53] It is equally important to recall that the emission allowances allocation and trading regime operates in pursuit but not in fulfilment of said reduction targets. In its current format, the ETD covers about 40 per cent of CO_2 emissions, which means that, even if every single unit of emission is duly accounted for and fully covered by a legitimately issued allowance, the regime gives no guarantee that the overall reduction target will be hit. Towards this greater goal, the EU relies instead on an entire portfolio of regulatory measures: the climate change 'package'.[54]

The EU climate change package contains an extensive set of recently adopted measures addressing, *inter alia*, tighter CO_2 emission limits for vehicles,[55]

of the Emissions Trading System' (2010) 22 *Journal of Environmental Law* 1; R. Baldwin 'Regulation Lite: the Rise of Emissions Trading' (2008) 2 *Regulation and Governance* 193; R. Stewart, 'Economic Incentives for Environmental Protection: Opportunities and Obstacles' in R. Stewart, P. Sands, and R. Revesz (eds), *Environmental Law, the Economy and Sustainable Development* (Cambridge: CUP, 2000); D. Ellerman and B. Buchner, 'The European Union Emissions Trading Scheme: Origins, Allocation and Early Results' (2007) 1 *Review of Environmental Economics and Policy* 66; A. D. Ellerman, F. Convery, and C. de Perthuis, *Pricing Carbon* (Cambridge: CUP, 2010).

49 Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC [2003] OJ L275/32, as amended by Directive 2009/29/EC [2009] OJ L140/63.

50 To date, emission allowances overwhelmingly cover CO_2 emissions and, to a much lesser extent, nitrous oxide. See Annex I in combination with Annex II of the ETD.

51 For a full listing, see annex II of the ETD.

52 See literature referenced under n 48 above. See also European Commission, *EU Action against Climate Change. The EU Emissions Trading Scheme* (Luxembourg: Office for Official Publications of the European Communities, 2008); M. Wråke, 'Emissions Trading. The Ugly Duckling of European Climate Policy?' Swedish Environmental Research Institute, July 2009 at: http://www3.ivl.se/rapporter/pdf/B1856.pdf (last visited 1 August 2011); S. Weishaar, *Towards Auctioning: The Transformation of the European Greenhouse Gas Emissions Trading System* (Alphen aan den Rijn: Kluwer Law International, 2009); J. Skjaerseth, 'EU Emissions Trading: Legitimacy and Stringency' (2010) 20 *Environmental Policy and Governance* 295; S. Bogojevic, 'Ending the Honeymoon: Deconstructing Emissons Trading Discourses' (2009) 21 *Journal of Environmental Law* 443.

53 n 47 above.

54 K. Kulovesi, E. Morgera, M. Munoz, 'Environmental Integration and Multi-faceted International Dimensions of EU law: Unpacking the EU's 2009 Climate and Energy Package' (2011) 48 *Common Market Law Review* 829.

55 Regulation (EC) 443/2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles [2009] OJL 140/1 (the Passenger Car Regulation).

promotion of renewable energy,[56] increased energy efficiency for industrial and domestic buildings, appliances and services,[57] eco-design and labelling,[58] and carbon capture and storage (CCS).[59] Moreover, in observance of the integration principle, the climate change regulatory agenda is partly one of amendment to existing legislation, as areas such as EU waste management, air pollution control, water management, and industrial regulation must be made responsive to climate change concerns.

The EU climate change strategy aims to curb temperature rises, not to stop global warming in its tracks altogether. This is partly because an even more ambitious emissions reduction programme is considered beyond the realm of the politically, economically, and technologically feasible, but also because, strictly speaking, the horse has bolted: the existing build-up of GHG in the atmosphere will cause global temperatures to rise in the coming decades, regardless of our present and future actions.[60] Hence, the climate change challenge is one of adaptation as well as mitigation. The EU's climate change adaptation strategy is at a relatively early stage of development,[61] and poses a number of particular challenges. The efforts of forecasting overall rises in temperature under business-as-usual scenarios are enormous, but they pale in comparison to the challenges of predicting actual localised impacts of climate change (which must take into account a range of different global, European, and domestic mitigation scenarios) and formulating reasonable adaptation responses.[62] Moreover, the predominantly local impacts of adaptation policies raise difficult questions of both EU competency and of shared responsibility. EU environment ministers have therefore agreed that initial EU adaptation action should in the first instance concentrate on the colossal task of data production, gathering, and exchange, on climate-proofing existing EU policies, and coordinating cross-border responses.[63] However, if the history of EU environmental law serves as any indication, it is to be expected that over time the EU's involvement in adaptation policies, and the corresponding development of implementing regulatory strategies, will deepen.

56 Directive 2009/28/EC on the promotion of the use of energy from renewable sources [2009] OJL 140/16.

57 Directive 2002/91/EC on the energy performance of buildings [2003] OJL 1/65 and Proposal for a Directive of the European Parliament and of the Council on the energy performance of buildings COM(2008)780 final, 13 November 2008 Directive 2005/32/EC establishing a framework for the setting of ecodesign requirements for energy-using products [2005] OJL 191/29; Directive 2006/32/EC on energy end-use efficiency and energy services [2006] OJL 114/64.

58 Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products [2009] OJL 285/10; Regulation 66/2010 on the EU ecolabel [2010] OJL 27/1.

59 Directive 2009/31/EC on the geological storage of carbon dioxide [2009] OJL 140/114.

60 'Facing the consequences. Global action is not going to stop climate change. The world needs to look harder at how to live with it' *The Economist* 25 November 2010; M. Stallworthy, 'Legislating against Climate Change: A UK Perspective on a Sisyphean Challenge' (2009) 72 MLR 412, 414.

61 Commission White Paper, Adapting to climate change: Towards a European framework for action COM(2009)147 final, 1 April 2009.

62 See I. Bartle, 'A Strategy for Better Climate Change Regulation: Towards a Public Interest Orientated Regulatory Regime' (2009) 18 *European Politics* 689.

63 'Leaders Focus on How to Share Climate Aid Burden' *ENDS Europe Daily* 29 Oct 2009.

The risks of climate change: comparing risk discourses and their impact on regulation

Climate change has lodged itself in our consciousness as a (arguably the) major threat to the future wellbeing of humanity. Stripped to its essentials, the European discourse on climate change undeniably bears the marks of a risk discourse: concerns about climate change relate to the likelihood of adverse impacts of global warming, some of which are already materialising today but most of which will emerge in the decades to come. The EU operates on a widely held assumption that the unprecedented acceleration in climate change is caused by human activity and this assumption comes paired with a belief that the risks of climate change are impressionable; that positive actions can be undertaken to ward off the most destructive manifestations of predicted changes and to adapt to the degree of change that is already deemed inevitable.

The message of climate change as a serious but still actionable risk resonates loudly in authoritative documents such as the Intergovernmental Panel on Climate Change Fourth Assessment Report, the Stern Review,[64] and a plethora of EU climate change policy documents.[65] But a closer look at how the climate change risk is understood and contextualised in EU policy reveals significant differences in the discourse surrounding the risks of climate change when compared to the conceptualisation of risks that drives conventional EU risk regulation.

Risks are double-edged, evoking a potential for gains as well as losses. Regulatory interventions in risk-taking, too, create their own sets of potential benefits and disadvantages. Within conventional EU environmental policy, the ambivalent nature of risk and regulation finds a particularly prominent expression in the 'trade versus environment' dilemma, which presents regulatory decision-making as an ongoing balancing exercise between the Scylla of health and environmental harm and the Charybdis of foregoing innovation and triggering economic stagnation.[66] In theory, climate change risks follow the same pattern: rising temperatures might jeopardise the survival of certain regions but could potentially benefit others. Climate change regulation, in turn, might control global warming-related risks but at the same time could hurt the EU's economic competitiveness.

Trade-off concerns are still part of the global climate change debate, most visibly in the fraught attempts to reconcile a number of developed countries' desires for a broad uptake of binding emission reduction targets with rapidly

64 N. Stern, *The Economics of Climate Change, the Stern Review* (Cambridge: CUP, 2007).

65 Commission Recommendation of 28 April 2010 on the research joint programming initiative on agriculture, food security and climate change [2010] OJL 111/27; European Parliament Resolution of 4 February 2009 on 2050: The future begins today [2010] OJC 67E/44; Commission Green Paper on forest protection and information in the EU: Preparing forests for climate change COM(2010)66 final, 1 March 2010; Commission White Paper on adapting to climate change, n 61 above; 20 20 by 2020, n 47 above; European Parliament Resolution on Climate change [2007] OJC 287E/344.

66 J. Lefevere, 'A Climate of Change: an Analysis of Progress in EU and International Climate Change Policy' in J. Scott (ed), *Environmental Protection. European Law and Governance* (Oxford: OUP, 2009) 171, 183–184.

developing countries' concerns over the impact of mitigation strategies on their economic growth.[67] Within the European Union, however, allusions to conceivably positive consequences of climate change or to the potentially adverse economic impact of intervention are gradually being excised from the debate. The advantages of global warming may be the stuff of private jokes on cold and blustery days, but in the public sphere climate change has become singularly and exceptionally divorced from the positive connotations of risk-taking; it is considered morally suspect even to contemplate foregone opportunities in the wake of climate change mitigation.[68] At most, EU policy documents will concede that rising temperatures might have some beneficial impacts, such as a decline in cold-related deaths during winter, but these are rarely quantified, in marked contrast to predicted negative impacts.[69] Nor is it suggested that any such localised positive impacts should affect determinations on the need for mitigation.[70] The resounding message emanating from EU climate change policy is that global warming is an unambiguous social bad, and that no amount of accidental positive side-effects could ever tilt the scales in favour of regulatory relaxation, let alone inaction.

There is no single, exclusive explanation for the shift of climate change from ambivalent risk to unqualified bad within the EU policy discourse, but the global yet deeply uneven impacts of climate change are certainly a factor. Having acknowledged its role in contributing to the climate change threat, as well as its commensurate responsibility *vis-à-vis* third countries in mitigating and furthering adaptation to climate change, the EU now finds itself in a position where economic competitiveness is a much trickier card to play. Countervailing considerations about potential benefits of temperature rises and the costs of climate change regulation stand to offend global moral sensibilities, particularly when we consider that climate change is predicted to wreak the most havoc in some of the world's most vulnerable regions.[71] Moreover, the EU was the driving force behind the global adoption and entry into effect of the United Nations Framework Convention on Climate Change and the Kyoto Protocol,[72] and remains the most committed promoter of renewing international binding obligations post-2012. The EU has staked its reputation as a global political leader in no small amount on its ability to promote climate change mitigation and adaptation on

67 Z. X. Zhang, *Reconstructing Climate Policy: How Best To Engage China and Other Developing Countries?* East-West Centre Research Program 2003 at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=955044 (last visited 1 August 2011).

68 cf Ellen Goodman's article in the Boston Globe in February 2007, comparing climate change deniers with Holocaust deniers: E. Goodman, 'No Change in Political Climate' *The Boston Globe* 9 February 2007.

69 See Commission Communication on 'Winning the Battle Against Climate Change' COM(2005)35 final 9 February 2005, Annex.

70 *ibid*, pt 7 'Doing nothing is not a sensible option'.

71 Commission Communication on 'Building a Global Climate Change Alliance between the European Union and poor developing countries most vulnerable to climate change' COM(2007)540 final, 18 September 2007. cf M. Paterson and M. Grubb, 'The International Politics of Climate Change' (1992) 68 *International Affairs* 296.

72 Commission White Paper on Adapting to Climate Change, n 61 above.

the international agenda.[73] Thus, it has politically invested in the reality of the climate change risk to an extent that does not characterise other EU risk policies.[74] In this context, any strictly 'EU welfare-oriented' consideration of the pros and cons of regulatory intervention becomes both a moral hazard and a cause for political embarrassment.[75]

The representation of climate change as an unmitigated bad – and correspondingly of regulatory intervention as an unqualified good – is facilitated by a growing reliance on win-win assumptions. EU environmental policy has long been sympathetic to the thesis that economic growth and environmental protection can and should be pursued symbiotically instead of competitively, but climate change policy has embraced the prospect of win-win outcomes with an unprecedented ferocity.[76] The adoption of a win-win rather than a trade-off perspective enables the EU to reintegrate economic opportunities into climate change. However, these opportunities are no longer the foregone opportunities of unfettered economic progress that must be weighed up against the benefits of regulatory control; they are the opportunities created by regulation itself. Thus, when '20 20 by 2020' talks of the climate change opportunity, it resolutely refers to the scope for economic growth and competitiveness in the wake of climate change mitigation and adaptation measures, and most decidedly not to what Europe stands to gain in the absence of climate change control.[77]

The decline of trade-off oriented thinking and ascent of win-win expectations have resulted in a new interpretation of 'risk taking' within EU climate change policy. Whereas, before, 'risk taking' was routinely associated with an active engagement with the new (such as the commercialisation of a new technology or the establishment of a new industrial facility, which activity must be assessed, controlled and, if necessary, curtailed),[78] the European climate risk discourse emphasises the connection between risk and *inaction*.[79] In other areas of health

73 The opening lines of '20 20 by 2020' are: '2007 marked a turning point for the European Union's climate and energy policy. Europe showed itself ready to give global leadership: to tackle climate change, to face up to the challenge of secure, sustainable and competitive energy, and to make the European economy a model for sustainable development in the 21st century' (n 47 above). cf K. Christer and C. Parker, 'Climate Change and the European Union's Leadership Moment: An Inconvenient Truth?' (2010) 48 *Journal of Common Market Studies* 923.

74 See M. Scheurs and Y. Thibergien, 'Multi-Level Reinforcement: Explaining European Union Leadership in Climate Change Mitigation' (2007) 7 *Global Environmental Politics* 19; F. Yamin, 'The Role of the EU in Climate Negotiations' in J. Gupta and M. Grubb (eds), *Climate Change and European Leadership: A Sustainable Role for Europe?* (USA: Kluwer Academic Publishing, 2000).

75 cf S. Oberthur and C. Roche Kelly, 'EU Leadership in International Climate Change Policy: Achievement and Challenges' (2008) 43 *The International Spectator* 35, 39.

76 See the EU's sustainable growth policy at: http://ec.europa.eu/europe2020/priorities/sustainable-growth/index_en.htm (last visited 1 August 2011) and Commission Communication on the 'Analysis of Options to Move beyond 20% Emission Reduction and Assessing the Risk of Carbon Leakage' COM(2010)265 final, 25 May 2010. cf M. Grubb, 'Climate Change Impacts, Energy and Development' in F. Bourguignon and B. Pleskovic, *Rethinking Infrastructure for Development* (Washington DC: The World Bank, 2008) 89, 109.

77 n 47 above.

78 cf O'Malley on the 'enterprising subject', n 15 above, 465; and R. Brockhaus, 'Risk-Taking Propensity of Entrepreneurs' (1980) 23 *Academy of Management Journal* 509.

79 Commission Communication on Winning the Battle, n 69 above; European Environment Agency, *Climate Change: The Cost of Inaction and the Cost of Adaptation* (EEA Technical Report Nr 13/2007).

and environmental risk regulation, business-as-usual tends to function as a relatively stable benchmark, referring to a set of practices and techniques that are usually susceptible to incremental tweaking and upgrading, but that rarely, if ever, need a complete overhaul. In the context of climate change, the relationship between stability and change is inverted, with business-as-usual becoming the path that leads to epic, unpredictable, and possibly catastrophic change.

Uncertainty, too, acquires different connotations in the context of climate change. In EU risk regulation, uncertainty is the antechamber of risk; situations characterised by uncertainty are those where insufficient, or insufficiently consistent, information is available to make conventional risk assessments.[80] What we are uncertain about are the actual health and environmental *impacts* of regulated activities. A pivotal function of the regulatory process is to translate such 'impact uncertainty' into a fictional but actionable form of certainty through highly formalised processes of information gathering and risk assessment. We recall the effort expended on the transformation of discretionary decisions into necessary outcomes of thoroughly documented and rigidly organised procedures. In contrast, far less effort goes into legitimising the effectiveness of risk control techniques.[81] Differently put, the legitimacy-enhancing features built into EU risk regulation overwhelmingly aim to buttress EU decisions on whether and to what extent to intervene; not to justify the choice of risk control instruments *per se*.

Climate change policy is set to confront uncertainty in a markedly different way. Climate change scepticism may be alive and well in some parts of the world, but the EU has accepted and promotes the reality of man-made global warming as a political fact.[82] The overall target of a maximum 2° C rise, and the determination of maximum emission levels cutting back eight, 20, or 30 per cent respectively from 1990 emissions levels, were forged in a political process culminating in the ratification of the Kyoto Protocol and the adoption of the 2002

80 Commission Communication on the Precautionary Principle, n 14 above.

81 EU regulatory regimes display a surprisingly high degree of stability in their choice of risk control techniques. Effectiveness deficits are typically explained as deficiencies in the reach or speed of regulatory decision-making, or as failures in implementation and enforcement. Hence, they are remedied by tightening up standards, streamlining and centralising decision-making and implementation, and stepping up enforcement. For example, for all its claims to innovation, the risk control strategies laid down in REACH regime show a high degree of continuity with those of the preceding regulatory framework. See V. Heyvaert, 'Guidance Without Constraint: Assessing the Impact of the Precautionary Principle on the European Community's Chemicals Policy' (2006) 6 *Yearbook of European Environmental Law* 27, 52. Recent reforms of the EU pesticide control regime betray a similar degree of instrumental continuity ('New Pesticide Approval Regime Begins in Earnest' *ENDS Europe Daily* 14 June 2011). On the judicial front, the Greenpeace case offers an interesting illustration of the European Court's effectiveness assumptions regarding EU risk regulation. The Court denied that it might be appropriate for a Member State to halt an EU decision-making process once it had been set in motion, reasoning that the EU regime was fully equipped to cope with risks, including risks that came to light after the process had started. The fact that the regulatory regime in question was contained in the 1990 Directive on Deliberate Release of GMOs, which had failed to deliver acceptable GMO authorisation outcomes and had been effectively defunct for several years by the time of the ECJ's ruling in the Greenpeace case, underscores the extent to which the ECJ's belief in risk regulatory effectiveness is a matter of principle rather than experience. Case C-6/99, *Association Greenpeace France* v *Ministere de l'Agriculture et de la Peche* [2000] ECR I-1651.

82 See, eg, Commission Communication on Winning the Battle, n 69 above.

and 2009 Council Decisions;[83] not in a regulatory process orchestrated by the European Commission, a European Agency, Member States Committees, regulatory addressees, and public and private interest groups. From a regulatory perspective, the burning question is not whether global warming presents an unacceptable risk and, hence, whether the EU is justified in adopting risk reduction measures, but whether the arsenal of regulatory instruments designed to control climate change can make a dent in the problem. The interdependency of control techniques pushes uncertainty surrounding their effectiveness to yet higher levels, as the success of one regulatory instrument is co-determined by the effectiveness, or lack thereof, of others.[84] For instance, the pressures for energy efficiency regulation to deliver will be far greater if the EU's measures to promote renewable energy production and uptake fall flat. This does not even engage with the far greater imponderable of how the rest of the world is going to respond to the challenge of climate change in the medium term, and how third country policies will affect the effectiveness of the EU regulatory package. In sum, because the question of climate change impacts is treated as a political instead of regulatory question, climate change regulation is likely to be spared some of the controversy triggered by impact uncertainty. However, it is saddled with a looming mass of 'control uncertainty', which affects both the tasks of regulatory goal-setting and strategic design.

Regulatory goals: micro-management versus systemic change

The risk regulation paradigm is quintessentially managerial. Risk regulation reacts to the economic and social conditions that characterise its field of application and is geared towards optimising the circumstances under which manufacturers develop their products, retailers offer their wares, financial advisers lend their services, and so on, by structuring decision-making processes intended to result in the substitution of acceptable for unacceptable risks. For instance, EU regulation on novel foods does not aspire to reach a wholesale verdict on the desirability of engineering new food products, but seeks to ensure that those new offerings that are released within the EU do not pose unacceptable health or environmental threats.[85] Risk regulation, therefore, exerts an essentially stabilising influence on economic and social development, policing and facilitating enterprise in equal measure.

Moreover, the future-oriented nature of risk tends to direct regulatory attention towards emerging threats, often associated with new practices or products, and de-emphasises the negative externalities of the familiar and well-established, thereby amplifying risk regulation's stabilising function.[86] This is not to say that

83 Decision 2002/358/EC, n 46 above; Decision 406/2009/EC, n 47 above.

84 cf H. Bulkeley, 'Governing Climate Change: the Politics of Risk Society?' (2001) 26 *Transactions of the Institute of British Geographers* 430, 431 (regarding climate change on the Australian political and regulatory agenda).

85 Regulation (EC) No 258/97 concerning Novel Foods and Novel Food Ingredients [1997] OJL 43/1.

86 P. Huber, 'The Old-New Division in Risk Regulation' (1983) 69 *Virginia Law Review* 1025, 1028.

risk regulation is wilfully blind to the burden of the past, but the difference is one of degree. Compare, for instance, the relative tolerance of residual risks posed by the entrenched practice of pesticide use to the much more stringent controls that accompany the introduction of genetically modified crops.

Climate change regulation, too, essentially aims to manage the risks flowing from our high GHG-emitting lifestyle, but the realisation of that goal demands the adoption of a regulatory agenda that is far more ambitious and radical than anything risk regulation has needed to contemplate up to now. In the area of climate change, stabilisation does not equate to effective management but negates it; systemic change is what is needed.[87] Risk regulation's stabilising propensities, therefore, could hinder instead of further climate change control initiatives. Bearing in mind the inverted relationship between stability and change, the objective of the climate change regulatory agenda is as much about fostering as it is about managing change. Hence, within climate change regulation, risk control cannot solely be achieved through 'better' management of existing practices, but must also be accomplished through the active regulatory promotion of new practices and technologies, which will then in turn necessitate the adoption of new technological risk control strategies.[88] The EU's mandate as a regulator is therefore to pursue change through the articulation of a regulatory agenda that encompasses both global warming abatement through a combination of restrictive and facilitating measures, and risk regulation of climate change abatement and adaptation strategies. This results in the formation of a multi-faceted agenda the objectives of which may not always be synchronised, and at times even at odds with one another.

Regulatory strategies: compartmentalisation versus orchestration

Risk regulation strategies inevitably entail a degree of compartmentalisation, since the identification of discrete activities with a finite set of impacts is a precondition for their manageability. EU risk regulation, particularly, thrives on the compartmentalisation and even individualisation of risks, both in the sense that risks are narrowly constructed and that they are typically assessed on a case-by-case, substance-by-substance, or installation-by-installation basis, with limited regard for cumulative or synergistic impacts. The pronounced compartmentalisation in EU risk regulation is partly functional, but also partly a response to the limited regulatory mandate that transnational regulatory authorities tend to have, which in the case of the EU moreover finds legal fortification in the subsidiarity principle.[89]

Turning to climate change, the field is certainly undergoing a degree of compartmentalisation, as law and policy makers seek to divide the intellectually

87 H. J. Schnellhuber, M. Molina, N. Stern, V. Huber and S. Kadner (eds), *Global Sustainability. A Nobel Cause* (Cambridge: CUP, 2010).

88 Commission Communication on Winning the Battle, n 69 above. cf D. Farber, 'Confronting Uncertainty under NEPA' (2009) 8 *Issues in Legal Scholarship*: Iss 3 (Balancing the Risks: Managing Technology and Dangerous Climate Change) Article 3 at http://www.bepress.com/ils/vol8/iss3/art3 (last visited 1 August 2011).

89 G. de Burca, 'The Quest for Legitimacy in the European Union' (1996) 59 MLR 349, 366–368.

overwhelming prospect of global warming into discrete economic, health, environmental, social, and security threats.[90] However, this process has not yet reached either the maturity or thoroughness of compartmentalisation that characterises EU risk regulation. Moreover, qualifying climate change as a risk to forestry or food security compartmentalises the risk according to its impacts, not its causes, and it is precisely the identification of separate *causes* of risk that enables their representation as attributable and manageable. It is possible to compartmentalise climate change causes and review climate change risks on a product-by-product or activity-by-activity basis,[91] but the attraction of this approach is much reduced in an area where accumulation is everything. It can certainly not hold itself out as a sufficient tool to maintain overall levels of climate risk within the margins of acceptability. The familiar 'divide and conquer' tactics of EU risk regulation are, therefore, at odds with the nature of the problem of climate change, which instead requires the EU to summon its much less practiced powers of orchestration and integrated decision-making.

The more diffuse and interdependent nature of the climate change risk affects the design and instrumentalisation of EU climate change regulation. EU risk regulation frameworks typically operate as self-contained units, largely identifying and fulfilling their own information needs and constructing both regulatory problems and solutions within the confines of singular regulatory frameworks. Climate change regulation, in contrast, enjoys a lesser degree of informational autonomy, as the range of data to be fed into decision-making is much more diverse,[92] and the sources much more dispersed. This implies that climate change regulatory frameworks cannot be self-sufficient in meeting their information needs to the extent that, for instance, pharmaceuticals regulation can, but depend on a combination of inputs sourced from different regulatory instruments, which creates new interdependencies and vulnerabilities within the regulatory design.

In terms of instrumentalisation, the need for orchestration and integrated decision-making calls for a greater reliance on 'packages' of measures which combine a considerable array of controlling, facilitating, incentivising and technology-forcing techniques.[93] The effectiveness of the measures within the package, and the corresponding need for reform, no longer solely hinges on how a measure performs on its own terms, but is just as much affected by the performance of other parts of the package. The flexibility and adaptability needs of climate change regulation are therefore greater than those of traditional risk regulation.

In sum, the instrumental parsimony that typifies the EU risk regulation paradigm, where individualised safety objectives are pursued through a single or narrow set of control techniques (eg, pharmaceutical safety through product authorisation; chemical substance safety through registration, evaluation, and use

90 See the separate studies and communications on climate change and forestry (n 65 above), agriculture and food security (n 65 above), and biodiversity (Commission Communication on 'Our life insurance, our natural capital: an EU Biodiversity Strategy to 2020' COM(2011)244 final, 3 May 2011.

91 See eg, the Passenger Car Regulation, n 55 above.

92 See Art 13 of the Passenger Car Regulation, *ibid* (listing review data).

93 See Kulovesi et al, n 54 above.

authorisation) is lost within the realm of climate risk regulation, which must summon a dazzling variety of regulatory instruments and control techniques to pursue its stated objectives of climate change mitigation and adaptation.

TOWARDS A NEW RISK REGULATION PARADIGM

The analysis above leaves risk regulation scholars with the unsettling impression that life is elsewhere. The most pressing environmental risk of our time challenges conventional assumptions about the nature of costs and benefits, about the relationship between risk and change, and about the meaning of uncertainty. It calls for regulatory responses that look very different from conventional risk regulation both in terms of goal-setting and instrumentalisation. But this observation constitutes an invitation more than a rejection. Ultimately, climate change throws down the gauntlet for risk regulation scholarship to re-appraise and re-define itself. The discipline has produced a wonderfully rich literature on complex issues such as the impact of probabilistic reasoning on notions of causation, the growing use of regulation as a forum for contestation between different risk perceptions, the phenomenon of proceduralisation and the development of principles such as the precautionary principle to cope with regulatory uncertainty (to name but a few).[94] Yet there is an urgent need for further engagement with the rising prominence on the regulatory agenda of risks, such as the climate change risk, that are more appropriately understood as endemic to our life-style than as the by-product of a particular scientific or technological development. As our conceptualisation of risks evolves, so should our understanding of risk regulation.

Beyond re-energising the discipline, the development of a new paradigm for risk regulation will prove vitally useful to the European Union as it forges on with the development and implementation of its climate change package. The EU has shown considerable mettle in launching itself into the great unknown that is climate change regulation and evidently does not shy away from innovative regulatory approaches, including the establishment of the world's largest market in emission allowances, the imposition of mandatory renewables targets coupled with the adoption of regulatory standards to facilitate conversion to renewable energy sources, and the introduction of regulatory frameworks enabling the controlled development of new and controversial technologies, such as carbon capture and storage (CCS). But there are risks to flying blind, and a stronger theoretical underpinning for the EU regulatory enterprise could improve its chances of identifying potential problem areas and regulatory vulnerabilities, thus creating opportunities for effective anticipatory responses. Moreover, the availability of a fleshed-out climate change risk regulation paradigm might ward off the temptation for the EU to fall back upon old and familiar but unproductive regulatory tactics to tackle new and unfamiliar challenges. Finally, the evolution of climate change regulation into a developed regulatory discipline, characterised by its own narrative, purpose and praxis, would create a host of new learning opportunities that could positively inform the European Union as a risk

94 See citations between notes 1 and 44 above.

regulator, whether operating within the heartland of product and technology regulation, in the realm of environmental regulation more broadly, or in the sphere of climate change regulation itself.

The risks of flying blind

Assuming that we accept the basic premise that social science scholarship can make a contribution to the practice of regulation, we readily see how a better understanding of the risk discourse and the regulatory dynamics of climate change could instruct the European Union as it tackles this momentous challenge. We recall that the EU's heavy dependence on justification techniques, both for the adoption of regulatory frameworks[95] and for regulatory decision-making, owes a lot to the representation of environmental risk regulation as a brake on trade and competitiveness. By contrast, the representation of climate change as an unqualified bad places the issue outside of the continuum between health or environmental harm and economic opportunity that demarcates the decision-making zone for conventional risk regulation. Liberating though this may be, the ascent of symbiotic perspectives on environmental regulation and competitiveness entails a new set of legitimacy challenges and raises a host of new questions surrounding the interpretation of regulatory effectiveness. The role of regulatory impact assessments, for instance, needs to be rethought to fit a context where regulation is expected to deliver on both protection and growth. By the same token, regulatory performance assessments and corresponding reform strategies must reflect a broader range of economic and environmental benchmarks. A full understanding of the consequences of embracing a dominant win-win perspective will therefore be invaluable in assisting the EU in its design of assessment and review strategies and in confronting new legitimacy concerns.

A related point concerns the political nature of overall mitigation target-setting within the EU, which lifts impact uncertainty out of the regulatory sphere. Instead of taking the EU regulator to task for the reliability of its impact predictions, the European public is more likely to stumble over the appropriate selection of control techniques. Thus, climate change regulation will have vulnerabilities different from those that beset traditional risk regulation. Consequently, efforts to boost the credibility and resilience of regulation should be re-directed. The insulating mechanisms of EU risk regulation (namely the rigorous data production standards, the tightly maintained separation between assessment and management, the public access provisions in risk evaluation procedures) are all designed to either respond to or deflect concerns about the EU's treatment of impact uncertainty. Climate change regulation could presumably get away with less robust defence mechanisms for its assessment procedures, but it needs to build in opportunities to cope with control uncertainty. In other words, it needs to respond to demands for both the scrutiny and the justification of its selection of regulatory control instruments, and of the relative weight it

95 cf G. Rowe, 'Tools for the Control of Political and Administrative Agents: Impact Assessment and Administrative Governance in the European Union' in H. Hoffmann and A. Türk, *EU Administrative Governance* (Cheltenham: Edward Elgar, 2006) 448–511.

attributes to different climate change instruments within its regulatory package. At the moment, such opportunities are lacking, arguably because the phenomenon of control uncertainty has been insufficiently explored and has not yet percolated down to the level of regulatory practice.

The risks of reverting to risk regulation

A solid theoretical foundation for EU climate change regulation could also minimise the risk that, in expanding its regulatory framework, the EU reverts to familiar but counterproductive risk regulatory strategies. This is by no means a speculative concern. Within the field of risk research, commentators have long been aware of the powerful draw of 'risk' as an organising principle, pulling complex phenomena into its orbit and converting them into management and communication problems through the application of risk identification and assessment routines.[96] As a mode of governance, risk exerts a particularly, some claim excessively strong influence on regulation.[97] In the field of climate change, too, authors such as Pidgeon and Bulkeley have observed the ascent of risk-based analysis, while simultaneously expressing concern about the suitability of risk-based strategies to govern climate change.[98] Considering the attractions of risk for regulation, combined with the EU's extensive experience as a risk regulator, the prospect of risk-oriented strategies gradually colonising the domain of climate change regulation is anything but farfetched.[99] The EU therefore needs to be armed with a clear understanding of the distinctiveness of its climate change risk discourse, and of the different programmatic and strategic needs of climate change regulation, to avoid mapping new problems onto old formats and to design and select risk control strategies commensurate to the task of climate change mitigation and adaptation.

To illustrate the point, let us consider two distinguishing features of risk regulation: its tendency towards compartmentalisation and its stabilising propensity. Both are prominent in EU risk regulation, but neither is appropriate for the design of an effective framework for climate change regulation, which calls for a fast pace of innovation through regulation,[100] as well as a much higher degree of

96 See more generally J. Adams, *Risk* (London: UCL Press, 1995); U. Beck, *Risk Society: Towards a New Modernity* (London: Sage Publications, 1992).

97 B. Hutter, *The Attractions of Risk-based Regulation: Accounting for the Emergence of Risk Ideas in Regulation* (CARR Discussion Paper 33, LSE) 3–4; and H. Rothstein, P. Irving, T. Walden, and R. Yearsley, 'The Risks of Risk-Based Regulation: Insights from the Environmental Policy Domain' (2006) 32 *Environment International* 1065.

98 Pidgeon and Butler, n 12 above; I. Lorenzoni, N. Pidgeon and R. O'Connor, 'Dangerous Climate Change: the Role for Risk Research' (2005) 25 *Risk Analysis* 1387; Morgan et al, n 34 above, 270; H. Bulkeley, n 84 above, 442–444; Rothstein, Huber and Gaskell, n 1 above, 91.

99 Mark Stallworthy comments that law-makers address new problems, including those posed by climate change, against a broader picture of regulatory evolution. He continues that this evolution 'has seen a developing emphasis on risk-based management. This can be characterised by features that include *ex ante* setting of clear objectives, across identified timelines, supported by transparent and participatory processes.' See Stallworthy, n 60 above, 418.

100 cf D. Kysar, 'Climate Change, Cultural Transformation and Comprehensive Rationality' (2004) 31 *Boston College Environmental Affairs Law Review* 555.

orchestration. A review of the current climate change package casts doubts on whether these messages have been fully absorbed. Regarding the need for rapid change, the EU undeniably promotes climate change mitigation through technological innovation, as evidenced in, for example, the Renewables and Ecodesign Directives.[101] However, once innovating products and technologies reach the market, they are likely to fall subject to the incremental, almost plodding process of risk decision-making that typifies EU product and technology regulation, thus robbing the innovation initiative of its momentum.[102] What is currently missing is a more systematic discussion of whether the relatively greater risk of inertia warrants a relaxation of the risk regulatory hurdles that scientific and technological innovations traditionally must pass. Particularly when it comes to the introduction of controversial energy sources and technologies such as nuclear energy and carbon capture and storage, there is a pressing need to address questions of risk-risk tradeoffs within the regulatory regime.[103]

Compartmentalisation, too, risks finding its way into climate change regulation, with unwelcome results. It would be disingenuous to accuse the EU of blindness to the need of orchestration; its championing of a multi-pronged approach combining overall capping, emissions trading, innovation facilitation and energy efficiency standard-setting confirms otherwise. Yet old habits die hard and, upon reviewing the climate change package, we encounter some surprisingly narrow framing. For instance, the 2009 Directive on the Geological Storage of Carbon Dioxide (CCS Directive)[104] approaches the environmental risks posed by CCS technology in a notably insular manner, highly reminiscent of the compartmentalisation that characterises EU risk regulation. Although the preamble asserts that CCS technology 'should not serve as an incentive to increase the share of fossil fuel power plants', nor 'lead to a reduction of efforts to support energy saving policies, renewable energies and other safe and sustainable low carbon technologies', the Directive's objectives are narrowly constructed and focus on ensuring that novel CCS technology is deployed in an environmentally safe way. The Directive addresses the risk of carbon leakage, but understands 'leakage' only as the involuntary escape of CO_2 from a storage complex;[105] not as the resurgence of fossil fuel industries, whether in the EU or outside of it, in the wake of the commercialisation of CCS technology.[106] Even though the acceptability of the environmental risks posed by CCS technology will at least partly depend on the success of alternative mitigation approaches, the Directive's framework for the risk assessment of storage sites does not offer any entry-points for contextual information to be introduced. At present, opportunities for inter-regulatory learning and review are not built into the CCS regulatory framework.

101 notes 56 and 57 above.

102 Art 12 of Reg 443/2009 (n 57 above) requires the adoption of Commission measures to regulate innovative technologies by 2010. No such measures have yet been issued.

103 cf K. Bickerstaff, I. Lorenzoni, N. Pidgeon, W. Poortinga and P. Simmons, 'Reframing Nuclear Power in the UK Energy Debate: Nuclear Power, Climate Change Mitigation and Radioactive Waste' (2008) 17 *Public Understanding of Science* 145.

104 n 59 above.

105 CCS Directive, Art 3(5) *ibid*.

106 cf M. Babiker, 'Climate Policy, Market Structure and Carbon Leakage' (2005) 65 *Journal of International Economics* 421.

Finally, the unanticipated complexities of regulatory interdependency are at the heart of a recent disagreement between Gunther Oettinger, EU Energy Commissioner, and Commissioner for Climate Change, Connie Hedegaard. Oettinger recently unveiled a new draft directive containing energy efficiency targets for business, including sectors covered under the ETD. Although contributing to the energy efficiency pillar of the climate change package, stringent efficiency standards risk destabilising the market for emission allowances. Hedegaard therefore opposes the initiative and advocates achieving energy efficiency through cutting the number of permits available instead.[107] The dispute eloquently illustrates the need for orchestration at the regulatory and institutional level, as well as the relative inexperience of the EU Commission in accomplishing either.

The opportunities of comparative learning

Beyond reducing the risk of regulatory failure, the development of a new paradigm for risk regulation would foster opportunities for mutual support and comparative learning, to the advantage of 'core' risk regulation, environmental regulation, and climate change regulation alike.

Firstly, failure to develop an effective climate change mitigation regime could undermine existing risk regulation by reducing the manageability of uncertainty. Rules on the planting of genetically modified crops and on co-existence, for instance, are developed on the assumption of these crops maturing under relatively stable ecological conditions that are predictable at the point of application for regulatory authorisation. Uncontrolled climate change could rapidly and drastically affect the ecosystem in which GMO crops grow, and hence obliterate the value of conducted risk assessments.[108] From this perspective, the development of a new paradigm for risk regulation, responsive to systemic life-style risks such as climate change would not threaten conventional risk regulation but rather help to guarantee its survival.

Furthermore, new-found awareness of different risk discourses, and of their impact on regulatory objectives and strategies, could spur renewed investigation into health and environmental challenges that thus far have been either insufficiently articulated or lumped together under the broad heading of risk regulation. One area that might considerably benefit from such exercise is biodiversity protection. Within the EU, biodiversity protection is characterised by regulatory strategies in the typical EU risk regulation tradition, displaying a high degree of compartmentalisation, dependence on scientific evidence, itemised decision-making and low awareness of control uncertainty. They are also notoriously ineffective at curbing biodiversity loss.[109] Recent Commission communications

107 F. Harvey, 'Barroso tries to defuse emissions trading row . . . by quoting the Kinks' *The Guardian* 18 June 2011.

108 M. Zinn, 'Adapting to Climate Change: Environmental Law in a Warmer World' (2007) 34 *Ecology Law Quarterly* 61, 64.

109 See Commission Communication on 'Options for an EU Vision and Target for Biodiversity Beyond 2010' COM(2010)4 final, 19 January 2010; A. Ross, 'Modern Interpretations of Sustainable Development' (2009) 36 *Journal of Law and Society* 32, 44.

confirm the need for change, but still seek to accomplish this goal mostly by extending and pursuing better implementation of existing regulatory approaches.[110] The example of climate change could potentially start a more considered debate on whether other risks, such as biodiversity loss, 'behave' like technological risks, climate change risks, or come with their own set of set of idiosyncrasies, thus warranting the development of self-standing and hopefully more effective regulatory responses.

Finally, the conventional risk regulation and new climate risk regulation paradigms could function as valuable counterpoints in the analysis of regime weaknesses. If subservience to scientific rationality is a notorious weak spot of conventional risk regulation, then the Achilles heel of climate change regulation may well be its dependence on continued political willingness to subscribe to the EU's ambitious mitigation and adaptation strategy in the face of overwhelming control uncertainty. Hence, whereas commentators have called for a re-politicising of EU risk regulation in order to balance its in-built tendencies towards formalisation, compartmentalisation, and rationalisation, the survival of the climate change regulatory package might on the contrary hinge on the extent to which it can develop an autonomous *raison d'être*, with some degree of independence from the political context in which the climate risk paradigm took shape.[111] In considering de- or re-politicising strategies, the experiences gained under the two respective regimes could offer invaluable input.

Climate change control as an EU regulatory project is in its infancy. As it matures into a fully-fledged regulatory complex, opportunities for cross-regime learning are sure to multiply. For instance, the fictions of certainty and necessity, already fragile within the EU risk regulation paradigm, are bound to shatter against the overwhelming uncertainties of climate change control. It defies the imagination that, in this area, the EU would be able to make any stronger claims than it is doing the best it can, learning as it goes along, adapting to rapidly changing internal and external circumstances, and correcting earlier mistakes. Moreover, the presence of an overall, quantified target against which the EU's regulatory success, or lack thereof, can be measured, should sour any appetite for Panglossian enthusiasm. The development of new legitimating strategies in the face of systemic control uncertainty will offer important lessons on the EU's ability (or lack thereof) to step out of its eudemonic rationale and justify itself without firm guarantees of regulatory superiority.

This experience could, in turn, prove wonderfully instructive for EU risk regulation, which displays a keen awareness of the stifling impact of eudemonia, but has thus far not been able to muster a credible response.[112]

As to instructive exchanges flowing in the opposite direction, the EU risk regulatory experience, and particularly its history of contestation, could serve as

110 Commission Communication on 'Our life insurance, our natural capital: an EU biodiversity strategy to 2020' n 90 above.

111 See 'British economist tears EU climate policy to pieces' *ENDS Europe Daily* 4 September 2009, reporting that 'Dieter Helm, a professor at Oxford University and chair of the UK environment ministry's academic panel, says the climate and energy package is profoundly flawed because its targets are entirely political and do not make economic sense.'

112 Chalmers, n 31 above.

a crucial source of inspiration for the climate risk regime. For instance, the EU regulatory regime governing food safety has faced formative internal and external legitimacy challenges[113] which have forced EU regulatory bodies and reviewing bodies alike to grapple with many of risk regulation's most intractable challenges, ranging from the role of local preferences in centralised decision-making to the reconciliation between competing expectations of timeliness, certainty, and inclusiveness of EU rule-making. For all their limitations, EU institutions have tried to respond to calls for better governance, greater responsiveness, and resilience of risk regulation. The political momentum in favour of action against climate change may thus far have supplied a degree of insulation against claims of illegality and illegitimacy, but the cracks are already appearing,[114] as the turmoil surrounding the adoption of the 2009 climate change package attests.[115] Once climate change regulation starts to bite at the local level, and particularly if adaptation policies are reeled into the sphere of EU governance, contestation will be all but inevitable. The EU risk regulatory experience of challenge and response, and of the opportunities and limitations created through response and reform, will be invaluable to the climate risk paradigm as it seeks out and defines its approach to governance.

CONCLUSION

The pursuit of an ambitious climate change policy constitutes a regulatory challenge that is different in scale and scope from anything the European Union has faced before. This challenge cannot and should not be met through the adoption of conventional risk regulation strategies, which respond to a different conceptualisation of risk and espouse fundamentally different aspirations from those that drive climate change control. Within the universe of climate change, the risks of the old far outstrip those of the new, change is valued over stabilisation, and orchestration is more productive than compartmentalisation. Consequently, regulating the risks of climate change is a both a quantitatively and qualitatively different exercise from regulating risks such as pesticide use, industrial pollution, or genetic modification.

This does not mean, however, that there is no role for risk regulation scholarship in the field of climate change. This article shows that, at the very least, the risk regulation paradigm offers an instructive comparator against which to identify and analyse the distinctiveness of climate change as a regulatory project. Yet the article pleads for something more ambitious, to match the ambition of the EU's climate change package itself: the full articulation of a new paradigm for risk regulation, commensurate with the scale and complexity that characterises contemporary environmental risks, of which climate change is the prime example.

113 Lee, n 28 above, 239–267; D Chalmers, 'Risk, Anxiety and the European Mediation of the Politics of Life' (2005) 30 *European Law Review* 649.

114 'European Leaders Clash over Pledges on Global Warming' *The Guardian* 11 December 2008; 'Poland Blocks Adoption of Low Carbon Roadmap' *ENDS Europe Daily* 21 June 2011.

115 'EU Struggles Toward Climate Package Consensus' *ENDS Europe Daily* 4 December 2008.

Such articulation, it is argued, will be invaluable to the European Union as it expands its regulatory arsenal towards climate change mitigation and, conceivably, adaptation. Ultimately, the development of a new paradigm might also help us to look at some old risk and environmental regulatory problems through new lenses, and perhaps come up with new responses.

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