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Editorial: Special Issue Managing Responsibilities for Climate Change Risks

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COLLECTION: MANAGING RESPONSIBILITIES FOR CLIMATE CHANGE RISKS

INTRODUCTION

ABSTRACT

The Special Issue brings together contributions examining concrete case studies on managing responsibilities for climate change risks around the world. It aims to generate new and interdisciplinary knowledge on potential approaches to risk allocation, adaptation and resilience, and explore normative aspects of burden-sharing in the development of rights and obligations to respond to climate change. This Special Issue was coordinated by the University of Sydney Law School and Utrecht University School of Law under the 2019 Utrecht University and University of Sydney Partnership Collaboration Award. The grant recipients and ULR guest editors from Australia are Katherine Owens, Director of the Australian Centre for Climate and Environmental Law (ACCEL) (Sydney University Chief Investigator), and Madeline Taylor (Macquarie University) Deputy Director of the Centre for Energy and Natural Resources Innovation and Transformation (CENRIT). The guest editors from the Utrecht University Centre of Water, Oceans and Sustainability Law (UCWOSL) are Natalie Dobson (Utrecht University Chief Investigator), Herman Kasper Gilissen (UCWOSL Senior Researcher) and Marleen van Rijswick (UCWOSL Director).

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> *'Climate change impacts and risks are becoming increasingly complex and more difficult to manage. Multiple climate hazards will occur simultaneously, and multiple climatic and non-climatic risks will interact, resulting in compounding overall risk and risks cascading across sectors and regions. Some responses to climate change result in new impacts and risks (high confidence).'*
>
> Intergovernmental Panel on Climate Change, *Sixth Assessment Report: Climate Change 2022: Impacts, Adaptation and Vulnerability.*

Climate risk cannot be addressed effectively through piecemeal policies and legal instruments. Governance systems must now address not only the immediate physical and socio-economic consequences of climate change, but also the systemic and compound effects on people, infrastructure, economies, societal systems and ecosystems. Yet, there is 'negligible evidence' that existing responses for reducing climate risk are up to the task.[1] In the context of rapid, widespread, and intensifying climate change, public and private actors must cooperate to develop comprehensive and coordinated approaches to manage responsibilities for reducing climate risk at the international, national and sub-national levels. Developing effective response measures will require complex trade-offs between competing interests, and crucial decisions on 'who should do what'.

This Special Issue of the Utrecht Law Review comprises a selection of nine articles from scholars who participated in a two-day international workshop *Managing Responsibilities for Climate Change Risks* in January 2021.[2] During the workshop, expert speakers from various countries including China, the United States, Australia, Finland and the Netherlands discussed insights on practices in domestic, EU and international law and policy contexts. The workshop and this Special Issue were coordinated by the University of Sydney Law School and Utrecht University School of Law under the 2019 Utrecht University and University of Sydney Partnership Collaboration Award.[3] The grant recipients and ULR guest editors from Australia are ***Katherine Owens***, Director of the Australian Centre for Climate and Environmental Law (ACCEL) (Sydney University Chief Investigator), and ***Madeline Taylor*** (Macquarie University) Deputy Director of the Centre for Energy and Natural Resources Innovation and Transformation (CENRIT). The guest editors from the Utrecht University Centre of Water, Oceans and Sustainability Law (UCWOSL) are ***Natalie Dobson*** (Utrecht University Chief Investigator), ***Herman Kasper Gilissen*** (UCWOSL Senior Researcher) and ***Marleen van Rijswick*** (UCWOSL Director). Over the duration of the project, scholars were confronted with increasingly extreme weather conditions bearing the fingerprint of climate change, such as catastrophic bushfires in Australia in early 2020, and extreme flooding in Western Europe in July 2021 and New South Wales throughout 2022, underlining the urgency of reducing and managing climate risk.

The Special Issue brings together contributions examining concrete case studies on managing responsibilities for climate change risks around the world. It aims to generate new, novel, and interdisciplinary knowledge on potential approaches to risk allocation, adaptation and resilience, and explore normative aspects of burden-sharing in the development of rights and obligations to respond to climate change. Diverse examples and jurisdictions are considered to assess and compare the extent to which current legal frameworks support the various stages of the climate risk management process, and areas that could benefit from development and reform.

CLIMATE RISK

Climate change governance requires a comprehensive understanding of climate risk, but the concept is understood in a variety of ways. Climate risk is central to the work of the Intergovernmental Panel on Climate Change (IPCC), which has worked over successive assessment periods to articulate a common description of risks and uncertainties. The Sixth Assessment Report defines risk as 'the potential for adverse consequences for human or ecological systems,

1 Brian O'Neill et al, 'Key Risks Across Sectors and Regions', in Pörtner et al (eds), *Climate Change 2022: Impacts, Adaptation and Vulnerability*, *Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2022), 2415.

2 The workshop was postponed due to Covid-19 and took place in digital form.

3 The University of Sydney – Utrecht University Partnership Collaboration Award, 2019 Round.

recognising the diversity of values and objectives associated with such systems'.[4] These risks can arise from 'potential impacts of climate change as well as human responses to climate change', such as policy failures and risk trade-offs.[5] Further examples are provided by the investment and finance sectors, which have their own tripartite typology of physical, transitional and liability risks that has been widely adopted in policy literature.[6] Risks may be *physical* where physical changes in the climate itself impact the environment, society and economy, and *transitional* when physical risks trigger social processes to adjust to a changing climate (such as policy and regulatory changes and market behaviours).[7] Climate risks may also take the form of *liability* risks when individuals or businesses seek compensation for losses they may have suffered as a result of climate change, and litigate against organisations, including governments, due to action or inaction on climate change.[8] Other conceptions have identified *systemic* risk, which is characterised by complexity, uncertainty, ambiguity, and the propensity for ripple effects beyond the system of origin.[9] These risks have the potential to create 'functionality losses at the macro level involving multiple agents at the micro level', and threaten critical societal systems.[10] This is just a sample of the concepts that have been deployed to explain the phenomenon of climate risk, and this proliferation of frameworks is constructive because the concept of climate risk is complex. In all contexts, 'climate action failure' is 'the risk with potential to inflict the most damage at a global scale over the next decade'.[11]

UNCERTAINTIES

Managing climate risk presents unique challenges because important factors such as emissions trajectories, how the physical climate system will react to those trajectories (with non-linear feedback loops) and our development patterns are all increasingly uncertain.[12] The enormous range of emission scenarios envisioned in the IPCC report illustrates the unpredictable nature of world development, and highlights that future GHG emissions will be a result of very complex dynamic systems, influenced by factors such as demographics, socioeconomics, and technology.[13] One of the greatest uncertainties, perhaps, is the difficulty of predicting collective government action. While information gaps and uncertainty are insufficient reasons for inaction,[14] '[h]ow to adequately carry out the scientific analyses and, in particular, the way to treat risks and uncertainties, is not straightforward.'[15] Developing effective response measures requires complex trade-offs between competing interests, and crucial decisions about allocation of governance responsibilities.

MANAGING RESPONSIBILITIES

The articles selected for this issue were presented and critically evaluated at the workshop *Managing Responsibilities for Climate Change Risks*. They consider a multitude of issues,

4 O'Neill et al (n 1) 2418; Andy Reisinger et al, 'The concept of risk in the IPCC Sixth Assessment Report: a summary of cross-Working Group discussions' (4 September 2020), 5.

5 Reisinger et al (n 4) 5.

6 See Mark Carney, 'Breaking the tragedy of the horizon – climate change and financial stability (Bank of England, Speech, 2015); Mark Carney, 'A Transition in Thinking and Action' (Bank of England, Speech, 2018); Reisinger et al (n 4) 13–14.

7 Reisinger et al (n 4) 13–14.

8 ibid.

9 See, for example, Ortwin Renn et al, 'Systemic risks from different perspectives' (2020) Risk Analysis 1,2

10 ibid.

11 2022 Global Risks Report (World Economic Forum, 2022) <https://www.weforum.org/reports/global-risks-report-2022> accessed 12 October 2022.

12 OECD, *Managing Climate Risks, Facing up to Losses and Damages* (OECD Publishing, 2021) 39–41.

13 See June-Yi Lee et al,'Future Global Climate: Scenario-Based Projections and Near-Term Information', in Masson-Delmotte et al (eds), *Climate Change 2021: The Physical Science Basis: Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate* Change (Cambridge University Press, 2021).

14 Under the Rio Declaration on Environment and Development, the precautionary principle provides that where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation: see Principle 15 of the Rio Declaration on Environment and Development (13 June 1992) 31 ILM 874.

15 Terje Aven and Ortwin Renn, 'An Evaluation of the Treatment of Risk and Uncertainties in the IPCC Reports on Climate Change' (2015) 35 Risk Analysis 701.

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including the fairness of initiatives to combat the risk of carbon leakage,[16] the potential for domestic courts to fill legal accountability gaps in international carbon markets[17] and the role of domestic climate litigation in targeting the adequacy of both state and private mitigation measures.[18] Specific attention is also given to the role of the private sector, which will be required to not only manage its own climate exposures but also drive sustainable agendas in alignment with the Paris Agreement.[19] A collection of papers focusses on how law and governance should manage flood-prone regions, adopting socio-ecological and adaptive governance approaches to evaluate the strengths and weaknesses of delta management programs, identify the institutional features required to manage climate risk and evaluate how diverse flood risk management strategies are positioning communities to 'live with water'.[20] Regulatory fragmentation, and its potential to compromise risk management strategies across regions and government scales, is explored through EU, Federal and state regulatory regimes in the context of critical infrastructure such as electricity grids,[21] and flood risk management strategies.[22] Comparing state-based regimes, scrutiny is also given to the potential for policy and regulatory misalignment when governance frameworks do not keep pace with the land use conflicts and risks generated by renewable energy technologies.[23] Finally, new governance models are examined that can grapple with the normative aspects of burden-sharing in relation to the impacts of climate change, and the potential to incorporate structured deliberation in water management.[24]

The contributions demonstrate collectively that climate risk governance is much more than risk assessment and management. Law and governance need to enable informed decision-making and implementation to cope with uncertainty, plan for the possibility of future climate scenarios, and build in flexibility to adapt to the changing climate. It must also facilitate an inclusive and equitable consideration of competing interests. We have identified three intersecting themes raised by the papers – climate risks and water management, climate risks and energy and international climate obligations and private economic activities – which exemplify the wide variety of climate risks, the state of risk governance and the potential for a wide range of normative and regulatory approaches to enhancing climate risk regulation.

1. CLIMATE RISKS AND WATER MANAGEMENT

Sea-level rise, water scarcity, hydrological uncertainty, and extreme weather events (such as floods and droughts) are placing unprecedented pressure on water resource management.[25] Climate change will intensify these pressures, with models predicting an increase in wet and dry extremes and more variability.[26] Coupled social-ecological systems, often characterised by 'competing interests, jurisdictional complexity, and multiple drivers of change', will experience

16 See in this issue: Natalie L Dobson, '(Re)framing responsibility? Assessing the division of burdens under the EU Carbon Border Adjustment Mechanism' (2022) 18(2) Utrecht Law Review.

17 See in this issue: Baine P. Kerr, 'Mitigating the Risk of Failure: Legal Accountability for International Carbon Markets' (2022) 18(2) Utrecht Law Review.

18 See in this issue: Otto Spijkers, 'The Influence of Climate Litigation on Managing Climate Change Risks: The Pioneering Work of the Netherlands Courts' (2022) 18(2) Utrecht Law Review.

19 See in this issue: Anita Foerster, 'Aligning private climate risk management to Paris climate goals: an Australian perspective' (2022) 18(2) Utrecht Law Review.

20 See in this issue: Mandy Pauw, Murray Scown, Annisa Triyanti, Haomiao Du and Ahjond Garmestani, 'Adaptive governance of river deltas under accelerating environmental change'; and Willemijn van Doorn-Hoekveld, Herman Kasper Gilissen, Frank A.G. Groothuijse, H.F.M.W. (Marleen) van Rijswick, 'Adaptation to Climate Change in Dutch Flood Risk Management: Innovative Approaches and Related Challenges' (2022) 18(2) Utrecht Law Review.

21 See in this issue: Rosemary Lyster, Daniel A. Farber and Rory McFadden 'Climate-induced wildfires and strengthening resilience in electricity infrastructure' (2022) 18(2) Utrecht Law Review.

22 See in this issue: van Doorn-Hoekveld, Gilissen, Groothuijse and van Rijswick (n 20).

23 See in this issue: Madeline Taylor, 'Regulating Land Use Risks in the Energy Transition: A comparative examination of solar energy siting on agricultural land in Australia' (2022) 18(2) Utrecht Law Review.

24 See in this issue: Katherine Owens, 'Governing climate-related systemic risks in the Murray-Darling Basin in Australia' (2022) 18(2) Utrecht Law Review.

25 O'Neill et al (n 1) 16.5.2.3.7.

26 ibid; see, for example, IPCC, 'Summary for Policymakers'. in: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2021) A.3, B.2 and B.3.

rapid and non-linear changes.[27] The stakes are particularly high in both the Netherlands and Australia, where water resources are already being impacted by various and accelerating climate extremes. Water governance must evolve to meet these complex and interlinked challenges and manage critical risks to people and ecosystems. Having a long history of human-engineered water regulation, both countries have invested in institutional strengthening, legal and regulatory frameworks, and infrastructure development. To cope with and adapt to increased shocks, many commentators have identified that water planning and regulation must transform further from static models and long-term strategies to adaptive and communicative regulatory approaches, and that an interdisciplinary approach is required.[28] Local contexts and approaches must be integrated with larger-scale processes of strategic planning and policy, for example at the national or basin scale.[29]

Managing climate risks to water resources is therefore an exercise in governing complexity. Water traverses natural systems, infrastructures, and societies, and the first three articles critically evaluate and identify how law and governance can facilitate water management, adaptation and transformation in these socio-ecological systems. The authors explore the cross-scale interactions that will need to be facilitated, and the role of government in steering these processes and identify the key legal and institutional components that are needed. In 'Governing climate-related systemic risks in the Murray-Darling Basin in Australia', ***Owens*** draws attention to the need for new governance approaches for the 'systemic' climate risks that exist in the Murray-Darling Basin (MDB).[30] Adapting to a hotter and dryer climate in the MDB, as elsewhere, has significant implications for governments, communities, Indigenous Peoples, industries and the environment. Owens describes these existing and future climate risks in the MDB, in a governance context that relies heavily on predictive models and scenarios. She then characterises these climate risks within the MDB as 'systemic risks' defined by Ortwin Renn, which occur at the intersection of natural events, socio-economic systems and policy driven actions. Managing these risks will require water managers to govern for projected future climate risk rather than annual climate variability, and Australian governments will need to address a variety of significant weaknesses in their current approaches under the Water Act 2007 (Cth), the Murray-Darling Basin Plan 2012 (Cth) (Basin Plan), and state legislation.

While the regulatory challenges described by Owens are significant, these shortcomings also reveal the interventions that are needed. The article's key contribution is to show how structured deliberation can be incorporated into the 2026 Basin Plan Review, providing the opportunity for governments, communities, Indigenous Peoples and industries to address fundamental questions as to whether water managers should base water planning and diversion limits on wet or dry scenarios, and what the risks of that are in 10, 20, 30 years and beyond. Drawing on perspectives from risk governance and theories of deliberative democracy, Owens shows how deliberative techniques can enable statutory water managers to confront complexity, and clarify knowledge. These techniques can also assimilate a range of perspectives and expertise in water reallocation, and create a process that can guide society toward effective and acceptable solutions.

Pauw, Scown, Triyanti, Du and Garmestani shift the analytical focus to river deltas, which have been identified as hotspots for climate risk.[31] Vulnerable to rising sea levels and flooding, delta regions are also host to diverse ecosystems and thriving economies. It is therefore imperative that delta regions be enabled to adapt in a manner that acknowledges these social and ecological interdependencies. The authors explore adaptive governance for river deltas and

27 Barbara Cosens, Lance Gunderson, and Brian C. Chaffin, 'Introduction to the Special Feature Practicing Panarchy: Assessing legal flexibility, ecological resilience, and adaptive governance in regional water systems experiencing rapid environmental change' (2018) 23(1) Ecology and Society 4.

28 ibid. See, for example, Barbara Cosens et al, 'Governing complexity: Integrating science, governance, and law to manage accelerating change in the globalized commons' (2021) 118 PNAS 1.

29 Cosens et al (2021) (n 27) 5.

30 See in this issue: Owens (24)

31 See in this issue Paauw, Scown, Triyanti, Du and Garmestani (n 20). Mandy Paauw, Centre for Research on Environmental and Social Change (CRESC), University of Antwerp; Murray Scown, Copernicus Institute of Sustainable Development, Utrecht University and Lund University Centre for Sustainability Studies (LUCSUS), Lund University; Annisa Triyanti, Copernicus Institute of Sustainable Development, Utrecht University; Haomiao Du, Utrecht Centre for Water, Oceans and Sustainability Law (UCWOSL), Utrecht University; Ahjond Garmestani, Office for Research and Development, US Environmental Protection Agency.

compare two case studies: the Dutch Delta Program and the Mekong Delta Plan. Acknowledging that adaptation is dependent not only on climate and environmental components but also on the responses of social systems, the authors take a social-ecological system (SES) approach to gain a better understanding of delta governance under accelerated environmental change. This SES approach is then combined with the adaptive governance framework developed by DeCaro and others, comprised of nine legal and institutional design principles.[32] In doing so, the authors systematically evaluate the strengths and limitations of adaptive governance in the 2020 Dutch Delta Programme and the 2013 Mekong Delta Plan. Based on this analysis, the article advocates for caution in transferring knowledge and policy from the Rhine delta to the Mekong delta, and calls for attention to the contextual differences in environment, culture, politics, law and economics between these deltas. The authors then consider the implications of these contextual nuances for the application of DeCaro and others adaptive governance framework itself.

Flood risk management (FRM) in the Netherlands is a key example of adaptive governance within a delta region. There, climate adaptation and water management are strongly interrelated policy domains given the expected effects sea-level rise, increasing river discharges and changing precipitation patterns. ***Van Doorn-Hoekveld, Gilissen, Groothuijse and van Rijswick*** evaluate recent FRM developments, unpacking the key flood risk management strategies (FRMSs) defined in the EU Floods Directive 2007/60/EC: prevention, protection and preparedness and emergency response strategies, before comprehensively canvassing implementation in Dutch law and policy.[33] Beginning with prevention, the article examines relevant aspects of the Spatial Planning Act and the long-anticipated Environmental Planning Act that is yet to enter into force. Having identified protection as the dominant strategy, the article unpacks the division of responsibilities under the Integrated Water System Management, and the uniquely central role of Water Management Authorities. It then turns to emergency preparedness, considering the role of security regions, and the three phases of emergency management: preparedness, response and recovery.

Reflecting on these developments, the article considers the critical shift in FRM from minimising the probability of flooding in 'the fight against water' and preparedness, towards a diversification of strategies aimed at 'living with water' and mitigating the effects of potential floods. Such innovations are not without vulnerabilities, and the authors conclude by considering various legitimacy and efficacy issues, providing valuable advice for policy and law-making in the future.

2. CLIMATE RISKS AND ENERGY

The IPCC's Sixth Assessment Report observes that 'warming cannot be kept below 2°C without rapid and deep reductions in energy system CO2 and GHG emissions' and countries must increase the speed and scale of their renewable energy transitions.[34] From solar and wind energy projects to early retirements of coal-fired power plants, this transition is taking place globally. Decarbonisation objectives, increased competition against fossil fuel generation, and the demand for clean energy and technology improvements from investors and governments[35] mean the most significant decarbonisation impacts are likely to be attributed to solar electricity generation, followed closely by wind generation.[36]

32 Daniel A DeCaro et al, 'Understanding and applying principles of social cognition and decision making in adaptive environmental governance' (2017) 22 Ecology and Society 1 <https://doi.org/10.5751/ES-09154-220133> accessed 9 January 2021.

33 See in this issue: van Doorn-Hoekveld, Gilissen, Groothuijse and van Rijswick (n 20). Willemijn Van Doorn-Hoekveld is Assistant Professor; Herman Kasper Gilissen is Associate Professor; Frank Groothuijse is Professor and Marleen van Rijswick is Professor at the Institute of Constitutional, Administrative Law and Legal Theory, Utrecht University School of Law. All of the authors are researchers with the Utrecht University Centre for Water, Oceans and Sustainability Law, directed by Marleen van Rijswick.

34 Jim Skea et al, *Climate Change 2022: Mitigation of Climate Change*: *Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2022), TS-52.

35 Jim Skea et al, 'Summary for Policymakers' in: *Climate Change 2022: Mitigation of Climate Change*: *Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2022) Section B.

36 ibid 42.

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These forces will result in massive investments in renewable energy infrastructure in the short and medium term, across landscapes and communities. For the sector to maintain its social licence, this footprint must be managed carefully to avoid conflicts with other land uses and the livelihoods of the most vulnerable. Effective integration of the energy sector with other industries will be essential, but will require innovative methods of renewable energy deployment, and governance frameworks that can reconcile a variety of land uses while safeguarding valuable resources for the future. Countries must enhance policy coherence, and 'capitalise on synergies among [Sustainable Development Goals] and targets, between different sectoral policies, and between diverse actions at the local, regional, national and international levels'.[37] In Australia, for example, increasing energy demand must compete with increased need for food and fibre production, housing, industrial development and public infrastructure, leading to potential conflicts between land use patterns.[38] Policy and regulatory misalignment can occur when governance does not keep pace with rapid developments in energy technologies, and draw connections between these various sectors.[39] Grid stability and capacity also pose significant challenges, as most grids were constructed around the characteristics of fossil fuel power plants but must adapt to variable solar and wind assets, which may be located in areas of insufficient grid capacity.[40]

In 'Planning the Energy Transition: A comparative examination of large-scale energy siting on agricultural land in Australia', ***Taylor*** addresses land use and climate risk at the complex nexus of agricultural land and renewable energy, focussing on the underexplored intersection of solar energy development for agricultural land uses.[41] Land and solar rich countries like Australia must contribute significant levels of solar energy production to global decarbonisation efforts but, when not planned and regulated sensitively, large-scale energy projects can have significant impacts on prime agricultural land use, such as impacts on agricultural soil quality. These risks have given rise to both concern on the part of rural communities and social licence risks for the solar energy industry. Taylor analyses the potential for land use planning to provide a significant spatial fix in this context and surveys a variety of approaches to reducing land use conflict and project impacts through a comparative analysis of planning regimes in Queensland, New South Wales and Victoria. Her comparative analysis, in turn, reveals key points of policy and regulatory misalignment, where the trade-offs and risks of projects have not been factored into decision-making. Discretionary approaches have been adopted for considering the impacts of solar energy projects on agricultural land use, which rely largely on voluntary guidelines.

Taylor sounds a warning bell for policy makers that solar farms can only be effectively and legitimately managed if planning regulation provides clearer and more coherent tools designed to mitigate these specific land use conflicts. Cross-sectoral integration, she considers, could be achieved through effective siting and co-location tools, which are delivered through the planning system. She argues that these 'new geographies of renewable energy in rural spaces' require the assessment and allocation of risks and benefits based on the size and intensity of a project. Equally important, Taylor argues, will be environmental planning instruments specific to solar energy infrastructure, with mandatory requirements for agricultural land assessments and referral mechanisms that require the concurrence of an Agricultural Minister.

Lyster, Farber and McFadden move the focus from climate mitigation to the ways in which the electricity sector is itself vulnerable to climate risk.[42] Extreme weather events and wildfires, among other climate impacts, can damage generation and grid infrastructure, reduce output,

37 OECD, *Better Policies for Sustainable Development 2016: A New Framework for Policy Coherence* (OECD Publishing, 2016) Chapter 2.

38 NSW Government, *Issues Paper: Renewable Energy & Agriculture in NSW* (NSW Government, 2022) 3.

39 Alexis S. Pascaris, 'Examining existing policy to inform a comprehensive legal framework for agrivoltaics in the U.S.' (2021) 159 Energy Policy 112620.

40 See Australian Energy Regulator, *State of the Energy Market 2021* (AER, 2021) 20.

41 See in this issue Taylor (n 23). Dr Madeline Taylor is Senior Lecturer at Macquarie Law School, Deputy Director of the Centre for Energy and Natural Resources Innovation and Transformation (CENRIT), and Honorary Associate at the Sydney Environment Institute.

42 See in this issue Lyster, Farber and McFadden (n 21). Rosemary Lyster is Professor of Climate and Environmental Law at The University of Sydney Law School and Co-Leader of the Disaster Justice Cluster at The University of Sydney; Daniel Farber is the Sho Sato Professor of Law and the Faculty Director of the Center for Law, Energy, and the Environment (CLEE) at the University of California, Berkeley; Rory McFadden is LLB Candidate, TC Beirne School of Law, the University of Queensland.

and affect security of supply. With the rapid growth in global energy consumption and the large investments required in the coming decades, climate change-related risks to the electricity grid must be fully recognised and managed through a variety of adaptation and resilience measures. Focusing on the increasing risks that wildfires pose to the grid in Australia and California, the authors analyse these complex issues of risk. They address the dual dilemma faced by governments, infrastructure operators, and communities in this context: the increased risk that the grid will start fires and the increased risk that the grid infrastructure itself will be damaged in a fire. To explore these interconnected climate risks, the authors deploy the concept of climate resilience; a concept that presents fundamental challenges to grid operators and requires a shift from preventing outages to preventing systemic collapse caused by rare but potentially catastrophic 'high impact events'.

The authors expose various challenges in grid management and find that Australia and California conceptualise risk management differently. Against the backdrop of climate inaction, Australia for example, ringfences the concept of resilience as a standalone concept, while California encompasses the concept within climate change adaptation. At the same time, both jurisdictions must deal with the fragmentation of resilience strategies, across and between different levels of government and between the private and public sectors. While a more fragmented approach to power sharing under the Californian regime may have contributed to more policy experimentation with resilience measures, the authors find that Australia has had more success in preventing fire-induced grid faults from starting fires and has made more progress in incorporating wildfire risks into land-use planning. This raises additional questions regarding the relationship between resilience, public versus private control, and fragmented regulatory authority, which the authors invite us to further explore. The article identifies a panoply of promising future reform directions that fall into the categories of (1) technological innovations; (2) better management of grid infrastructure and surrounding vegetation; and (3) land use policy and electricity infrastructure siting away from hazardous areas.

3. INTERNATIONAL CLIMATE OBLIGATIONS AND PRIVATE ECONOMIC ACTIVITIES

Reducing greenhouse gas emissions is inextricably linked to the production and consumption of goods and services, including energy. As a result, states' international law commitments to mitigate climate change are dependent on the conduct of private actors engaging in domestic and cross-border economic activities. The third strand of this Special Issue considers various facets of this dynamic, evaluating to what extent domestic law and governance developments are in line with various open-ended international climate obligations.

Foerster, in 'Aligning private climate risk management to Paris climate goals: an Australian perspective', examines the growing body of private climate risk regulation in Australia.[43] Built on existing climate-neutral legal obligations to disclose and manage material financial risks, private climate risk regulation frames climate risk as a source of material financial risk for the private sector. Foerster's thematic focus reflects the core concern of these initiatives, which is alignment with the climate mitigation goals of the international Paris Agreement. Her central inquiry is whether private regulatory activities and risk management are evolving from being focussed on the financial risks posed *to* private sector actors *by* climate change, to recognising the collective, longer-term interests of private sector contributions to emissions reduction. To this end, Foerster maps and evaluates the emerging complex of private regulation and governance to drive emissions reductions within the private sector. This includes industry best practice standards, benchmarking initiatives and strategic legal interventions, underpinned by formal legal obligations under corporate law and prudential regulatory frameworks to identify, disclose and manage material financial risks when those risks are climate related. These private sector developments are particularly significant in Australia, which is only now in the process of legislating national emissions reduction targets, in both filling regulatory gaps and building consensus towards more ambitious substantive climate law and policy. At the same time, Foerster is careful to limit the role of private climate risk regulation to a complementary function that supports the critical role of a coordinated and strengthened legal and policy response

43 See in this issue, Foerster (n 19). Anita Foerster is Associate Professor, Department of Business Law & Taxation, Monash Business School, Monash University.

to climate change. The extent to which this complementary role will be achieved depends on a host of economic, scientific and regulatory factors, including the level of accountability that can be achieved through transparency and third-party scrutiny, and the business case for private investment that can be made.

The climate goals in the Paris Agreement also play an important role in domestic climate litigation on the adequacy of both state and private mitigation measures. Investigating this interplay, ***Spijkers*** analyses the pioneering work of the Netherlands courts[44] in two ground breaking cases, the first against the state: *Urgenda Foundation v State of the Netherlands*, and the second against a private company: *Friends of the Earth Netherlands (Milieudefensie) v Royal Dutch Shell*.[45] The article starts by devoting attention to a more general definition of 'climate change risk management' derived from authoritative sources, in particular IPCC reports and studies. This is particularly valuable given the heavy reliance of the domestic courts on these documents. It then examines the *Urgenda* case, where the Netherlands' climate risk management obligations were channelled through Articles 2 and 8 of the European Convention on Human Rights (ECHR). Spijkers sets out how the Netherlands Supreme Court dealt with various facets of the Netherlands' obligations to respond to climate change in the context of uncertainty, in particular given the relatively small contribution of the Netherlands to the total greenhouse gas emissions. The Court uses various sources of international environmental law to interpret the standard of care posed by these human rights, including the United Nations climate agreements and the customary norm of precaution.

Turning to the *Shell* case, Spijkers examines how The Hague District Court used the ECHR to give meaning to the unwritten societal standard of due care in Dutch tort law. The article unpacks the multitude of considerations underlying the definition of Shell's obligations, including the distinction between Scope 1, 2 and 3 emissions, and the extent to which adaptation measures may alleviate mitigation obligations. Spijkers explains how the unwritten standard in Dutch civil law is leveraged by the District Court to incorporate various international norms including the Paris Agreement, the ECHR and the United Nations Guiding Principles on Business and Human Rights. As examples of some of the first successful climate cases, the reasoning of the Dutch courts is worth attention, and continues to inspire domestic and international litigation in other jurisdictions.

Another means of stimulating private sector emission reductions is through international carbon markets. As observed by ***Kerr***, however, studies have found that large quantities of international carbon offsets may not result in 'additional' reductions in greenhouse gas emissions, i.e. reductions that would not otherwise have occurred in the absence of the program.[46] Responding to these troubling findings, Kerr considers legal accountability in relation to the environmental integrity of international carbon markets.[47] The article focuses on the older Clean Development Mechanism under the Kyoto Protocol, as well as the new Sustainable Development Mechanism under the Paris Agreement and the freshly-minted Carbon Offset Reduction Scheme for International Aviation of the International Civil Aviation Organization. Adopting Brunée's definition, this article conceptualises 'accountability' as 'the legal justification of an international actor's performance vis-à-vis others, the assessment or judgment of that performance against international legal standards, and the possible imposition of consequences if the actor fails to live up to applicable legal standards'.[48]

While noting the underlying institutional weaknesses of these markets, Kerr's article embarks on a more explorative analysis of the role of the immunity of international organisations before domestic courts. To support the analysis, the article sketches a hypothetical scenario of a tort claim

44 See in this issue: Spijkers (n 18). Otto Spijkers is Professor at Wuhan University's China Institute of Boundary and Ocean Studies (CIBOS), and Wuhan University's Research Institute of Environmental Law (RIEL) and Founding Staff Member of Wuhan University's International Water Law Academy (IWLA).

45 *State of the Netherlands (Ministry of Infrastructure and the Environment) v Urgenda Foundation*, Netherlands Supreme Court, Judgment of 20 December 2019; *Friends of the Earth Netherlands (Milieudefensie) v Royal Dutch Shell*, District Court The Hague, Judgment of 26 May 2021.

46 Michael Cames et al., 'How Additional is the Clean Development Mechanism?' Oko Institute (March 2016), available at: www.oeko.de.

47 See in this issue: Kerr (n 17). Baine P. Kerr is a PhD Candidate with the Utrecht Center for Water, Oceans, and Sustainability Law and Netherlands Institute for the Law of the Sea, Utrecht University School of Law.

48 Jutta Brunée, 'International Legal Accountability Through the Lense of State Responsibility,' 36 Netherlands Yearbook of International Law (2005), 6.

based on damages arising from certified carbon-offsets that were not, in fact, 'additional'. It then analyses to what extent immunity, as bar to realising accountability, may be overcome. In doing so the article focusses on the host countries of the relevant institutions, Canada and Germany, and the implications of the absence of internal accountability mechanisms for the success of an international organisations' claim to immunity. Drawing on fast-evolving developments in climate litigation, the article evaluates opportunities to open up domestic judicial review, and begin to overcome the accountability gaps of the new international carbon markets.

While carbon markets implicate international organisations, complex questions also arise in the context of unilateral trade measures aimed at environmental protection. A key example here is the EU's highly controversial proposal for a unilateral Carbon Border Adjustment Mechanism (CBAM) investigated by ***Dobson***.[49] The CBAM places a price on carbon embedded in imports from certain energy-intensive sectors, and is intended to combat the risk of carbon leakage arising from the gap between the EU's high climate ambitions, and those of its trading partners. From the EU's perspective, the proposed CBAM reflects the EU's 'responsibility to continue playing a leading role in global climate action' through reducing its *global* GHG footprint in line with the Paris Agreement. However, relying on other norms of international law, several newly industrialised countries have attacked the proposal as discriminatory and contrary to the principles of equity and common but differentiated responsibilities and respective capabilities (CBDRRC).[50]

Against this backdrop, Dobson's article assesses how the EU's framing of responsibility fits within the applicable public international law framework. Conceptually, 'responsibility' is defined as a question of how burdens are to be divided when interpreting rights and obligations to mitigate climate change. First the article examines how the EU's framing of 'responsibility' fits within the law of state jurisdiction, which conditions regulators' competence to place burdens on actors beyond their territory. It then turns to the division of responsibilities under the UN climate agreements, with a particular focus on opportunities for incorporating a more equitable differentiation of burdens in line with CBDRRC. Such differentiation would only be feasible for regulators if it could pass the obstacles posed by the law of the World Trade Organisation (WTO). Unpacking the challenges and opportunities, Dobson argues that these hurdles need not be insurmountable, though much would depend on the willingness of both the EU and the WTO dispute settlement body to accommodate competing trade and environmental interests.

While there is much more work to be done, we hope that the excellent papers that follow will encourage ongoing dialogue, research, and collaboration surrounding the nature of climate risk and risk governance. Different climate risks require different responses, but in all cases the increased risks of climate change will give rise to the need for more rapid and responsive regulatory approaches, involving a wide range of public and private actors. In order to achieve responsive and systems-focused climate risk governance, a host of coordination challenges will need to be resolved between levels of government and between sectors. Governance frameworks will need to address not only the content and division of responsibilities between public and private actors, but also position economies and communities for long-term, pervasive and uncertain change.

COMPETING INTERESTS

The authors have no competing interests to declare.

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49 See in this issue, Dobson (n 16).

50 'Joint Statement issued at the conclusion of the 30th BASIC Ministerial Meeting on Climate Change hosted by India on 8th April 2021' (Government of South Africa Website) <www.gov.za/nr/speeches/joint-statement-issued-conclusion-30th-basic-ministerial-meeting-climate-change-hosted> accessed 18 October 2021, para 19.

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