

**Governing Energy Transitions: Unconventional Gas, Renewables
and their Environmental Nexus (Editorial)**

Author

Holley, Cameron, Kennedy, Amanda, Mutongwizo, Tariro, Shearing, Clifford

Published

2019

Journal Title

Environmental and Planning Law Journal

Version

Version of Record (VoR)

Rights statement

© 2019 Thomson Reuters. This article was first published by Thomson Reuters in the Environmental and Planning law journal and should be cited as (2019) 36 EPLJ 427. For all subscription inquiries please phone, from Australia: 1300 304 195, from Overseas: +61 2 8587 7980 or online at legal.thomsonreuters.com.au/search. The official PDF version of this article can also be purchased separately from Thomson Reuters at <http://sites.thomsonreuters.com.au/journals/subscribe-or-purchase>.

Downloaded from

<http://hdl.handle.net/10072/391899>

Link to published version

<http://sites.thomsonreuters.com.au/journals/category/journals/environmental-and-planning-law-journal/>

Funder(s)

ARC

Grant identifier(s)

DP170100281

Griffith Research Online

<https://research-repository.griffith.edu.au>

Editorial

GOVERNING ENERGY TRANSITIONS: UNCONVENTIONAL GAS, RENEWABLES AND THEIR ENVIRONMENTAL NEXUS

Cameron Holley, Amanda Kennedy, Tariro Mutongwizo and Clifford Shearing*

INTRODUCTION

The threat of climate change – realised through harms such as unprecedented cyclones and droughts – and the linkages between these harms and the carbon emissions of contemporary economies, have given rise to increasingly urgent demands for a radical transition from high- to low-carbon energy sources.¹ These calls are widespread, and arise at multiple levels, including the Governor of the Bank of England,² the Extinction Rebellion,³ the Sustainable Development Goals (SDGs),⁴ and the Intergovernmental Panel on Climate Change (IPCC). Indeed, the IPCC suggest that global net emissions will “need to fall by 45% from 2010 levels by 2030, reaching net zero around 2050”.⁵ While such a shift is paramount to securing a habitable planet, global progress towards clean energy continues to be slow. According to the International Energy Agency, even with rapid growth in low-carbon generation over the last five years, as of 2018 coal remained the largest source of electricity generation, while power sector carbon emissions continued to rise by 2.5%.⁶

There are many multifaceted causes of this continued lock-in to carbon intensive fuels, just as there are many emerging forms of institutional innovation and actors seeking to destabilise and change dominant energy regimes and advance a lower carbon energy transition.⁷ Given the heavy investments made in high-carbon energy sources from the birth of the first industrial revolution to the present – ranging from locating and extracting coal and oil deposits and the infrastructural investments associated with utilising these energy sources – it is not surprising that transitions from high-carbon fossil fuel-based economies to clean energy and low-carbon economies have been slow to materialise. In Australia, for instance, despite aspirations for lower emissions and orderly transitions expressed under national blueprints like the Finkel Review, governmental responses, including national commitments under the Paris Agreement

* Cameron Holley: Professor, UNSW Law, UNSW Sydney, member of the Connected Waters Initiative Research Centre and the UNSW Global Water Institute. Amanda Kennedy: Professor, Queensland University of Technology, Brisbane. Tariro Mutongwizo: Postdoctoral Fellow, UNSW Law, UNSW Sydney. Clifford Shearing: Professor, Griffith Criminology Institute, and School of Criminology and Criminal Justice, Griffith University, Faculty of Law, University of Cape Town and School of Criminology, University of Montreal. This Special Issue and article draw on work presented at a PLuS Alliance workshop, which was funded by the PLuS Alliance and an Australian Research Council Discovery Grant (DP170100281). We are grateful for the research assistance of Georgia Regan and for the support of our PLuS Alliance collaborators Diana Bowman, Rhett Larson, Megan Bowman and Leslie-Anne Duvic-Paoli. We also thank Paul Curnow, Baker McKenzie, Justice Rachel Pepper and UNSW Law for hosting and presenting at the workshop in February 2019.

¹ International Energy Agency, *CO2 Emissions from Fuel Combustion* (IEA, 2018) xix.

² Mark Carney, Governor Bank of England, “A New Horizon” (Speech delivered at the European Commission Conference: A Global Approach to Sustainable Finance, Brussels, Belgium, 21 March 2019) <<https://www.bankofengland.co.uk/-/media/boe/files/speech/2019/a-new-horizon-speech-by-mark-carney/>>.

³ Extinction Rebellion, *Our Demands* (XR, 2019) <<https://rebellion.earth/the-truth/demands/>>.

⁴ Sustainable Development Goals Fund, *Goal 7: Affordable and Clean Energy* (UN, 2015) <<https://www.sdgfund.org/goal-7-affordable-and-clean-energy/>>; see also *Paris Agreement, Paris*, signed 12 December 2015 (entered into force 4 November 2016) C.N.92.2016.TREATIES-XXVII.7.d of 17 March 2016. the Paris Agreement

⁵ IPCC, *Special Report, Global Warming of 1.5°* (IPCC, 2018) <<https://www.ipcc.ch/sr15/>>.

⁶ International Energy Agency, *Power* (IEA, 2019) <<https://www.iea.org/tcep/power/>>.

⁷ Donald Zillman et al (eds), *Innovation in Energy Law and Technology: Dynamic Solutions for Energy Transitions* (Oxford, 2018); Benjamin K Sovacool, “How Long Will It Take? Conceptualizing the Temporal Dynamics of Energy Transitions” (2016) 13 *Energy Research & Social Science* 205; Derk Loorbach, Niki Frantzeskaki and Flor Avelino, “Sustainability Transitions Research: Transforming Science and Practice for Societal Change” (2017) 42 *Annual Review of Environment and Resources* 599.

and fluctuating energy policies (eg from the now defunct National Energy Guarantee, to a price safety net and underwriting new generation investments) have faced significant criticism for their failure to achieve swift and sufficiently large-scale energy transitions.⁸

Generally speaking, advocates of these developments have argued that reducing a reliance on traditional fossil fuels like coal and oil, given the contexts of today's energy markets, requires shifting the mix of primary energy sources, rather than an abrupt transition, and that realising this requires the use of hydrocarbons.⁹ Within this context the speedy transition to unconventional gas in recent decades – Smil regards these developments as “perhaps the most remarkable, and consequential, expansion of resource extraction in modern history” – has seen it play an increasingly vital role in meeting human energy requirements.¹⁰ Apart from the obvious benefit of providing a purportedly lower carbon hydrocarbon source to the energy mix that can reduce dependence on coal, there are many positive social and economic aspects to unconventional gas development, including infrastructure enhancements, job creation and investment, as well as supporting the public purse through royalties and tax revenue.¹¹ With numerous jurisdictions continuing to support exploration of unconventional gas supplies, and new technologies for extracting shale gas and coal seam gas (CSG) advancing rapidly, unconventional gas is now considered a global phenomenon.¹² Australia alone is home to significant unconventional gas resources, including approximately 10% of the world's CSG reserves.¹³ Of global gas exporters, it is the fourth largest, and presently over 90% of Australia's CSG production is occurring in Queensland.¹⁴ Despite plans for its expansion (albeit with potentially more mature regulatory frameworks),¹⁵ this

⁸ See, eg, A Finkel et al (Expert Panel), *Independent Review into the Future Security of the National Electricity Market: Blueprint for the Future* (9 June 2017) <<https://www.energy.gov.au/government-priorities/energy-markets/independent-review-future-security-national-electricity-market>>; Chris McGrath, “Paris Agreement Goals Slipping Away and with Them, Australia's Chance to Save the Great Barrier Reef” (2019) 36 EPLJ 3; Simon Anderson, “A Study of the National Energy Guarantee and Federal Governance Frameworks within the Power Generation Industry” (2019) 36 EPLJ 7. For recent policy developments, including the *Competition and Consumer (Industry Code – Electricity Retail) Regulations 2019* (Cth), see Department of the Environment and Energy, *Affordable, Reliable Power for Australians* (Australian Government, 2019) <<https://www.energy.gov.au/about-government-priorities/affordable-reliable-power-australians>>.

⁹ Michael Lazarus et al, “Natural Gas: Guardrails for a Potential Climate Bridge” (Working Paper, The New Climate Economy, 2015) 1; IEA, *Energy Supply Security. Emergency Responses of IEA Countries* (IEA, 2014) 13; Ben Wah Ang, W Choong and T Ng, “Energy Security: Definitions, Dimensions and Indexes” (2015) 42 *Renewable and Sustainable Energy Review* 1077; IEA, *Energy and Air Pollution* (IEA, 2016) 2.

¹⁰ V Smil, *Natural Gas: Fuel for the 21st Century* (Wiley, 2015) 133. In Australia, for instance, coal seam gas accounted for one-third of Australian gas production and nearly two-thirds of east coast gas production in 2016–2017; Department of the Environment and Energy, *Australian Energy Update 2018* (Australian Government, 2018).

¹¹ Lazarus et al, n 9, 1; Smil, n 10. Note that some economic changes, such as in rural communities, have also engendered increases in living costs and a fly-in-fly-out work force that can disrupt previously tight-knit agricultural communities: Jamie Pittock, Karen Hussey and Samuel McGlennon, “Australian Climate, Energy and Water Policies: Conflicts and Synergies” (2013) 44 *Australian Geographer* 1, 3.

¹² L Young, “Hydraulic Fracturing (Fracking) in Australia” (2019) 36 EPLJ 277, 283 noting in the United States an energy mix of 63% natural gas, 31% renewable, and the remainder from coal fired power, pointing to similar trends in Australia; World Energy Council (WEC), *World Energy Resources, Unconventional Gas, a Global Phenomenon* (WEC, 2016); Standing Council on Energy & Resources, *The National Harmonised Regulatory Framework for Coal Seam Gas* (Australian Government, 2013).

¹³ Cameron Holley and Amanda Kennedy, “Governing the Energy-Water-Food Nexus: Regulating Unconventional Gas Development in Queensland, Australia” (2019) 59(2) *Jurimetrics* 233, 244; Andrea Walton et al, “Resilience in a Changing Community Landscape of Coal Seam Gas: Chinchilla in Southern Queensland” (2013) 3 *Journal of Economic and Social Policy* 3, 4.

¹⁴ Holley and Kennedy, n 13, 244; *Petroleum and Coal Seam Gas* (Business Queensland, 2019) <<https://perma.cc/FQ5Q-YS8G>>; Madeline Taylor and Tina Hunter, *Agricultural Land Use and Natural Gas Extraction Conflicts: A Global Socio-Legal Perspective* (Routledge, 2018).

¹⁵ The Scientific Inquiry into Hydraulic Fracturing in the Northern Territory, *Final Report of the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory* (NT, 2018). See also the recent consultation on a Regulation Impact Statement examining options to improve transparency in the eastern and northern Australian gas markets, COAG Energy Council, *Measures to Improve Transparency in the Gas Market – Consultation* (COAG, 2019) <<http://coagenergycouncil.gov.au/publications/measures-improve-transparency-gas-market-consultation>>.

energy resource is seemingly reaching a crossroads, with concerns over its own climate impacts¹⁶ giving rise to contentions that unconventional gas simply delays an urgent transition and misunderstands the magnitude of the environmental crisis facing humanity and many other species. Those concerned also point to the environmental impacts of unconventional gas exploration and production, including air pollution, noise and amenity concerns, risks of subsidence, changes in the use of food-producing land, water pollution, and reduced water availability.¹⁷

Such unrest has only added to the growing pursuit (from both private and public sectors) of renewable energy resources, not least solar and wind power. With the rapid development of new renewable and energy storage technologies, smart grids and distributed generation, the global transition to low-emission energy sources has seen many nations and their jurisdictions take advantage of emerging economic opportunities and governance. The transition pathways, however, have often been highly uneven and are sometimes blocked or redirected. Australia's national pursuit of renewables has largely relied on the Renewable Energy Target and investment in renewables (eg see Australian Renewable Energy Agency's investment and knowledge sharing activities, and recent plans to expand the Snowy Hydro scheme),¹⁸ while State governments have established additional schemes and targets (Queensland, for instance, has set a target to achieve 50% renewable energy by 2030 and seeks to transition to low-carbon energy sector under its Powering Queensland Plan).¹⁹ While these developments have achieved some success, as noted above, other (and often more established) energy sources also compete for attention as "transition" sources, including unconventional gas, but also nuclear (including the recent Inquiry into the prerequisites for nuclear energy in Australia),²⁰ and even coal where it is to be accompanied by new technologies, such as carbon capture and storage, and more recently, hydrogen.²¹ Moreover, as is increasingly becoming clear, the required scale of a renewable transition will not be impact free. Growing concerns have been raised about the effects of solar and wind farms on agriculture, biodiversity and water.²² For example, the increasing expansion of onshore and offshore wind farms as an alternative to coal-generated energy is creating flashpoints for conflict between renewable energy producers, biodiversity, endangered species,

¹⁶ Robert W Howarth, "Ideas and Perspectives: Is Shale Gas a Major Driver of Recent Increase in Global Atmospheric Methane?" (2019) 16 *Biogeosciences* 3033; John R Worden et al, "Reduced Biomass Burning Emissions Reconcile Conflicting Estimates of the Post-2006 Atmospheric Methane Budget" (2017) 8 *Nature Communications* 2227; Bryce Kelly et al, "Fugitive Methane Emissions from Natural, Urban, Agricultural, and Energy-Production Landscapes of Eastern Australia" (2015) 17 *Geophysical Research Abstracts* 1.

¹⁷ See, eg, Amanda Kennedy, *Environmental Justice and Land Use Conflict: The Governance of Mineral and Gas Resource Development* (Routledge, 2017); Cameron Holley and Darren Sinclair, "Rethinking Australian Water Law and Governance: Successes, Challenges and Future Directions" (2016) 33 *EPLJ* 275, 277; IEA, n 9, 2; Maria Comino, Poh-Ling Tan and David George, "Between the Cracks: Water Governance in Queensland, Australia and Potential Cumulative Impacts from Mining Coal Seam Gas" (2014) 23(6) *Journal of Water Law* 219; Kathryn Owens, "Strategic Regional Land Use Plans: Presenting the Future for Coal Seam Gas Projects in New South Wales?" (2012) 29 *EPLJ* 113; Hennie Coetzee and Louis J. Kotzé, "Shale Gas Development and Water in South Africa: Regulatory Aspects" in E Hollo (ed) *Water Resource Management and the Law* (Edward Elgar, 2017).

¹⁸ Australian Renewable Energy Agency (ARENA), *About* (Australian Government, 2019) <<https://arena.gov.au/about/>>; Department of the Environment and Energy, *Snowy 2.0 – Making Power More Affordable and Reliable* (Australian Government, 2019). For a recent discussion of the Mandatory Renewable Energy Target and related voluntary GreenPower schemes, see David Leary, "GreenPower and Renewable Energy: Consumer Protection, Trade Practices and Energy Market Regulation in Australia" (2019) 36 *EPLJ* 113.

¹⁹ Department of Natural Resources Mines and Energy, *Powering Queensland Plan* (Queensland Government, 2019) <<https://www.dnrme.qld.gov.au/energy/initiatives/powering-queensland>>.

²⁰ House of Representatives Standing Committee on the Environment and Energy, *Inquiry into the Prerequisites for Nuclear Energy in Australia* (Australian Government, 2019) <https://www.aph.gov.au/Parliamentary_Business/Committees/House/Environment_and_Energy/NuclearEnergy>.

²¹ On carbon abatement generally, see the Clean Energy Regulator, *Emissions Reduction Fund* (Australian Government, 2019) <<https://www.aph.gov.au/nuclearpower>>. For a discussion of other energy technologies and climate responses, see, eg, M Vella, "Waste to Energy or Waste of Energy: Social and Regulatory Barriers for Waste-to-Energy in Australia" (2019) 36 *EPLJ* 262; Jan McDonald et al, "Governing Geoengineering Research for the Great Barrier Reef" (2019) 19(7) *Climate Policy* 801.

²² See US Energy Information Administration, *Annual Energy Outlook* (US EIA, 2017) <<https://www.eia.gov/outlooks/aeo/pdf/0383%282017%29.pdf>>; Georgina Davis, "Planning and Siting Considerations for Renewable Energy: Agricultural Coexistence in Queensland, Australia" (2019) *EPLJ* (forthcoming).

agriculture and marine aquaculture.²³ As the former Australian Greens Party leader Bob Brown recently illustrated, these concerns have a long history in the environmental movement: “I cut my teeth on the Franklin campaign and that’s a renewable energy project that was stopped in 1982 ... my history is not simply against polluting power, but is also against inappropriate renewable energy projects where they have massive impacts on the environment, not least the living species”.²⁴ Contestations over new renewable developments are only likely to intensify, given estimates that renewables will require society to devote up to 1,000 times more land area to energy production than today.²⁵ While enormously beneficial for reducing carbon emissions, renewables at this scale may have equally enormous impacts on the many other sectors that have a close nexus with energy.²⁶ Nerini et al’s recent analysis of global energy goals suggests as much, with their work identifying at least 60 tradeoffs and 140 connections with the many diverse targets of the 2030 Sustainable Development Agenda.²⁷

How then should we facilitate transitions to low-carbon energy systems in a way that can provide accessible, reliable and affordable supplies of energy, while minimising impacts on ecosystems and the environment? Given the complexity of these challenges, it is unsurprising that the response has been equally multifaceted and polycentric. At international, regional, national and local levels, governments, corporations and non-government organisations are increasingly participating in energy transition processes that can be thought of as exemplifying “governance laboratories” that represent lived and real-time experiments in what works and what does not.²⁸ It is from these experiments that this Special Issue seeks to learn and bring to light law and governance insights, including the management of concerns and contests of different interests affected by energy transitions.

This Special Issue comprises a selection of nine articles from scholars who participated in the second annual “Rethinking Law in a Nexus Future” PLuS Alliance workshop series entitled *Energy Transitions: Governing Unconventional Gas, Renewables and the Energy-Environment Nexus*.²⁹ The PLuS Alliance is a collaborative relationship between Arizona State University, Kings College London, and the University of New South Wales (Sydney). Building on the inaugural workshop in 2018, which examined the challenges and opportunities surrounding the intersection of laws governing the energy–water–food nexus,³⁰ this second collaboration brought together professionals and scholars from the Alliance and around the world to discuss the challenges and opportunities surrounding the intersection of laws governing energy transitions and their environmental impacts. The articles selected for this issue were presented, discussed, and critically evaluated at the workshop. They consider a host of issues including emerging international

²³ See Robin Kundis Craig, “Harvest the Wind, Harvest Your Dinner: Using Law to Encourage an Offshore Energy-Food Multiple-Use Nexus” (2018) 59(1) *Jurimetrics* 61.

²⁴ Quoted in R Bolger, “Bob Brown Calls for ‘Moderation’ on Renewable Energy Proposals”, *SBS News*, 16 July 2019 <<https://www.sbs.com.au/news/bob-brown-calls-for-moderation-on-renewable-energy-proposals>>.

²⁵ Smil quoted in P Voosen, “Meet Vaclav Smil, the Man Who Has Quietly Shaped How the World Thinks about Energy” (2018) *Science*, 21 March 2018 <<https://www.sciencemag.org/news/2018/03/meet-vaclav-smil-man-who-has-quietly-shaped-how-world-thinks-about-energy>>; P Voosen, “The Realist” (2018) 359(6382) *Science* 1320. For other views see, Arnulf Grubler et al, “A Low Energy Demand Scenario for Meeting the 1.5°C Target and Sustainable Development Goals” (2018) 3 *Nature Energy* 515, noting that down-sizing the global energy system dramatically improves the feasibility of a low-carbon supply-side transformation.

²⁶ Rhett Larson, Cameron Holley and Diana Bowman, “The Energy-Water-Food Nexus: An introduction” (2018) 59(1) *Jurimetrics* 1; Lauren Butterly, “Fishing for Rights: The Water-Food Nexus and Indigenous Fishing in Australia’s Northern Territory” (2018) 59(1) *Jurimetrics* 43.

²⁷ Francesco Fuso Nerini et al, “Mapping Synergies and Trade-Offs between Energy and the Sustainable Development Goals” (2018) 3 *Nature Energy* 10.

²⁸ Claudia Pahl-Wostl, *Water Governance in the Face of Global Change* (Springer, 2015) 267; Gráinne De Búrca, Robert O. Keohane and Charles Sabel, “New Modes of Pluralist Global Governance” (2013) 45 *New York University Journal of International Law & Politics* 723.

²⁹ The workshop was held on 5–6 February 2019 at UNSW Law and Baker McKenzie, Sydney. Additional papers from the workshop will appear in later volumes of the EPLJ, including Samantha Hepburn, “Ownership and Royalty Sharing for Landowners Affected by Onshore Coal Seam Gas Development” (2019) EPLJ (forthcoming); Darren Sinclair and Larissa Schneider, “The Role of Mercury Emissions in Transitioning from Coal Fired Power Stations” (2019) EPLJ (forthcoming); Davis, n 22.

³⁰ See *Rethinking Law in a Nexus Future: Governing Energy, Water, Food, and Climate Challenges – Part I and II in Jurimetrics* (2018) 59(1) and (2019) 59(2). For an overview of the papers see Larson, Holley and Bowman, n 26.

initiatives for tackling energy transitions and the ability of international environmental law and the Paris Climate Agreement of 2015 to facilitate an urgent transition to an alternative, de-carbonised, and more sustainable global energy paradigm.³¹ Scrutiny is also given to the growing prominence of corporate law tools and shifts in the role of the private sector from being incumbents inclined to block change, to potential new fulcrums of energy transition governance.³² The remaining papers in the Special Issue critically examine the most major energy transition experience to date, zooming in on the boom in unconventional gas development over the preceding 10 years.³³ Comparing and contrasting significant legal and regulatory developments and on ground experiences of unconventional gas in Australia and internationally, the articles drill down into moral complicity, climate change and gas exports,³⁴ the use (and absence) of strategic planning regimes in the United States,³⁵ as well as the management of unconventional gas in transboundary contexts such as the Delaware River Basin in the United States, the Guarani Aquifer in South America and the Great Artesian Basin in Australia.³⁶ Federal and State regulatory regimes in Texas, Colorado, Queensland and New South Wales are also explored through lenses of regulatory capture,³⁷ cumulative effects³⁸ and risk management.³⁹ Finally, the potential for governing through new informational tools that quantify the water use of unconventional gas relative to other renewable and non-renewable energy sources is considered.⁴⁰ This collection of papers seeks to learn how law and governance has and should manage energy transitions and their environmental impacts, as well as explore ongoing governance challenges and opportunities in this complex and contested space as we move further into the Anthropocene.⁴¹ Ultimately, we hope the insights and questions raised in this Special Issue will encourage an ongoing dialogue, research and collaboration on the critical and interconnected issues surrounding energy transitions and the energy–environment nexus.

While it is difficult to summarise the range of responses and contexts examined across the articles contained in this Special Issue, below we attempt to identify intersecting themes, which have important implications for how law and governance scholars might approach thinking about and creating arrangements for governing energy transitions and their environmental nexus. We turn to these issues by exploring two core questions:

- what has been the role of law in governing energy transitions; and
- what law and governance mechanisms might be needed to better govern energy transitions and their nexus with the environment?

³¹ Louis J Kotzé, “International Environmental Law and the Anthropocene’s Energy Dilemma” (2019) 36(5) EPLJ 437.

³² Peel et al, “Governing the Energy Transition: The Role of Corporate Law Tools” (2019) 36(5) EPLJ 459.

³³ For an earlier analysis of Australia’s CSG Laws see EPLJ Special Issue on the regulatory responses of the Commonwealth, Queensland and New South Wales governments to concerns about CSG developments. Rosemary Lyster, “Coal Seam Gas in the Context of Global Energy and Climate Change Scenarios” (2012) 29 EPLJ 91; PL Tan, D George and M Comino, “Cumulative Risk Management, Coal Seam Gas, Sustainable Water, and Agriculture in Australia” (2015) 31(4) *International Journal of Water Resources Development* 682.

³⁴ J Moss and E Walsh, “Complicity in Climate Harms: A Case Study of Australia’s Gas Export Industry” (2019) 36(5) EPLJ 477.

³⁵ Mark Squillace, “Smart Planning for Unconventional Oil and Gas Development” (2019) 36(5) EPLJ 489.

³⁶ Rhett B Larson, “Fracking and Transboundary Water Management” (2019) 36(5) EPLJ 502.

³⁷ Holley et al, “Shaping Unconventional Gas Regulation: Industry Influence and Risks of Agency Capture in Texas, Colorado and Queensland” (2019) 36(5) EPLJ 510.

³⁸ Rebecca Nelson, “Big Time: An Empirical Analysis of Regulating the Cumulative Environmental Effects of Coal Seam Gas Extraction under Australian Federal Environmental Law” (2019) 36(5) EPLJ 531.

³⁹ Katherine Owens, “Coal Seam Gas Regulation in New South Wales: Drawing the Connections Between Risk, Communication and Trust” (2019) 36(5) EPLJ 552.

⁴⁰ Wendy A Timms, Sudeep Nair and Rebecca Nelson, “More Joules per Drop – How Much Water Does Unconventional Gas Use Compared to Other Energy Sources and What Are the Legal Implications?” (2019) 36(5) EPLJ 565.

⁴¹ See Cameron Holley et al, “Environmental Security and the Anthropocene: Law, Criminology, and International Relations” (2018) 14 *Annual Review of Law and Social Sciences* 185.

THE ROLE OF THE LAW IN GOVERNING ENERGY TRANSITIONS

A central theme aim this Special Issue is to explore how far have we come in our understanding and thinking about the role of law in governing energy transitions, and in particular, whether existing instruments and institutions have been effective in facilitating transitions that are environmentally sustainable. The opening article from Kotzé, entitled “International Environmental Law and the Anthropocene’s Energy Dilemma”, offers a bleak assessment of the complacency and complicity of international environmental law in stalling energy transitions, arguing that international environmental law has both promoted unsustainable energy use, and failed to actively facilitate a global energy transition.⁴² He notes five ways in which international environmental law has created and sustained this so-called energy dilemma: the prevailing neoliberal anthropocentrism of the law; the entanglement of international environmental law with colonialism; the entrenchment of State sovereignty in international environmental law; the lack of an Earth systems approach; and the lack of contribution to normative thinking around renewable and sustainable energy transformations.

These threads are picked up in different ways by the other contributors to this volume, who variously assess the effectiveness of existing law and governance mechanisms in responding to the production of energy sources in specific jurisdictional contexts. The inherent anthropocentrism and neoliberalism observed in international environmental law, which Kotzé argues has led to the present situation of energy over-consumption, is echoed in many State regulatory approaches which objectify the environment and prioritise development. For example, as Peel, Foerster, McDonnell and Osofsky observe in “Governing the Energy Transition: The Role of Corporate Law Tools”, governments the world over continue to advocate for fossil fuel development, creating a climate policy disconnect and widening the gap between pledged emissions reductions and the reality of the cuts required. As noted further below, Peel et al discuss the growth of corporate law as a means through which energy transitions can be governed. However, as they argue, motivating corporate behaviour to go beyond what is dictated by private interests – even enlightened self-interested – will likely require clearer signals from regulators and governments on the overall direction of climate policy development. To date, such signals have been lacking in Australia, due to limited regulatory controls on corporate emissions and governments’ reluctance to embrace mandatory climate risk disclosure requirements.

In “Complicity in Climate Harms: A Case Study of Australia’s Gas Export Industry”, Moss and Walsh go further, arguing (at least in the case of Australia) that the present energy policy setting – with its emphasis on high-volume export supply of natural gas – represents a “problematic and inadequate” response to climate change that creates a moral culpability for harm. In particular, the power of influence that both governments and industry have on shaping energy policy is identified as contributing significantly to the risk of climate harm.

Kotzé’s and others explication of the weaknesses of siloed and sectoral governance of energy development also found traction with other contributors. In “Smart Planning for Unconventional Oil and Gas Development”, Squillace notes that segmented and reactive law and regulatory approaches to oil and gas development assessment have failed to quell community concerns and resolve ongoing environmental challenges. Meanwhile, in “Fracking and Transboundary Water Management”, Larson notes the risks of transboundary impacts from fracking upon water resources, and draws out some of the difficulties that can arise where one State (national or international) has greater power to set the governance agenda over shared resources. These contributions each indicate that where governance mechanisms fail to capture the realities of Earth system interconnectivity – its interlinked ecological and social components, and their spatial and temporal dynamics – they are destined to keep the planet on an unsustainable trajectory. In response, Larson takes inspiration from Australia and the Americas to lays out possible roles for the law and governance of sustainable transitions in unconventional gas, including establishing or promoting a fiduciary relationship between transboundary member States and the use of

⁴² For further discussion on innovations in international law see, Neil Craik et al (eds), *Global Environmental Change and Innovation in International Law* (CUP, 2018).

trusts to pay for remediation for transboundary contamination of connected water supplies or lowered water tables.⁴³

Holley, Mutongwizo, Shearing and Kennedy, in “Shaping Unconventional Gas Regulation: Industry Influence and Risks of Agency Capture in Texas, Colorado and Queensland”, offer an empirical analysis of unconventional gas regulation in these jurisdictions, and find evidence that even perceptions of industry influence can hamper the effectiveness of efforts to use the law to regulate energy transitions. In a similar vein, several of the respondents in Holley et al’s research point to the long-term legacies evident within particular State legal responses to energy transitions, which have entrenched institutional inertia and further instilled a preference for industry over environmental and social concerns. In terms of lessons for governing energy transitions, this raises questions around the capacity for existing governance systems to break free of the historical vestiges of resource exploitation and economic growth, in order to confront emerging risks as well as opportunities.

Kotzé’s final charge against international environmental law’s failure to confront the socio-ecological impacts of the current fossil fuel-intensive energy paradigm is its apathy towards normative action around energy transitions. Filtering down to the State level, there is certainly evidence that normative ambition is lacking; one need look no further than the failure to translate the rhetoric from the SDGs into binding and meaningful international and national laws and regulations. Nelson’s “Big Time: An Empirical Analysis of Regulating the Cumulative Environmental Effects of Coal Seam Gas Extraction Under Australian Federal Environmental Law”, highlights the “short-sightedness” of the relevant regulatory regime and how principles of ecologically sustainable development – such as intergenerational equity and the precautionary principle – get “lost in translation” as narrow interpretations of the temporal impacts of development in cumulative assessment mechanisms both fail to appreciate prior harms, and underestimate future risks. Likewise, Owens, in “Coal Seam Gas Regulation in New South Wales: Drawing the Connections Between Risk, Communication and Trust”, highlights how a governance system which retrofitted existing regulatory frameworks and was largely geared towards the exploitation of resources, ultimately failed to meet the contemporary challenges presented by emerging energy technologies of unconventional gas. This echoes some of Kotzé’s observations around the influence of colonialism and permanent State sovereignty over natural resources upon international environmental law. As he notes, “[a]s long as cheap fossil fuels are available to exploit, and as long as corporations prop up state coffers in doing so, there are few incentives for governments to force corporations to restrict their activities or to shift their focus to renewable resources instead”.⁴⁴ Taking a slightly different tack, Timms, Nair and Nelson, in “More Joules Per Drop – How Much Water Does Unconventional Gas Use Compared to Other Energy Sources and what are the Legal Implications?”, suggest that a lack of reliable data on water and energy use constrains opportunities for innovation in assessing energy policy mixes, arguing that movement beyond “business-as-usual” approaches opens up new ways of seeing problems as well as possible solutions.

Overall, the contributors to this volume emphasise that, despite various attempts, the law – at both national and international levels – has struggled to make sufficiently swift and widespread inroads towards a low-carbon and sustainable transition. Certainly, in the case of unconventional gas, which was initially lauded as a “bridge” to low-carbon energy solutions, the law has arguably acted to facilitate development; in many instances, it has had less concern for longer-term transitional goals, and has failed to attend to the complex socio-environmental concerns that have arisen. While some have argued that the recent levelling of global emissions from the burning of fossil fuels is a sign that climate mitigation policies and investments are beginning to bear fruit, far more urgent efforts are arguably required to actively “bend the greenhouse-gas emissions curve downwards”.⁴⁵ Some have suggested this must

⁴³ For a related discussion on transboundary issues for rivers and groundwater see Rhett B. Larson, “Colorado River Lessons for International Water Law” (2018) 59(1) *Jurimetrics* 83; Sharon B Megdal and Jacob D Petersen-Perlman, “Decentralized Groundwater Governance and Water Nexus Implications in the United States” (2018) 59(1) *Jurimetrics* 99.

⁴⁴ Louis J Kotzé, “International Environmental Law and the Anthropocene’s Energy Dilemma” (2019) 36(5) *EPLJ* 437.

⁴⁵ C Figueres et al, “Three Years to Safeguard Our Climate” (2017) 546 *Nature* 593.

include a significant increase in legal designs and incentives that foster renewable energy sources, and no further approval of coal-fired power plants beyond 2020 (with existing ones being actively retired).⁴⁶ The achievement of such aims will require a “deep integration”⁴⁷ of knowledge from not only science, but social science, in order to effectively shift human behaviour towards respecting planetary boundaries, and perhaps even a more radical rethink of a more responsive, more pluralist, and more ecological makeover of the governance system as a whole.⁴⁸

WHAT LAW AND GOVERNANCE MECHANISMS MIGHT BE NEEDED TO BETTER GOVERN ENERGY TRANSITIONS AND THEIR NEXUS WITH THE ENVIRONMENT?

Finding that the law, in its present shape, is falling short in facilitating desired energy transitions, the majority of the articles argue for law and governance reform to better achieve swift transitions, while managing their environmental impacts. However, there was less agreement among our authors on the optimal responses to this challenge. Broadly speaking, at least three themes for improving the governance of energy transitions were evident across the articles – some proposed the direct force of the law to command radical transitions, others argue the key for achieving lower carbon and more environmentally sustainable transitions lies with private and non-government governors (sometimes enhanced through the use of law), while a third and final grouping emphasise the importance of governance responses prioritising ongoing learning, data collection, sharing and transparency. These themes are not mutually exclusive, and sometimes overlap, however they usefully point towards possible reform directions.

First, for at least some of the contributors, governments and the law should more directly steer desired change. Moss and Walsh, for example, advocate for either a rapid phasing out of Australia’s gas export industry, or having the industry accept responsibility for the consequences of its actions through offsets, and preferably, both. The implications of extreme supply-side measures – such as an immediate restriction of supply – would no doubt prove problematic, at least in the current political climate. Even so, Kotzé broadly agrees with Moss and Walsh, arguing for analogous extensive reforms to address the shortcoming of international environmental law in governing energy transitions, not least rethinking its neoliberal anthropocentric orientation, its embedded colonial legacies and its lack of an Earth systems approach. Peel et al also express a desire for a stronger normative role for law, arguing that corporate law tools are only likely to make a more substantial contribution to energy transition governance where a robust public regulatory framework for greenhouse-gas emissions reduction acts as a complementary regime.

Overlapping with this line of thought, the second theme for reform argues for expanded and new roles for non-traditional governors. For some, legal reform is needed to more meaningfully engage non-government stakeholders in decision making. Squillace, for example, outlines a process of “smart planning” for unconventional oil and gas development, alluding to the concept of “smart regulation”.⁴⁹ He proposes that key issues, such as the siting of well pads and infrastructure, the management of water resources, and the control of air emissions, must be carefully scrutinised through public environmental impact assessment processes which effectively and meaningfully engage the community. Owens makes a similar point, noting the need for explicit consideration to be given to broader governance reforms that give those who are sceptical of government and unconventional gas companies a voice, so as to initiate, criticise and action particular steps in the “risk-handling process”.

⁴⁶ Figueres et al, n 45; Australian Panel of Experts on Environmental Law, *Energy Regulation* (Technical Paper 5, 2017).

⁴⁷ Will Steffen et al, “Trajectories of the Earth System in the Anthropocene” (2018) 115(33) *Proceedings of the National Academy of Sciences* 8252.

⁴⁸ Christine Parker, Fiona Haines and Laura Boehm, “The Promise of Ecological Regulation: The Case of Intensive Meat” (2018) 59(1) *Jurimetrics* 15; Janice Gray, “Ecological Integrity as an Alternative Frame for the Water, Unconventional Gas, and Food Nexus” (2019) 59(2) *Jurimetrics* 193.

⁴⁹ Neil Gunningham, Peter Grabosky and Darren Sinclair, *Smart Regulation* (OUP, 1998).

Beyond utilising law to expand stakeholder involvement, other articles draw on private and new governance trends⁵⁰ to argue that non-state actors must play key roles in energy transition governance.⁵¹ Peel et al's article is emblematic of this line of thinking. As national government and international efforts under the Paris Agreement fall short of greenhouse-gas mitigation, they note that the next wave of climate action will necessarily be motivated beyond government, and the corporate realm provides an effective avenue of private climate governance. In particular, they discuss the potential for business risk disclosure requirements, director's duties and shareholder rights to influence company behaviour around climate risk and energy transition. While there are some limitations to such approaches, most notably the abovementioned need for surrounding regulatory and policy contexts to place greater pressure on companies, they clearly document how directors are keenly feeling the pressure to be proactive on climate risk. Holley et al also recognise significant potential for reconfiguring partnerships between industry, government and society, not least because of the recognised vulnerabilities of State regulatory arrangements in governing unconventional gas. They explore the potential for strategic leveraging of community pressure on companies' social licences and expanding the scope of private agreements to offset power imbalances (eg to facilitate information and resource sharing). Timms et al complement these suggestions, identifying opportunities for corporations to facilitate energy transitions through linking water issues, energy issues, and environmental awareness via a joules per drop rating that may influence consumer behaviour.

The third and final set of recommendations focuses on improving learning and the collection, sharing and transparency of data. Echoing calls from the first PLuS Alliance workshop to investigate learning and information-generating processes for energy–water–food nexus problems,⁵² a range of articles offer insights on tools and areas of need. For instance, Peel et al consider the role of information-generating processes (including ensuring appropriate disclosure regarding climate change risks) in the corporate sphere, noting the fundamental role law plays in establishing disclosure rules to help advance acceptance and practice of climate risk as a material business risk, and the need for disclosure by many companies. Timms et al, pointing out the “hidden flow of water” in the use of electricity, propose a rethink of how data on water use could provide a better understanding of the water-related risks of energy. They detail a wide range of potential law and policy contexts throughout different law-related stages of an energy development that might be informed by a joules per drop analysis, including investment-related decisions about specific energy projects, environmental impact assessments and water entitlement applications, water-related risks during the operation of the project and consumers energy purchase options. As they argue, existing levels of public concern about unconventional gas water use may lay the foundation for broader political acceptability of incorporating a joules per drop approach in energy-related decision-making contexts more broadly.

Owens similarly highlights the importance of data transparency to effective energy transition governance, pointing to the “close connection between risk communication and public trust” and calling for processes of consultation and deliberation needed to facilitate information flows and mutual learning between disparate stakeholder groups affected by energy developments. Sharing and diffusing information among multiple stakeholders, both for better governance and accountability, was similarly endorsed by Holley et al, who draw on democratic experimentalist scholarship⁵³ to characterise the energy space as an area ripe for spreading learning, ratcheting up performance of diverse State regulatory regimes and potentially lessen vulnerabilities to industry influence.

⁵⁰ Michael P Vandenburg, “Private Environmental Governance” (2013) 99 *Cornell Law Review* 129; Cameron Holley, Neil Gunningham and Clifford Shearing, *New Environmental Governance* (Earthscan, 2012).

⁵¹ See also Darren Sinclair, “Speak Loudly and Carry a Small Stick: Prudential Regulation and the Climate, Energy, and Finance Nexus” 59(2) *Jurimetrics* 141. See also discussions of the need for more collaborative approaches to energy governance in Holley and Kennedy, n 13. On the importance of engaging non-traditional actors, see Emily Hammond, “The Energy In-Betweens” (2019) 59(2) *Jurimetrics* 167.

⁵² Larson, Holley and Bowman, n 26.

⁵³ For a general discussion see James Bohman, “Democratic Experimentalism” (2013) 29 *Social Philosophy Today* 7; De Búrca, Keohane and Sabel, n 28.

Larson places equal importance on facilitating information exchange between jurisdictions (eg a fate-and-transport model to evaluate potential transboundary impacts from fracking operations) as well as functions such as dispute resolution and mediation to achieve more holistic forms of energy governance. Central to these and other energy governance processes, as Nelson stresses, is the need for greater information regarding the cumulative effects of certain energy technologies and industries. Importantly, Nelson draws attention to the *very* long-term nature of the losses that are potentially incurred by future generations as a result of unconventional gas (and indeed other energy) projects, and the desirability of spending a relatively short time up-front to best understand these effects. Squillace's proposed reforms in the United States context complements Nelson's approach, as he argues for the adoption of adaptive management techniques.⁵⁴ This would involve investment and obligations for post-decision monitoring to ensure that the impacts that were predicted at the time of energy decision-making are largely the impacts that actually occur, and further, that the impacts that do occur do not cause any more harm to the public and the environment than was anticipated. To the extent that the new data from monitoring indicates that the original assumptions, or the conclusions from those assumptions, were wrong, the initial decision must be adjusted in a timely fashion to reflect the new information. As he explains, such a "learning by doing" approach is especially useful and effective in the context of large-scale planning decisions for energy developments because large-scale plans are inherently more flexible in terms of accommodating post-decisional change.

In summary, as calls for swift energy transitions increase, the need for greater learning about what works and what does not, as well as how to manage the critical nexus linkages between energy and other sectors will no doubt require us to further explore such adaptive and whole-of-system approaches involving mixes of direct government law, private and non-state governors. The papers in this EPLJ Special Issue help advance this thinking and lay out a research agenda for us and others to consider, learn from and enhance opportunities for better governing energy transitions and their environmental nexus.

⁵⁴ See, eg, Barbara Cosens et al, "The Adaptive Water Governance Project: Assessing Law, Resilience and Governance in Regional Socio-Ecological Water Systems Facing a Changing Climate: Introduction to NREL Edition of the Idaho Law Review" (2014) 51 *Idaho Law Review* 1; J Lee, "Theory to practice: Adaptive Management of the Groundwater Impacts of Australian Mining Projects" (2014) 31 EPLJ 251.