

ENVIRONMENTAL AND PLANNING LAW JOURNAL

Volume 36, Number 5

2019

EDITORIAL

Governing Energy Transitions: Unconventional Gas, Renewables and Their Environmental Nexus – *Cameron Holley, Amanda Kennedy, Tariro Mutongwizo and Clifford Shearing* 427

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International Environmental Law and the Anthropocene’s Energy Dilemma – *Louis J Kotzé*

This article attempts to reveal the structural complicity of international environmental law (IEL) in causing and exacerbating the Anthropocene’s socio-ecological crisis and its attendant energy dilemma. It further shows how IEL is unable to address this dilemma and to contribute to a full-scale transition to renewable and sustainable energy resource alternatives that respect Earth system integrity and that are accessible to everyone on equal terms. The discussion commences with a critical reflection on the Anthropocene’s energy dilemma and its associated socio-ecological crisis and patterns of injustice and inequality. It then turns its focus to five specific areas of concern that reveal IEL’s entanglement with the rise of Anthropos, its mastery of energy, and the resultant unjust socio-ecological order. These concerns include: IEL’s neoliberal anthropocentrism; IEL’s entanglement with (neo)colonialism; IEL’s entrenchment of State sovereignty and the sovereign right to exploit energy resources; IEL’s lack of an Earth system approach; and IEL’s normatively unambitious contribution to renewable, sustainable energy transformations. 437

Governing the Energy Transition: The Role of Corporate Law Tools – *Jacqueline Peel, Anita Foerster, Brett McDonnell and Hari M Osofsky*

Conventionally the private sector has been considered a barrier to effective energy transition governance. However, in the wake of the 2015 Paris Agreement, a range of international initiatives have emerged that focus on enhancing the positive role of the private sector in energy transition governance. These developments reinforce a gradual international shift in the business community to view climate change in financial risk terms. Climate change seen as a matter of financial risk for corporations, and for the large institutional investors who invest in them, has the potential to engage corporate law tools, such as requirements for risk disclosure, shareholder actions and the fiduciary duties of company directors. This article explores the potential, and limitations, of such corporate law tools to drive private sector action on sustainable energy transition. The article draws on empirical research examining business perceptions and practices relating to climate risk management and promotion of clean energy sources. Although there are promising signs of a more serious consideration of climate risk in business decision-making, corporate practices around climate risk disclosure, and shareholder and board engagement with clean energy issues, remain highly variable and in flux. If corporate law tools are to make a more substantial

contribution to energy transition governance, they will likely need to be complemented by a robust regulatory framework for greenhouse gas emissions reduction. 459

Complicity in Climate Harms: A Case Study of Australia’s Gas Export Industry – J Moss and E Walsh

Australia is currently the World’s second largest exporter of gas. The GHG emissions produced from exported gas add significantly to the risk of climate change. Yet according to current international conventions, fossil fuel-exporting States such as Australia are not liable for any of the harms to which their exported fossil fuels contribute. This article argues that the current “territorial” model for allocating responsibility for climate harms is inadequate and that fossil fuel-exporting States ought to be responsible for at least some of the harms to which their exported fossil fuel emissions contribute. Part II outlines the extent of Australia’s gas export industry. Part III describes an account of complicity drawn from legal and moral philosophy and applies it to the case of Australia’s gas export industry. Part IV discusses two ways in which gas use constitutes significant harm. The article closes by considering the policy implications of these moral arguments (Part V). 477

Smart Planning for Unconventional Oil and Gas Development – Mark Squillace

Notwithstanding persistent concerns about fossil fuel development and climate change, oil and gas development remains a significant player in the global energy economy, and is likely to remain so for at least the next decade or two. Methods for extracting oil and gas, however, have evolved, placing a particular focus on unconventional development. Unconventional development generally involves drilling low permeability formations horizontally and then fracking the horizontal well bore to release the oil and gas contained in the formations. Unconventional development offers significant potential advantages over conventional development because it affords substantial flexibility as to where you place the well pad and because multiple wells can be drilled from a single pad. This flexibility can be used to make development more efficient while at the same time dramatically lowering environmental costs, including greenhouse gas emissions. Unfortunately, these advantages are often lost because developers are impatient and regulators tend to simply react to industry proposals for development rather than demanding advance planning. Smart planning of oil and gas development asks regulators to be proactive. Rather than responding to a particular proposal to drill a well, the regulator should first ask whether other wells are likely to be proposed for the region, and how multiple wells might best be developed to promote both efficiency and environmental protection. This article offers a detailed assessment of how smart planning of unconventional oil and gas development can be good for both the industry and the environment. 489

Fracking and Transboundary Water Management – Rhett B Larson

Hydraulic fracturing (“fracking”) presents challenges for water management, both in terms of water supply and water quality. These challenges are compounded when the water sources impacted by fracking operations cross political boundaries. This article describes three cases of inter-jurisdictional water governance institutions managing impacts from fracking operations: (1) the Delaware River Basin Commission in the United States comprised of States sharing the Delaware River; (2) the Guarani Aquifer Treaty Commission comprised of four countries sharing the Guarani Aquifer in South America; and (3) the Great Artesian Basin Coordinating Committee in Australia, comprised of States sharing the Great Artesian Basin. This article then draws lessons from these cases for managing the impacts of fracking across political boundaries, and the role of such institutions in facilitating a transition from a hydrocarbon-based energy economy to a renewable one. 502

Shaping Unconventional Gas Regulation: Industry Influence and Risks of Agency Capture in Texas, Colorado and Queensland – *Cameron Holley, Tariro Mutongwizo, Clifford Shearing and Amanda Kennedy*

Unconventional gas has quickly become a significant energy resource and a site of contestation over the nature and outcome its regulatory processes. Central to this contest are issues of power and capture and the implications for achieving sustainable energy regulation. The influence of dominant industry players can be a serious obstacle for transitions beyond established energy regimes, and can negatively affect the sustainability of energy policy and implementation. Drawing on interviews across three case studies in Texas, Colorado and Queensland, this article examines perceptions of unconventional gas regulators and regulations. It finds a general view from interviewees that economic interests within the unconventional gas industry have influenced regulation, and that this influence is a significant explanation for the failures of regulation and policy to address a number of environmental and societal concerns. Variations are identified between the cases in terms of the extent of possible industry influence, but all three cases reveal common points of vulnerability, including economic arrangements, suboptimal organisational structures, expertise imbalances, limited agency funding and “revolving doors” of staff. The findings suggest that fully addressing these challenges through law alone will be difficult, and instead highlights three governance pathways that could be pursued beyond state law to achieve more effective and sustainable unconventional gas governance. 510

Big Time: An Empirical Analysis of Regulating the Cumulative Environmental Effects of Coal Seam Gas Extraction under Australian Federal Environmental Law – *Rebecca Nelson*

The cumulative environmental effects of coal seam gas (CSG) extraction are a notable challenge in regulating the transition to a more sustainable energy future. Federal legislation was introduced in 2013 to address concerns about the effects on water resources of CSG extraction, but the effectiveness of this five-year-old federal regime remains unclear. This study empirically analyses the ways in which CSG projects assessed under this federal “water trigger” legislation have considered cumulative environmental effects, with an emphasis on elements related to time. By highlighting key gaps in how cumulative effects are considered in practice under the water trigger, it aims to sharpen the attention of regulators on issues requiring additional legislative and policy guidance, and the attention of stakeholders in general on potential areas for greater attention in meeting the regulatory intentions underlying the legislation. 531

Coal Seam Gas Regulation in New South Wales: Drawing the Connections Between Risk, Communication and Trust – *Katherine Owens*

Australia is poised to become the world’s largest gas exporter, but the role of gas in Australia’s domestic energy mix is uncertain. Coal seam gas (CSG) has failed to gain a social licence in New South Wales, where there has been an erosion of trust in both the CSG industry and government, and a lack of data and evidence justifying the safety of CSG activities. The New South Wales government has attempted to restore public confidence through the measures contained in its 2014 Gas Plan, which was informed by the O’Kane Review. However, both the O’Kane Review and Gas Plan failed to demonstrate a clear theory of how a governance framework can promote and restore public confidence in a complex risk situation. Effective governance in this context must reflect the close connection between risk communication and public trust, and facilitate collective decision-making in the context of uncertain outcomes. This requires explicit consideration to be given to the role of various stakeholders in initiating, criticising and actioning particular

steps in the “risk-handling” process, and broader reforms to give those who are sceptical of government and CSG companies a voice and additional transparency. 552

More Joules per Drop – How Much Water Does Unconventional Gas Use Compared to Other Energy Sources and What Are the Legal Implications? – *Wendy A Timms, Sudeep Nair and Rebecca Nelson*

Water is critical to energy security. This article compares “joules per drop”, or the equivalent joules of energy per litre of water for selected energy sources that include unconventional gas and renewables. The volumes of co-produced water during coal seam gas operations for example vary by a factor of at least 100 between different geological basins. Yet, typical unconventional gas has a much higher “joules per drop” (up to 909 MJ/L) than that of solar thermal and biomass energy (only 8 and 0.02 MJ/L respectively). Optimizing the future portfolio of energy sources should include a goal of reducing the lifecycle of freshwater use. Potential law and policy applications arise throughout the different stages of an energy production project: from strategic decisions about a desirable energy mix, to assessments for granting environmental approvals and water entitlements, to providing information to consumers about the sustainability of their energy source. 565