Climate Law 3 (2012) 191–207
DOI 10.3233/CL-2012-063
IOS Press

Book reviews

Energy 2050: Making the Transition to a Secure Low-Carbon Energy System

Edited by Jim Skea, Paul Ekins and Mark Winskel

Earthscan, 2011, 381 pp. (incl. index), ISBN 978-1-84971-084-8

This book gathers contributions from members of the UK Energy Research Centre, in the context of a collaborative research project. It addresses the challenge of determining how the United Kingdom might meet its objective of reducing greenhouse gas emissions by 80 per cent by 2050. This target was included in the UK's 2008 *Climate Change Act*. Yet, significant changes are required in the UK energy sector if this ambitious target is to be respected. Further, the target is set in the context of a liberalized energy sector, controlled largely by private actors, and of a growing reliance in the UK on foreign energy sources. As such, the book also addresses the issue of energy security and resilience to "shocks". All of the chapter authors use the "scenario analysis" methodology to study various aspects of meeting the 2050 objective while enhancing energy security. A scenario is an imagined future with plausible and internally consistent drivers and developments. Scenarios are explored to assess how non-business-as-usual policies and other variables would impact the UK's energy future. The authors come from several disciplines and adopt an interdisciplinary approach. Scenario analysis is followed rigorously by each author, and the coherent, cohesive, and comprehensive structure of the book distinguishes it from many other collaborative works in the field.

While the volume is intended primarily for UK policymakers, it is relevant to other stakeholders in the UK energy sector interested in energy security and the promotion of renewable energy. The work will also be useful outside the UK, especially to domestic policymakers and law experts. Indeed, the analysis and recommendations that it details in the UK context should serve as an inspiration and model of best practice in other jurisdictions seeking a secure, resilient, and low-carbon energy future. Decarbonization of the energy sector is a daunting policy challenge, and crucial in the context of climate change. Energy is the lifeblood of modern economies, as well as societal lifestyles. The volume provides several realistic and attainable scenarios to decarbonize the UK energy sector, while also addressing the problem of energy security.

This represents an impressive analytical achievement, and the implementation of the work's recommendations will hopefully make a difference in the years ahead. However, a broader analysis of the international context for UK policymaking would have benefitted both the reader and the overall study. Specifically, the book does not provide the necessary detail on the UK's regional (EU ETS) and international (Kyoto Protocol) legal obligations, nor does it sufficiently analyse the impact of multinational corporations on domestic policymaking in the energy sector.

The introductory chapter by the editors sets the book's context and explains the analytical framework employed throughout. Chapters 2 and 3 focus on the current UK energy system in order to set the context for the scenario analysis. In particular, Chapter 2 (Skea, Xinxin Wang, and Winskel) analyses the UK energy sector in an era of globalization. The authors identify three key factors, namely the lack of growth in energy supply and demand, the recent decrease in CO_2 emissions, and the transition of the UK from energy sufficiency to being a net energy importer. A rising role for natural gas accompanied the liberalization of the energy sector in the UK in the 1980 s and 1990 s. Despite significant policy ambitions, renewable energy still plays a very small role in the UK's energy production, and consists mainly of large-scale hydropower. The authors review the current state of development of renewables in the UK, including nuclear energy. The overall picture appears to be one of "accumulating trends building slowly over time... punctuated by sometimes abrupt change" (p. 39).

Chapter 3, also written by the three editors, turns to institutions, and briefly reviews the evolution and role of UK institutions from the Second World War to the present. There are two key types of institution here: markets, and public institutions that make and administer policy. Six major corporations currently control most of the UK's energy supply, and are regulated by an institution called Ofgem. Ofgem plays a key role in managing the many laws and policies that impact the energy sector. Further, according to the authors, the conception of the energy sector as led primarily by private interests, which was central during the liberalization era, no longer reflects reality. Concerns regarding energy security and GHG emissions have hailed a new era of intervention and regulation. The chapter provides an excellent review of the existing legal framework in the UK. The authors also present a detailed list of current and proposed policy options for reducing GHG emissions and improving energy security. The chapter explains the prominent challenges, including the lack of rigour in policy implementation, lack of transparency in climate policymaking, and the risk of conflict between climate change and energy-security priorities.

Chapters 4, 5, and 6 form the core of the book, and describe the key scenarios for the UK's energy future. Chapter 4 (by Skea and six others) describes the framework for thinking about the technical, economic, and institutional feasibility of a low-carbon, resilient energy sector. The chapter sets out the "reference scenario", detailing the future of the UK's energy system under business as usual. All other scenarios developed in the book are compared against this one. The analysis focuses on domestic policies. The international drivers taken into account are mainly those that may cause "shocks" at the domestic level. As such, the reference scenario does not account for geopolitical influences, for example further developments in EU policy. The

methodology also tends to examine resiliency in terms of shocks more than long-term structural challenges. Overall, however, the strengths and weaknesses of the reference-scenario analysis are described transparently, and reflect a well-established and creative methodology. The reference scenario notably involves a growth in coal, due to its low cost, with a corresponding rise in CO_2 emissions. Under it, the UK would be almost entirely dependent on imports for its energy needs.

Chapter 5 (Ekins, with Gabrial Anandarajah and Neil Strachan) analyses scenarios leading to a low-carbon economy. The authors note the strong potential for decarbonizing the residential sector in the UK. The low-carbon scenarios face the challenge of preventing the re-emergence of coal as a dominant energy source by filling its place with nuclear- or renewable-energy sources. Carbon capture and storage is another option in the medium term to mitigate coal emissions. At present, CCS technology remains commercially untested in the UK. It therefore does not provide for the near-complete decarbonization of the power-generation sector necessary to meet the UK's 2050 goal. The authors emphasize that successful low-carbon scenarios involve the development of CCS (for coal), nuclear power, and energy from wind, especially offshore wind. The greatest policy challenge is to increase the deployment of renewables in the next decade, and to ensure that the full range of possible renewable technologies is explored.

Chapter 6 (Skea, Ekins, and four other authors) turns to an analysis of resilient energy scenarios for the UK. The authors note that many energy shocks relate to equipment failures and weather events, rather than political factors. Further, oil and gas shocks have a longer and graver impact than electricity shocks. The resilience scenarios emphasize that energy security entails both a reduction in the demand for energy through efficiency mechanisms and new technologies, and a diversification in energy supply. Notably, a decreased dependency on coal, oil, and gas, as well as a switch from coal to nuclear power and renewables is central to achieve diversification objectives. The authors elaborate on a "low-carbon resilience" scenario, which combines both low-carbon and energy-security objectives. It is quite distinct from both the earlier "low-carbon" and "resilience" scenarios, involving for example a greater oil demand due to the proliferation of hybrid vehicles. Overall, the authors highlight the importance of policies to improve energy efficiency in buildings and transport, and the need for new market arrangements that are conducive to attaining low-carbon objectives. One major concern regards welfare costs. All scenarios involve increased prices for energy, which will have a negative impact on the poor.

Chapters 7 to 9 address specific issues that are key to the scenario analysis for both low-carbon targets and energy security. Chapter 7 (Winskel and Skea, with Gabrial Anandarajah and Brighid Jay) considers the potential to accelerate development of several low-carbon technologies, especially offshore wind, CCS, nuclear power, and hydrogen fuel cells. They emphasize that besides the 2050 target, the UK has an EU-related renewable-energy target of 15 per cent of energy supply by 2020. Currently, renewables account for only 2.5 per cent of energy supply in the UK. Further, the liberalization of the energy sector in the 1980 s and 1990 s led to a decline in research and development, and a focus on short-term strategies and "asset sweating". Innovation in the energy sector is "now mostly developed by international networks of private firms and public sector organisations" (p. 193). The challenge is to overcome "the relative inertia and resistance

to change in energy systems" (p. 190). Accelerated technology development in the energy field requires strong and sustained investment in the context of an energy sector "locked in" to established high-carbon technologies. The scenario analysis reveals a strong effect of policies and investments aimed at accelerated technology development in the long term. As for the UK's 15 per cent target for 2020, the authors cast doubt over the country's capacity to meet it.

Small-scale energy generation in the residential sector could potentially become a significant source of low-carbon supply; it could leverage behavioural change and create awareness about people's interaction with the energy system. Chapter 8 (by six authors) emphasizes that the key factors here are the skills available for microtechnology installation, in addition to consumer psychology. A strong increase in microgeneration would require changes to building codes, as well as a range of policy instruments such as "white certificates". Chapter 9 (five authors) examines the relation between lifestyles and energy consumption. Lifestyles are challenging to quantify in a scenario analysis, as they involve many qualitative factors, such as norms, fashion, and identity. The factors are often non-rational, and are linked to opportunities or infrastructure rather than intent. The analysis here engages with detailed and transparent assumptions about lifestyle change in order to consider possible scenarios. Overall, the authors note that "consumers are often locked in to unsustainable patterns of living by a combination of perverse incentives, institutional structures, social norms and sheer habit" (p. 260). Proactive policies are therefore required to guide lifestyle choices, such as the availability of low-carbon community infrastructure and citizen-scale low-carbon technologies. An important finding of the lifestyle scenarios concerns the cost of decarbonization, which is decreased when coupled with lifestyle changes. Successful lifestyle-oriented policies could notably alleviate the welfare impact of energy prices, by decreasing overall demand and therefore cost.

Chapters 10 and 11 explore two aspects of importance to scenario analysis in the UK energy context, namely environmental and social impacts of energy policy beyond climate change, as well as key international drivers of energy policy. Chapter 10 (Winskel and five others) notes that the energy sector is responsible not only for CO_2 emissions but also for emissions of other pollutants as well as significant use of natural resources such as water. The "low-carbon resilience" scenario appears most effective at reducing pollutants, as it involves a decrease in energy consumption coupled with a greater use of hybrid vehicles. Energy policies also need to pay close attention to water and land-use issues. Further, the chapter develops several "socio-environmental sensitivity" scenarios in order to account for the social acceptability of possible decarbonization pathways. This is sensible as individuals might object to energy developments that have a direct effect on their lifestyle. The scenarios suggest that public acceptance has a significant impact on the financial and social cost of decarbonization, and highlight the importance of meaningful public engagement early in the process of decarbonization.

Chapter 11 (Neil Strachan and Skea) briefly explores three main international drivers of change for the UK energy sector: fossil-fuel prices, sustainable-biomass imports, and availability of CO_2 emission credits. The scenarios developed in this chapter indicate that rising fossil-fuel prices tend to decrease fossil-energy use, but with a complex trade-off between which fossil-fuel price

changes and when that change will have the greatest effect. The purchase of CO_2 credits gains importance in later years, when decreasing emissions from the remaining CO_2 emitters becomes more technically challenging and costly.

A concluding chapter by the editors provides a useful summary of the work's key points, and the challenges in moving ahead. Overall, the editors express hope that the book will help guide and inform political and social decision-making. The scenario analysis identifies several viable pathways to low-carbon development which would allow the UK to meet its 2050 goal while increasing energy security and resilience to shocks. The scenario analysis provides a valuable and creative projection into the future that accounts for uncertainties and imponderables while providing a solid basis for decision-making. "There is an urgent need for a large developed country to show that a low-carbon transition is consistent with economic competitiveness, energy security and a high quality of life" (p. 365). By accounting for technological, behavioral, social, economic, and (some) international factors, the volume provides a compelling and very useful toolkit for policymakers both in the UK and elsewhere.

Patrick Reynaud
Senior Manager
Centre for International Sustainable Development Law

The Earthscan Reader on Adaptation to Climate Change

Edited by E. Lisa F. Schipper and Ian Burton

Earthscan, 2008, 480 pp., ISBN 978-1-84407-530-0, £19.99

As is well known, two broad response strategies to climate change have found their way into the UNFCCC: mitigation and adaptation. Mitigation has received the bulk of attention in both science and policy. Adaptation is defined by the IPCC as the "adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities". Its relative neglect is largely due to what now seems to be the false hope of preventing climate change through mitigation—and the wish to not distract attention from mitigation efforts. The political sensitivity of the locus of responsibility for adaptation finance is another constraining factor. Furthermore, adaptation was expected to occur autonomously, that is, irrespective of climate projections and based on actual experience, and was considered to be a long-term strategy—as opposed to mitigation which demanded immediate action.

The increasing scholarly interest and international policy debate on adaptation that is evident today can be ascribed to various factors: climate change is already under way and is now recognized as being irreversible; vulnerability to the impacts of climate change is increasing due

to other factors such as population growth and poverty; and developing countries are demanding action ever more loudly.

The Earthscan Reader on Adaptation to Climate Change is conceived as a primer on the current state of adaptation studies. It offers an excellent collection of contributions from several disciplines reflecting trends in adaptation studies from the early 1990 s to the late 2000 s. While all of the material has been published before, a notable feature of the collection is its incorporation not only of scholarly articles and book chapters, but of UN and NGO meeting reports. The selection is rounded off with a comprehensive bibliography of further reading. By embracing a variety of scholarly perspectives, including from the development, disaster-risk, and climate-policy community, and by offering theoretical as well as practical approaches, the book enables a foray into the thicket of adaptation research.

The Reader is organized into five parts, each composed of three-to-five chapters. Part I gives an insight into adaptation theory and its concepts. A chapter by Barry Smit, Ian Burton, Richard Klein, and Johanna Wandel provides an overview of the amplitude of definitions of, and theoretical approaches to, adaptation, noting a lack of a common understanding of the concept among scholars. Instead of proposing a new definition, the authors attempt to establish an "anatomy of adaptation" for understanding and categorizing the variety of adaptive responses. In their proposed framework, adaptation is analysed into three elements: climate-related stimuli, the "system of interest", and the types of adaptive response. Then, adaptation options are evaluated based on criteria such as cost, benefit, equity, or efficiency. In another chapter, Ian Burton builds a bridge between theory and practice by analysing the current "adaptation deficit". He distinguishes between two categories of adaptation. Most adaptation so far has been "Type I", that is, adaptation strategy without consideration of climate change. "Type II" adaptation has been rare, according to Burton, due to uncertainty and lack of awareness. Instead of allocating international funding to "Type II" adaptation only, Burton calls for an integrated approach to assist both "Type I" and "Type II" adaptation strategy and to mainstream climate change into development activities.

In Part II of the Reader, adaptation is linked to the concepts of vulnerability and resilience. The chapter by Mick Kelly and Neil Adger provides a useful definition of "vulnerability" and its link with adaptation. They define vulnerability as the (in)ability of individuals or social groups to respond to, recover from, or adapt to external stress. An illustration of how the concept can be operationalized is provided by a case study from northern Vietnam where poverty, inequality, and institutional adaptation are identified as the key vulnerability indicators. Especially noteworthy is John Handmer and Stephen Dovers' exploration of the concept of resilience. They develop a three-tiered typology of resilience drawing from ecological theory (with its appreciation of heterogeneity) and risk theory (with its focus on institutional stability). Three types of response are thereby distinguished. "Type 1" is resistance to change, where stability of institutional structures is seen as an end in itself. "Type 2" involves change at the margins but does not challenge the basis of society. "Type 3" focuses on adaptability and addresses the underlying cause of environmental problems. While the response of most societies is currently Type 1

or 2, Handmer and Dovers call for a mix of all three approaches, with an emphasis on the third type.

Parts III and IV of the collection provide an insight into how adaptation is addressed in the research communities. Taking its cue from the fact that climate change increases disaster risk, Part III concentrates on the linkage between adaptation science and the scholarship on disaster-risk reduction. Handmer observes that the long-standing relationship between adaptation and natural-hazard research could well inform research on adaptation to climate change, as the problems faced are very similar. The summary of a meeting organized by the UNDP, which brought together researchers from the fields of disaster-risk reduction and adaptation, demonstrates that the current distance between the communities is artificial and a consequence of institutional fragmentation. Addressing this issue, Marcus Moench finds that common entry points for the two research communities include interventions in the underlying systemic factors and the post-disaster context. He provides a practical approach on how to move from concept to action in the integration of adaptation to climate change and disaster-risk reduction.

The aforementioned discussion on vulnerability points to a direct connection with development research, which is addressed in Part IV. Drawing from five adaptation examples in the developing world, Robert Kates cautions that the global poor will be the most affected by climate change and will be able to adapt only at a high cost. In order to avoid new inequities brought about by adaptation strategies themselves, Kates demands that the emphasis should be placed on poor people rather than on poor countries. Neil Adger, Saleemul Huq, Katrina Brown, Declan Conway, and Mike Hulme criticize the distortive focus of international adaptation actions on planned adaptation. Most adaptation, they say, will occur autonomously or spontaneously, building on people's own resources and capacities, so that policy should rather concentrate on enhancing the resilience of vulnerable communities. The chapter by Huq and Hannah Reid identifies the linkages between development and climate change and illustrates how the international funds dealing with adaptation fail to adequately recognize those linkages by defining adaptation to climate change too narrowly. The authors call for a greater collaborative effort between the climate change and development communities, and give concrete recommendations on how financial institutions, policy actors, and researchers at all levels can discharge this task.

The final part of the Reader concerns the role of adaptation in climate policy. Roger Pielke's article from 1998 gives an insight into the neglect of adaptation during the early years of the UNFCCC. He explains how mitigation became an end in itself in global climate policy, substituting itself for the goal of minimizing the adverse impacts on society and the environment. He makes a strong case for adaptation as a back-up strategy, and for the redefinition of the objectives of climate policy. Lisa Schipper provides an excellent overview of the conceptualization of adaptation within the UNFCCC. She criticizes the dichotomy between mitigation and adaptation established by the UNFCCC and points to the lack of explicit adaptation provisions in the UNFCCC as an important reason for the slow development of adaptation policy. Schipper argues that a conceptual shift in thinking about adaptation began in 2002 with the growth in importance of the concept of sustainable development.

The collection's major strength is that it provides a gateway into research on climate change adaptation. It accurately reflects one of the great challenges of the research community: the jumble of interrelated concepts and definitions and the missing common ground of understanding between disciplines. Furthermore, the volume identifies a multitude of open questions: How should adaptation be defined and measured? How much planned adaptation is necessary? Which situations influence the success of adaptation strategies? To which extent does global policy need to address adaptation? A summary chapter exploring commonalities in the diversity of approaches as well as a summary future research agenda would have been useful additions. In the period since the volume was published, research on climate change adaptation has gained momentum and parts of the book may have lost their timeliness. Yet it will not cease to be a valuable reference work on the history of adaptation research.

Lena Donat
Edinburgh Law School

Intellectual Property and Climate Change: Inventing Clean Technologies

By Matthew Rimmer

Edward Elgar, 2011, 495 pp. (incl. index), ISBN 978-1-84844-624-3, hb £120

Intellectual property confers on IP owners the right to control the results of innovation and creativity. IP is clearly relevant to climate change, yet calls for action to limit climate change are unlikely to have as their primary focus the rewards accruing to innovators. Accordingly, there are divisions between the perspectives of scholars, policymakers, practitioners, and activists with expertise in IP, and those with expertise in climate change. Rimmer has sought to bridge this gap in this timely contribution, which is one of the first books to address these fields together. The book is well written, scholarly, and accessible, and engages in depth with academic and practical legal and business literature. Rimmer begins with a discussion of Edison and his innovations and patents related to light, and the place of patents in the founding of General Electric Inc.—a reminder that the link between innovation, energy, and business is an old one.

Important first impressions can be gained from the contents' page: the book is split into three parts: "International Law", "Patent Law", and "Innovation". International law covers three distinct but overlapping fields, and an important and apt point is made by separating Parts 2 and 3.

In Chapter 1, Rimmer starts with climate change, discussing the UNFCCC and Kyoto Protocol. He explores the increased attention paid to IP at the meetings of the UNFCCC in Copenhagen (2009) and Cancun (2010). Text boxes highlight the decision drafts with their unsettled

clauses enclosed in square brackets (e.g. p. 75). In Chapter 2, under the emotive title "Disaster Capitalism", Rimmer focuses on IP and world trade, discussing the TRIPS agreement of 1994. TRIPS obliges WTO members to pass national legislation protecting IP. (The WTO includes most countries, almost all of which are also parties to the UNFCCC and Kyoto Protocol.) Rimmer reviews when and how a patent can be obtained, grounds for objecting to a patent on environmental grounds, and systems which have been put in place in different countries to limit the power of the patent and effect compulsory sharing. He discusses the relationship of patent law with competition law, enforcement under the WTO, and the lessons to be learnt from steps taken in the WTO in respect of access to medicines. In Chapter 3, again under an emotive title, "Energy Poverty", Rimmer considers the original international home of IP, the World Intellectual Property Organization, and its gradual shift away from innovator reward and towards a development agenda. He discusses the prospect of international patent harmonization in relation to environmental innovation, as well as the links between WIPO and other international organizations, such as the Convention on Biological Diversity, the World Health Organization, and the United Nations Conference on Trade and Development.

Against this wide-ranging international landscape, Rimmer proceeds to take a more practical approach in Part 2 ("Patent Law"). Here, in Chapter 4, he considers the steps taken by the patent systems of several industrialized countries to encourage grants of "green patents", and provides evidence of the use of patents for clean-energy technologies, based on sector and country (pp. 178, 180). He considers the important tripartite collaboration between UNEP, the European Patent Office, and the International Centre for Trade and Sustainable Development, which led to the report *Patents and Clean Energy* (2010). In Chapter 5, the author explores "trolls"—patent owners who do not manufacture products. One example he considers is the patent litigation commenced by Paice LLC against Toyota in the United States and at the International Trade Commission concerning the Prius vehicle. In the case of energy-friendly cars, is it appropriate to enforce a patent to obtain a financial reward? Is it desirable to obtain license fees from others who are using the patented technology (alongside their own patents)? Chapter 6 recalls the discussion of compulsory licensing under TRIPS and addresses the US Clean Air Act and other attempts made in the United States to impose limits on the power of the patent owner. Rimmer also considers objections to this approach within the United States, where IP is seen as the basis for building a clean-technology industry. At the 2009 Copenhagen COP the United States strongly resisted suggestions that a compulsory-licensing regime be explored.

Moving to the part on "Innovation", Chapter 7 explores private control of technology. Rimmer discusses US public-sector licensing schemes as well as those proposed by the UK Carbon Trust. Chapter 8 discusses the choices which could be made by patent owners to work as part of partnerships, with important examples being the Eco-Patent Commons and open licensing. In Chapter 9 Rimmer explores environmental prizes, such as the H-Prize and the Saltire Prize. Could these provide other, or complementary, forms of reward for innovation, particularly if there is no market inducement for innovators and investors? Are these rewards adequate? The wide range of prizes suggests a "policy incoherence" (p. 375). Rimmer argues that a Climate Impact Fund could be part of the solution.

The book's conclusion reviews policy calls for more innovation in respect of technologies important for climate change, and Rimmer considers that "the work of such economists, social scientists, and political scientists marginalises intellectual property, placing it at the periphery of the topic of climate change, or in the footnotes" (p. 381). He seeks to address this problem by calling for better coordination between international organizations; fast-tracking of applications and informed patent-grant systems; better enforcement procedures; restrictions on unjustified threats; flexible approaches to compulsory licensing, national emergencies, and circumstances of extreme urgency; public non-commercial use; impact funds; and a greater focus on "justice". He identifies areas for future research, including consideration of other IP rights and access to information. It would have been interesting to see a greater focus on these here, particularly given the important *Grüne Punkt* decision of the ECJ. Further, questions which engage IP and climate change also involve other areas of the law, and the perspectives of industry, funders, and activists also form an important part of the landscape. These issues have been explored by this reviewer and others in a project funded by the British Academy, leading to a collection entitled *Environmental Technologies, Intellectual Property and Climate Change* (Edward Elgar, forthcoming 2012). Rimmer's important contribution to this area is considered in the introduction to the collection.

The bibliography and index to Rimmer's book take up almost one hundred pages. In addition to a comprehensive list of secondary sources, there is a list of patents and trademark applications, a list of international materials and instruments, and a full list of cases with helpful definitions (e.g. "the *Blackberry* case"). For lawyers, it would have been helpful to also provide details about the jurisdiction of cases. Of great value, considering the diversity of potential readers of this book, is the depth of the index. Besides cases, the index lists innovators, venture capitalists, countries, and financial tools—among other categories of information.

In conclusion, the relationship between IP and climate change continues—and must continue—to evolve. All those participating in the development of the field will find this book of immense value.

Dr Abbe E.L. Brown
Senior Lecturer
University of Aberdeen, School of Law

Global Democracy and Sustainable Jurisprudence: Deliberative Environmental Law

By Walter F. Baber and Robert V. Bartlett

MIT Press, 2009, 248 pp., ISBN 0262512912, £15.95

This brief work develops the idea of "juristic democracy", which is that one way to bring democratic substance and therefore effectiveness to international environmental law is to carry out a global opinion poll on environmental issues. Hundreds of small groups of individuals from all over the world ("citizen juries") would be presented with hypothetical cases drafted to elicit the jury's normative view on a discrete issue. Then, a separate institution (Baber and Bartlett suggest the International Law Commission) would be charged with analysing the multitude of resulting verdicts. Just as the common law creates a coherent body of rules from a disparate and eclectic array of precedents, so this institution would turn the verdicts into some sort of law.

It is an intriguing proposal but, as presented, rather flawed.

A number of basic problems with citizen juries are not addressed by the authors. First, there is no mention of how untrained lay "juries", unversed in economics, science, and a host of other disciplines, could have competence in the fiendishly tricky background of environmental problems as a precursor to making an informed moral decision. Second, there is no mention of what legal or moral framework citizen juries might assume as a backdrop, with the result that they would be required to make a practical moral decision in a legal vacuum. (Even strident legal realists would hesitate at that.) The problem would apply not only to the question of how basic rules, such as contract law, affect the parties in the hypothetical situation, but also to the potential effect of the jury's decision on the operation of interlocking legal rules and regimes such as human rights (the latter being an issue raised by the authors but not addressed). The limited scope of the jury's consideration compounds this problem of unintentional consequences.

Third, the method by which rationales can be teased out of statistics is evaded. Because Baber and Bartlett require a unanimous verdict from each citizen jury, there is little room for reasoning in each decision. When a traditional unanimous court judgment is handed down, there can be vigorous debate over the true reasoning. Even in the most carefully constructed hypothetical scenarios, it is unclear how a set of binary jury verdicts (liable/not liable) will shed light on the reasons for coming to a conclusion—reasons that are required, of course, if we are to construct a coherent system of thought on environmental norms. The obverse problem to whittling down competing rationales to one norm involves having several policy options adhering equally to the chosen norm but differing both in their impact on the incentive equilibrium of the parties and the nature and extent of any externalities—and again this is not covered. Even Dworkin's Herculean judge would struggle.

These problems are difficult enough without considering language barriers, or bias in the moderators or experts used to facilitate jury deliberation (both matters raised by the authors but not addressed). The desire to "start somewhere" (p. x) should be applauded, but to omit the rebuttal of basic objections does not bode well for the proposal's longevity.

To compound these omissions, there is a lack of clarity on what the end-product would constitute. It is variously described as international law binding on non-consenting states, a "system of legal doctrine" (p. 156), rules "binding (at least in a minimally legal sense)" (p. 131), "general principles of law" (p. 179), law akin to customary international law that states could "disavow" (p. 180), normative principles binding upon states, "persuasive authority" (p. 55) for adjudicators to consider when deciding actual disputes, "democratic raw material with which to construct positive law" (p. 174), and "an agenda for ongoing diplomacy" (p. 153). This adds to a feeling (evidenced elsewhere by odd repetitions of material) that this book was written by the authors taking a chapter each, and gives the impression that difficult but crucial questions are being avoided.

None of this is aided by the fact that the quality of argument fades in places. Although the authors display a nuanced understanding of the moderate positions taken by their opponents, the extreme positions of the latter are consistently deployed against those of the deliberative democrat. The passages dealing with legal or jurisprudential analysis are analytically thin and contain basic inaccuracies. For example, they seem to confuse the common-law rules on the types of contracts that are enforceable for "a background of law that is obligatory" (p. 117), in the sense of a regime that imposes obligations rather than one that limits the legal force of certain promises. The exceptional and often quite primitive nature of the examples chosen to demonstrate the existence or validity of a trend is rarely highlighted. Instead of analytically rigorous neutrality, there is a derisive tone taken when democratic national politics, science, or the nation-state (in particular the nation-state as effective or legitimate international actor) crop up, which is somewhat convenient as all three pose challenges to the book's thesis. The beginnings of an argument (especially one designed to deflect a serious criticism) are often glibly inserted without any development or explanation. Introduction, content, and summary regularly do not match, as the book covers less ground than it claims. The fastidious referencing disrupts the flow of the text, and the works cited seem to lose flavour in being reduced so forcefully from a comprehensible, subtle line of argument to a convenient sound bite used as a given, undeniable conclusion.

The authors gather plenty of material (especially from modern political philosophy: much of the book follows the drumbeat of Rawls's "public reason", Habermas's "ideal discourse", and Bohman's "full liberalism") to justify why their approach has a good theoretical grounding in deliberative democracy (a "concept that defies easy definition", (p. 11): a warning bell from the proponents of a theory if ever there was one). These justifying chapters sometimes seem confused, meandering, and tangential to the core proposal (which does not appear until the second half of the book). There is an unshakeable feeling that these chapters—on subjects ranging from epistemology through the history of equity to scholarship on the problems of the ILC—are included to bolster the academic credentials of the authors rather than the normative

pedigree of their proposal. The only use for most of this material is to paper over the questionable quality of citizen-jury deliberation by obviating the need for the jury's agreement on the reasons underlying their unanimous verdict.

There is a significant jurisprudential leap of faith required for juristic democracy itself to be theoretically sound. Equating juristic democracy to the grand tradition of the common law involves the somewhat dubious appropriation of an adversarial adjudicative process for a polycentric legislative purpose. Indeed, a confusion of adjudication and legislation appears throughout the book. The authors lean on legal realism as an explanation of legal decision-making to bridge this conceptual divide. They start by assuming that trained judges find justice in the facts of an actual case and make the legal authorities conform to their bidding while maintaining the coherence of their decision within a legal tradition. The authors apply this method to untrained juries making decontextualized moral judgments in imaginary cases, with a separate institution striving to make legal sense of a slew of statistical data in order to construct a system of norms. Moreover, as the book comes to a close, the authors admit that juristic democracy may involve the citizen jury reacting to a sense of injustice rather than actively searching for justice (borrowing heavily from Amartya Sen in *The Idea of Justice*). Never mind the debateable level of support for legal realism as a convincing theory for understanding law, there is little explanation of why a theory developed to explain the traditional judicial situation could properly be deployed to justify a legislative reform agenda using citizen juries, given the differences between the two. Again, this bodes ill for the construction of a coherent set of just norms as the product of juristic democracy.

Oddly, there is little indication of why environmental concerns should be so especially suitable for juristic democracy compared with other policy areas, such as human rights—an example offered by the authors in their conclusion. The stated justification is that the solution of environmental problems requires international cooperation. While this is true in some cases, it is not in many others, and it certainly does not explain why other policy areas requiring or benefiting from international cooperation would not also benefit from juristic democracy. This need for cooperation does not of its own suggest that an injection of deliberative democracy will usher in better regulation more effectively than any other method of recalibrating the international legal system. Moreover, the need for cooperation certainly does not guarantee that there will be international consensus on the norms to govern such issues, which Baber and Bartlett themselves admit could doom their project to futility.

The authors try to ignore the nagging thought that law with a higher democratic content could turn out to be less environmentally effective (p. x). They see a correlation of unsuccessful international environmental law and the lack of democracy at the international level and conclude that there must be a causal link. But why are they so sure that the world's rural poor (or even the urban rich) would not happily renounce environmental worries in exchange for greater economic prosperity, and in so doing potentially run roughshod over concerns about human rights where such concerns conflict with the unassailable will of democracy? Just because the scenarios are hypothetical does not mean that citizen juries could or would ignore the normative reactions that their cultural and socio-economic surroundings have conditioned them to display.

According to the authors, "arbitrary or authoritarian approaches to protection of the environment have to be dismissed as unacceptable in principle, even if they were not destined to fail (which, of course, they are)" (p. 6), but they offer nothing in support of these assertions. Indeed, the democratic deficit has been suggested as one reason why the EU has been able to pass such volumes of environmental legislation. If the authors' project is to bring about a more effective international environmental protection through taking a more democratic approach to law-making, they should not shy away from the potential environmental downside of their proposal. Moreover, they might consider that there are ways other than through an infusion of democracy to furnish regulation with meaningful normative content separate from the law's ability to achieve noble goals—instead of assuming that it is the "democratic deficit that robs international law of its moral authority" (p. 155)—and that such content (however instilled) is rarely sufficient to render law effective and enforceable.

This project is a logical manifestation of deliberative democracy. The authors' admission that deliberative democracy "is not so much a search for ethically or empirically defensible solutions as it is a process of personal development for citizens" (p. 15) seems to expose the real purpose of juristic democracy, and, in combination with the myriad problems inherent in their suggestion, dooms this particular proposal from its inception.

James Chapman
Associate, Freshfields Bruckhaus Deringer LLP, London

This review was written in the author's personal capacity. The opinions expressed are the author's own and not those of Freshfields Bruckhaus Deringer LLP.

Bending Science: How Special Interests Corrupt Public Health Research

By Thomas O. McGarity and Wendy E. Wagner

Harvard University Press, 2008, 384 pp. (incl. index), ISBN 978-0-674-02815-9, US$24.95

It is shocking to think that the concept of climate change remains under debate in the United States. European and other developed countries grasp this particular environmental issue as one of the most important of our time, prompting innovative research and active social change. So why is the United States so far behind the rest of the developed world? Some of the answers are brought to light in *Bending Science: How Special Interests Corrupt Public Health Research*. Here, "bending science" refers to research that is "manipulated to advance economic or ideological ends."

McGarity and Wagner give a well-researched view into the strategies used by special-interest groups to influence public opinion and pervert the regulatory process through manipulating

science, scientists, scientific data, and research studies. Using a plethora of examples drawn primarily from the food-and-drug, pesticide, and product arenas, the authors delve into the complex processes of managing the "scientific pipeline" to undermine legitimate research. They have compiled a pointed handbook on how special interests engage with all aspects of science research, analysis, reporting, and communication to further financial or ideological goals. While it gives only a few examples from the area of climate change, this does not limit the book's value for climate professionals, as the material examined from other areas is directly applicable to "bending" climate research as well as tainting climate-related communications. The authors, both law professors, discuss why special-interest groups would want to bend science—and they make suggestions for science reform.

Historically, food, drugs, pesticides, and other consumer products are regulated with the support of scientific studies. This community quickly realized and responded to such regulations by conducting toxicological testing through contract research organizations, thus giving sponsors control over experimental design, research methods, and data collection and analysis. These privately run research facilities also provided "anonymous science writers who drafted articles to be signed by prominent scientists who are paid handsomely for lending their reputation and a modest amount of their time and effort." Enter the concept of junk science.

The authors present the various "bending strategies" under chapters on shaping science, hiding science, attacking science, harassing scientists, packaging science, and spinning science. "Shaping Science," discusses recipes for managing science through three main ingredients: one or more savvy scientists, a desired outcome, and sufficient financial resources to support the strategic enterprise. Case examples include how support for particular drugs or chemicals relates to the bending of science and how public-relations companies promote (through junk science) a defective product purely for financial gain. The chapter portrays the manipulation of data as common practice.

"Hiding Science" elucidates techniques used to conceal scientific studies that run counter to special-interest goals. Examples are primarily drawn from the health-care field. MTBE—a gasoline additive—is mentioned in this chapter and is relevant to the environmental field. Without presenting data from formal research studies, the petroleum industry convinced the EPA that the chemical is safe. When data became public, MTBE was revealed as a carcinogen in laboratory animals.

Discrediting scientific results counter to a sponsor's goals are described in "Attacking Science". Science is an improved discourse among experts, and thus suggestions to enhance scientific studies can always be provided. However, the continued systematic targeting of one particular point of weakness within research can instill—or can be exploited to instill—uncertainty in scientific results that are *not* flawed. This creates a belief in those who are unaware of such deliberate tactics that the science is questionable and should be doubted.

Backed, therefore, by credentialed scientific consultants and a good public-relations firm, an industry-funded think tank can make legitimate scientific studies look like junk science in the eyes of the public. McGarity and Wagner explain: "If information is relatively complicated, like most research reports, then its credibility can be reduced simply through strategic and sustained attacks on the methods, experimental design, or integrity of the researcher" (p. 146). It is difficult for the layperson to detect scientific scepticism that is based on economic or ideological attacks on science. The more the controversy created around a study, the lower its credibility in the eyes of the public. With a complex scientific issue like climate change, this approach allows special-interest groups to string out the attacks on science indefinitely. University scientists generally lack the financial resources and motivation to advocate for a particular position regarding climate change; in fact, most feel it would harm their professional ethics and scientific credibility to become engaged. Yet, scientists face the fact that the public sector is often turning true science into pseudoscience to alter public opinion and gain regulatory and policy support.

This approach is particularly effective when coupled with the technique of discrediting scientists. The chapter on "The art of bullying scientists who produce damaging research" discusses how a scientist's reputation is impugned by attacks. Examples of scientists who underwent such harassment explain how investigations are instigated by these special-interest groups, which carry out a kind of witch hunt of scientists. In 1996, a specialist on climate modeling, Dr Santer, gave a preview of a report on climate change. During questioning, the scientist was accused of making unauthorized and politically motivated changes to the previous year's report. The story was printed in the *Washington Times* and resulted in serious unfounded allegations that left Dr Santer under legal investigation. While eventually the scientist was vindicated, the pointed investigation cast a shadow over his research, undermining his report.

In a disturbing subsection entitled "A novel approach to global warming", McGarity and Wagner outline the strategies that have tied the hands of US scientists, preventing research that is the basis for climate change consensus. The Competitive Enterprise Institute, a consortium of groups questioning the reality of climate change, employed the novelist Michael Crichton, who told a sympathetic audience that he had studied the research on global climate change and found it "shockingly flawed and unsubstantiated".

In "Packaging Science" the authors discuss how expert groups form foundations to advance the economic interests they serve. The Heinz Foundation and other prominent food companies, including Coca Cola and Kraft, have established the International Life Science Institute as a credible research organization with the stated goal of improving the well-being of the public through the advancement of science. This sounds benign, but McGarity and Wagner explain that these forces have financial backing and marketing tools to disseminate "information" that feeds into policy as if it were coming from a scientific organization. The chapter on "Spinning Science" discusses the influence of media and advertising. Beryllium and asbestos are two case examples that illustrate how firms have managed information "to present a balanced view of the role that chemicals play in the earth's atmosphere".

In the final chapters, the authors suggest an overhaul of scientific review processes to eliminate the types of manipulation identified earlier in the book. They advocate for investigators to report their funding sources and declare potential conflicts of interest in funding. Although private or sponsored funding does not necessarily mean that science will be corrupted, it has been shown to be a leading corrupting factor. Uncovering research that has been suppressed when it does not support the sponsor's objectives is another recommendation. The authors suggest regulatory changes that would impose significant fines on researchers who suppress data, require central databases to log data as it is collected, and increase the stringency of peer reviewing.

While these are excellent suggestions, in the United States university scientists and those within the regulatory structure who might take a significant role in policing science are not currently funded to perform these functions. Significant financial support and an ethical mandate would be needed from the federal government to support such changes. McGarity and Wagner also suggest that the media act as watchdog. While news programs that educate the public about real science do exist, the containment or defusion of controversy are generally considered dull functions, and too academic. In the age of communication management and high speed internet, fact-checking often trails far behind a well-orchestrated media blitz that can alter public opinions. Nevertheless, based on the extensive research compiled in this book, an investigation and overhaul of the US approach to scientists and the use of scientific data is well overdue.

Stephen Foster, PhD
Terra Mentis Environmental Consulting
Boulder, Colorado