

“The Political Economy of Energy Justice in Canada, the UK, and Australia: A Nuclear Energy Perspective”

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Abstract/Summary

Energy justice has recently emerged as a new crosscutting social science research agenda. In this chapter, its core tenets are explored: distributional, procedural and recognition justice. Using a case study approach of nuclear waste in Canada, nuclear reactors in the UK, and uranium mines in Australia, the manifestations of energy justice in practice are illustrated from a political economy perspective through analysing the nuclear energy sector. This focus allows us to identify both winners and losers with regards to energy justice throughout the nuclear energy system. Through promoting the application of this triple-pronged approach across the energy system and within the global context of energy production and consumption, recommendations for its operationalisation are advanced. Of significance, the political economy focus highlights the key areas for conflicts and trade-offs amongst the core tenets of energy justice as the concept makes policy ground.

“The Political Economy of Energy Justice: A Nuclear Energy Perspective”

1. Introduction

Energy justice has recently emerged as a new crosscutting social science research agenda, which seeks to apply justice principles to energy policy, energy production, energy consumption, energy activism, energy security and climate change. It aims ‘to provide all individuals across all areas with safe, affordable and sustainable energy’¹ (p. 1), and carries three core tenets, distributional, procedural and justice as recognition. Within this chapter, we begin by exploring these core tenets of energy justice, as they are understood in academic theory. Using three case studies throughout the nuclear energy system, we then illustrate manifestations of energy justice in practice from a political economy perspective.

We use our case studies to test three hypotheses. Firstly, that potential trade-offs will exist between the core tenets of energy justice. Here we give the example of the siting of Deep Geological Repository for Canadian nuclear waste and the complexity of balancing distributional and procedural justice calls. Secondly, that a political economy approach to energy justice can resolve the political economy dilemma of having winners and losers from an energy policy perspective. We illustrate our reasoning through a case study of the development of the UK Energy Act 2013. Thirdly and finally, we show potential for the deployment of one tenet to mask another. Here, our example of the recognition of indigenous groups surrounding uranium mines highlights the necessity of not only attention to who is involved in decision-making, but the legitimacy of social inclusion.

In utilising a political economy perspective throughout, we therefore identify both winners and losers with regards to energy justice throughout the nuclear energy system. The modern political economy research agenda, and within, the concept of the international political economy or global political economy, first appeared as a subfield of international relations in the 1970s. Emerging primarily with a focus on the interrelationship between public and private power in the allocation of scarce resources, it sought to answer the fundamental questions of ‘who gets what, when and how?’. Thus it questions, in essence, who the winners and losers are in fundamentally intertwined political and economic choices.^{2 (p.18)}

Our discussion leads us to provide two insights into the debates surrounding energy justice. Firstly, we demonstrate that energy justice offers an opportunity to explore where injustices occur – highlighting the maldistribution of burdens and benefits and allowing for the development of new processes of avoidance and remediation as well as the recognition of new actors. It is therefore an agenda that inspires both evaluative accounts and normative solutions to dealing with both the winners and losers in energy policy. Secondly, through exploration of these case studies, we illustrate the international scope of energy justice concerns across all sections of the nuclear energy system. Thus, we highlight that energy justice provides a new framework for bridging existing and future research on energy production *and* consumption. Here, the hitherto competing discourses are united in the common goal of achieving *just* energy-based processes and outcomes.

On this basis, we promote the application of energy justice's three core tenets, distribution, procedure and recognition - a three-pronged framework - for assessing the winners and losers across the energy system. Throughout, our political economy focus leads us to highlight the potential for conflicts and trade-offs amongst the core tenets of energy justice. Further, it not only provided cautionary tales around the implementation of energy justice tenets, but also demonstrates how energy justice may be used as a positive tool for resolving political economy issues. Indeed, we don't claim that the emerging concept of energy justice provides a panacea for our energy concerns; instead, we draw attention to the need to explore and consider its own political economy as the concept makes policy ground.

2. Energy Justice: The Tenets

Generally, justice theory rests upon three tenets: distributional justice, procedural justice, and justice as recognition.

2.1. Distributional Justice

Distributional justice, the first of three tenets of energy justice, recognises the inherently spatial nature of the concept. It includes attention to both the physically unequal allocation of environmental benefits and ills, and the uneven distribution of their associated responsibilities³ and recognises that issues in specific localities become entwined with the desirability of technologies more generally⁴. Further, it represents a call for the even distribution of benefits and ills on all members of society regardless of income, race, etc.

This first tenet of energy justice fits classically with the concept of political economy, which, in questioning, 'who gets what, when and how?'² (p. 18), is primarily concerned with questions of distribution. Nancy Fraser highlights this focus in her work 'Social Justice in the Age of Identity Politics: Redistribution, Recognition and Participation', where she states, 'the redistribution paradigm focuses on injustices it defines as social-economic and presumes to be rooted in the political economy. Examples include exploitation, economic marginalisation and deprivation'.⁵ (p. 73) In this regard, both distributive justice as a tenet of energy justice and the political

economy agenda, call to question where the benefits and burdens of our energy infrastructures lie.

Such distributional concerns typically emerge as public opposition to energy developments and therefore highlight instances of *injustice*. Research has demonstrated the unequal placement of nuclear facilities in areas of low-income, for example, and in the case of waste storage, the contamination of Native American Lands.^{6, 7, 8, 9, 10} We highlight, however, the importance of noting the distributing of benefits too and their role in creating injustice, thus recognising both winners *and* losers. Conflict surrounding community wind farm developments has stimulated interest in ‘community benefits’, for example – the provision of material and financial benefits by developers to local communities.¹¹

2.2. Procedural justice

Energy justice requires the use of equitable procedures that engage all stakeholders in a non-discriminatory way.^{3, 12} It states that all groups should be able to participate in decision making, and that their contributions should be taken seriously throughout. It also requires participation, impartiality and full information disclosure by government and industry¹³, and the use of appropriate and sympathetic engagement mechanisms.¹⁴

Our aim here is to assess the extent to which such a procedural justice is observable in energy policy and to what degree there is energy justice from a political economy perspective. In essence, this involves assessing who the potential winners and losers may be in terms of procedural justice. We note, however, that the aim should not be to look at one case of procedural justice in isolation, it is necessary to look at the entire energy cycle, as is evidenced by our discussion in the sections below.

Firstly and in brief, we take the example of energy subsidies, where there is an the issue of full information disclosure, questioning, in particular, whether the public are in full knowledge of what subsidies different energy sources in the energy sector receive. Analysis was undertaken in the United Kingdom (by the UK Environmental Audit Committee) to determine the exact levels of subsidies that are being received by different energy sources in the UK, and how this could then inform public decision-

making on what represents the best choice of energy for the future.¹⁵ However, there was not a conclusive outcome. The IEA has also produced a well-documented analysis that identifies that the fossil fuel industry receives \$550 billion annually.¹⁶ Despite this, however, there continues to remain a lack of core procedural justice elements of participation, impartiality and full information disclosure by government and industry on the issue of energy subsidies, and the energy sector remains significantly skewed in favour of fossil fuels as a result.

Such information disclosure should be readily accessible so that all stakeholders can access informed decision-making as to what energy sources we should have. This is especially relevant given the notable affect of subsidy costs of societal welfare, as is discussed in Farrell and Lyons' ¹⁷ exploration of renewables subsidies in Ireland. Nevertheless, there is a lack of research into the access to knowledge of energy subsidies by all stakeholders in the energy sector.¹⁸

2.3. Justice as recognition

The third tenet of energy justice is recognition justice or the injustice of misrecognition – originating also from Nancy Fraser's 'Social Justice in the Age of Identity Politics: Redistribution, Recognition and Participation'.⁵ Misrecognition is not the same as a lack of participation, instead manifesting as 'the process of disrespect, insult and degradation that devalue some people and some places identities in comparison to others'.³ (p. 615) Recognition justice is also more than tolerance, and states that individuals must be fairly represented, that they must be free from physical threats and that they must be offered complete and equal political rights.

From an unconventional energy systems perspective, under-represented health impacts exist for communities who are often based in a developing world context. Health problems due to poor indoor climate from burning of traditional fuels impact women and children disproportionately, due to gender roles and division of household chores.^{19,20} Furthermore, the task of collecting firewood tends to be the responsibility of women and children, who spend hours every day collecting wood.²¹ Further, in terms of conventional energy systems, the renewable power industry and environmental NGOs often deride local campaigns against wind farms as 'not-in-my-backyard'

(NIMBY) protests by self-interested and misinformed individuals who care much less about the public good than about undisturbed scenery and property values.²² This not only denies respect and recognition justice for local anti-wind groups, but could also deepen public resistance to new forms of low-carbon energy installations.

Recognition justice may therefore manifest itself not only as a failure to recognise, but also as misrecognising—a distortion of people’s views that may appear demeaning or contemptible.²³ Thus it includes calls to recognise the divergent perspectives rooted in social, cultural, ethnic, racial and gender differences. From this perspective, recognition justice scholarship challenges the predominantly universalist discourse of distribution and procedure, suggesting a terminology of *distributive* vs. *post-distributive* (or recognition) aspects of justice.²⁴ Bulkeley and colleagues employ the *post-distributive* concept ‘to engage with how...justice is actually practiced and embedded in the city ... by moving from universal principles of climate justice to its articulation in particular places’, and to highlight the *recognition* aspect of justice.²⁴ (p. 25)

3. Energy Justice in Practice: The Case of Nuclear Energy

Here, we use three case studies to both illustrate the emergence of the tenets of energy justice in practice and to highlight the tensions that exist between them. We do so through firstly, an assessment of the siting process for a deep geological repository in Canada, secondly, consultation and due process around the development of the UK Energy Act 2013, and finally, the recognition of indigenous groups around Australian uranium mines. Our analysis seeks to demonstrate two points: (1) that the tenets of energy justice are subject to their own political economy at any one scale and (2) that a political economy perspective highlights many of the trade-offs that exist in the energy system and that need to be resolved to increase the practice of energy justice.

3.1. Nuclear waste Siting: A Canadian Case Study

The fundamental underpinning of distributional justice is the idea of equality – the idea that everyone should be subject to the same amount of environmental burdens and

benefits.²⁵ However, there is acknowledgement too that some resources are either naturally, or unavoidably, uneven in their distribution.²⁶ This is true of nuclear waste. For technical, managerial and safety reasons, it is infeasible and unsafe to distribute nuclear waste equally amongst all those who benefit from nuclear energy.²⁷ Potential sites for deep geological repositories are restricted by geological conditions, for example, meaning that some areas are practically more suitable than others.²⁷ Thus, the unavoidable ‘stock-piling’ of nuclear waste necessitates that some people who live in communities neighbouring nuclear waste storage facilities face a disproportionate burden from the radioactive material.

Where maldistribution is a necessity, then, claims for distributional justice must be made in tandem with an argument for fair treatment - procedural and recognition justice.²⁶ Here, we use the case study of the siting of a Canadian Deep Geological Repository for nuclear waste as an example of the complexity of balancing distributional and procedural calls.

Despite the acknowledgement amongst the scientific community that deep geological disposal is a safe means of disposing of radioactive waste, almost all countries that have tried to find a location for a repository site have failed.²⁸ To date, only Finland and Sweden have made progress towards site development, with operations expected to begin sometime between 2020 and 2025, though developments are criticised for their lack of independent review and on the grounds of geological suitability.^{29,30} With plans across several countries to expand their nuclear fleet, plus several countries running out of storage space, and given that solutions to the nuclear waste legacy are a strong influence on attitudes to nuclear, a solution must be found.^{28,29} Canada in particular, has a long history of trying to find such a path.²⁸

Initial attempts to find a site for a Canadian deep geological repository (DGR) began in the mid-1970s and initially took what Kojo and Richardson³¹ describe as a ‘hierarchical approach’, the most extreme model of which is known as DAD – decide, announce and defend. Within the hierarchical approach, whilst it may contain elements of consultation and public engagement, the final decision on proceedings ultimately rests with state or federal authorities, which have the right to impose a facility on a community.³¹ By 1972, the then established committee of waste owners had already

decided that a DGR was a necessity. Indeed, the Canadian nuclear waste management program initially envisaged a timeline in which site selection and the early construction of a repository would have been completed in the late 1980s, with a fully operational site then expected around 2000.³² The initial actions of Atomic Energy Canada Limited, the overseeing body, demonstrated that they planned to move quickly on developments for a waste disposal site on the assumption that it this was the responsible thing to do. Durant^{32 (p.152)} highlights here ‘the notion that because disposal was an, “urgent need”, and because sufficient technical means and know-how was available, public consultation was unnecessary’.

However, in the midst of intense public opposition this program was halted in 1981, and the decision was made that no disposal site would be identified before a full public inquiry on the disposal concept was held - the Seaborn panel.^{28,32} Reasons for objections can be numerous, arising over a desire not to contaminate pristine ground, tactical refusal in a bid to stop the development of future nuclear stations, NIMBYism - a refusal to host a facility in the local area despite recognition that the development of one is necessary, and because the siting process does not consider transparency or the sufficient involvement of affected peoples.^{28,33}

In a bid to overcome such opposition, the organisations responsible for the repository’s development changed tack. The Nuclear Waste Management Organisation (NWMO) was developed as an independent body tasked with investigating a DGR, the storage of materials above-ground at reactor sites in a centralised location, and, primarily, with achieving social acceptance.³² The NWMO created the process of Adaptive Phase Management, which moved away from a position in which technical and political elites held all decision-making rights, to one in which public stakeholders had a far greater role, with decision-making capacity granted to communities across time and space.³² The NWMO described the subsequent consultation process as a ‘dialogue’, which included, ‘nation-wide surveys, focus groups, issue-focused workshops and roundtables, e-dialogues and deliberative surveys, and public information and discussion sessions’ to reach out to people, including specifically targeting indigenous populations.^{34 (p. 61)}

Following a lengthy engagement phase, the NWMO is now in the process of identifying an informed and willing community to host the repository.²⁸ The end result being that despite lengthy consultations and an on-going deliberative process, no site for a deep geological disposal facility has been found 40 years after the initial exploration of the DGR concept. This case study, whilst necessarily brief, demonstrates potential trade-offs between the tenets of energy justice, as calls for procedural justice significantly lengthen the progress for distributional justice. Ramana²⁸ states that emerging conflicts between the principles underlying siting and the process of site selection itself may pose barriers for the successful establishment of a repository. Alley and Alley²⁹ highlight, too, that even if a facility was opened tomorrow, it would take decades to transport all of the fuel to it, and that even then the transport of radioactive waste will undoubtedly itself be subject of opposition. In this regard, the demands for procedural justice in the development of a DGR have dampened its progress and, arguably, posed greater distributional risks since the nuclear waste destined for the DGR remains in above-ground, distributed, interim storage.

3.2. Nuclear electricity supply: a British case study

Energy justice requires that ‘people are provided with the opportunity to participate effectively and meaningfully in decisions concerning the production and distribution of energy...’³⁰ (p. 121). Within this case we examine participation, consultation and due process using the example of the formulation of the UK Energy Act 2013. We highlight that through a focus on procedural justice, energy justice can resolve the political economy dilemma of having winners and losers from an energy policy perspective.

The traditional meaning of the term political economy is that branch of the art of government concerned with the systematic inquiry into the nature and causes of the wealth of nations, although it is now often used loosely to describe political aspects of economic policy-making. It is this latter perspective that this section utilises to illuminate the political aspects of energy policy and legislation formulation in the UK and its consequences on energy justice in the energy sector.

At its core the political economy concept has three central facets: institutions, information, and behaviour.³⁵ Here we focus on the second - information - which is the

object of focus in political economy in the context of provision, revelation and aggregation. The nature of political economy allows for the analysis of why, how and what information is provided and its effects in terms of legislative and political decision-making; a necessity given that whilst information is important to any economic sector, it is even more so in energy activities where the risk is so high should a project fail or because of the long life-cycle of energy infrastructure (and the resulting level of potential environmental effects).

The UK's current energy policy - the Energy Act 2013³⁶ - was developed through a process of consultation lasting over a decade. While, in general, consultation has not been at the forefront of policy development, the UK did aim for a more inclusive process that involved the production of successive policy documents. In addition, there was a similar process to changing law in other areas, such as planning and climate change before the final introduction of the Energy Act 2013 was possible. Table 1 outlines the major policy and legal developments over the decade prior to the Energy Act 2013. All stakeholders had access to significant information to inform and enhance their potential to make inputs into the process.

Table 1: Policy and Legal Development in the Electricity Sector

White Papers and Legislation 2002-2012
2002 <i>The Energy Review</i>
2002 <i>Managing the Nuclear Legacy – A strategy for action</i>
2003 <i>Energy White Paper: Our Energy Future—Creating a Low Carbon Economy</i>
2006 <i>The Energy Challenge: Energy Review Report 2006</i>
2007 <i>Energy White Paper on Energy 2007. Meeting the Energy Challenge</i>
2007 <i>Planning for a Sustainable Future White paper</i>
2008 <i>Meeting the Energy Challenge: A White Paper on Nuclear Power</i>
2008 <i>Energy Act chapter 32</i>
2008 <i>Climate Change Act chapter 27</i>
2008 <i>Planning Act chapter 29</i>
2009 <i>The UK Low Carbon Transition Plan: national strategy for climate and energy</i>

2009 *The Road to 2010: Addressing the nuclear question in the twenty first century*

2011 *Planning our electric future: a White paper for secure, affordable and low-carbon electricity*

The next few paragraphs detail the development of the UK Energy Act 2013 and highlight that it was aimed at addressing the concerns of all stakeholders, to provide complete information to them, and to then result in energy law that was more *just and equitable*, rather than to identify clear winners and losers. The followings is a description of these steps:

- The initial transition began and was greatly influenced by the 2002 Energy Review³⁷ and then in turn by the 2003 White Paper *Our Energy Future: Creating a Low Carbon Economy*.³⁸ The 2002 and 2003 documents represented a shift in attitudes towards the UK's energy strategy, framed in terms of a response to commitments made by the UK government to reduce carbon emissions, and to assess energy security. There was a particular reference to the need to build new energy infrastructure, and this was to involve the construction of a large number of renewable energy projects around the country.
- In 2006, the UK government's Department of Trade and Industry produced another Energy Review³⁹, assessing the UK's progress towards the medium and long-term goals of the 2003 Energy White Paper. The 2006 review reinforced the need to build more large-scale renewable projects and also represented a *public* shift in government attitudes towards nuclear energy, advocating an expansion of nuclear power through Generation III nuclear power plants.
- In the 2007 White Paper *Meeting the Energy Challenge* the UK government set out its energy strategy, basing it on 'tackling climate change' and 'ensuring secure, clean and affordable energy'⁴⁰ (p. 6), a strategy that formed the basis of the 2008 Energy Act.⁴¹ The year 2008 was significant in that it also saw the creation of the Department of Energy and Climate Change (DECC) to lead energy policy development in the UK. A new department had been considered

before, with Maugis and Nuttall⁴² noting that this type of reform had been an issue since 2003. DECC was given a Cabinet seat and was formed from the Climate Change Group in the Department for Environment, Food and Rural Affairs (Defra) and the Energy Group from the Department of Business, Enterprise and Regulatory Reform (BERR). Also in 2008, three other government outputs modified the UK's approach to energy and energy infrastructure planning: the White Paper on Nuclear Power⁴⁰; the Planning Act; and the Climate Change Act.⁴³

- In 2011, a new White Paper entitled *Planning Our Electric Future* was presented by the Department of Energy and Climate Change, and the key elements of this White Paper were intended to become law by 2013⁴⁴. This White Paper was an attempt to develop a long-term energy policy in the UK, and alongside the 2011 White Paper, the Renewables Roadmap⁴⁵ detailed proposals for a major expansion of large-scale projects by 2020.

We illustrate here that each phase of the development of the UK Energy Act 2013 over the previous decade involved several periods of consultation. The aim of the UK Government, by having core goals of consultation and due process, was to achieve a greater balance between economics (cost-focus), environment (climate change goals) and politics (energy security) so as to deliver a better outcome for society. All stakeholders were given equal opportunity to make an input to the process with extensive information being made available. Also there were more than several opportunities to be involved in the process.

As a result the UK Energy Act 2013 is seen across Europe as a model for new energy law that aims to achieve a more 'just' energy policy (in essence energy justice), and which also aims to balance the competing objectives of economics, the environment and politics and thereby avoid having a policy outcome trade-off where there are winners and losers.

Despite the apparent successes of the UK Energy Act 2013 process, however, Whitton *et al.*⁴⁶ take a critical look at current legislative developments. They discuss

the proposed amendments to the UK planning and infrastructural law presented within the 2014-2015 Infrastructure Bill, and note a potential U-turn in infrastructural politics. They highlight in particular the suggestion that more decision-making powers for large-scale developments, particularly in the low-carbon sector, will be returned to the Secretary of State – a threat to opportunities for local democracy. Energy justice in this regard is sensitive to political timescales and changes in political process, highlighting again that it is subject to its own political economy.

Nevertheless, there is a counter argument in that in the energy policy literature where policy outcomes and the winners and losers are discussed there is too often a focus on nuclear energy and its pitfalls in comparison to other low-carbon energy sources, such as renewable energy. In Whitton *et al.* they ignore the phased development of the UK Energy Act 2013 and instead focus on how nuclear energy may benefit from a potential u-turn with the introduction of the 2014-2015 Infrastructure Bill. This ignores how this U-turn (though it is not a U-turn as in fact it is just a further clarification on the 2008 Planning Act that allowed for nationally-significant-infrastructure-projects (NSIPs) of any type to be accelerated in the planning process,¹ however, this issue we will concede is an area for future research) would be available for all energy projects and other infrastructure.

A further example is highlighted in a more recent article by X and Y who again focus on nuclear energy and have a comparison with renewables.² They focus on comparing civil nuclear energy development in the UK and Germany. They even assert that it is only countries who are slightly less democratic that are considering to build nuclear energy (p.62-64). Indeed the authors state that (p.69) “Put simply, the question is raised as to whether the main reason for nuclear discontinuity occurring in Germany rather than in the UK, is that the latter affords less effective general opportunities for

¹ Smith, L. 2015. Planning for Nationally Significant Infrastructure Projects. House of Commons Library, Briefing Paper Number 06881, 8 June 2015. Available at: <http://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN06881>

² Johnstone P. and Stirling A. 2015. Comparing Nuclear Power Trajectories in Germany And the UK: From ‘Regimes’ to ‘Democracies’ in Sociotechnical Transitions and Discontinuities. Science Policy Research Unit Working Paper Series, SWPS 2015-18 (June). Available at: <https://www.sussex.ac.uk/webteam/gateway/file.php?name=2015-18-swps-johnston-stirling.pdf&site=25>

diverse kinds of democratic pressure and challenge.” The authors also highlight the success of renewable energy in Germany.

A familiar story emerges in energy literature that in discussing nuclear energy policy, there is always a return to a debate where the discussion is where society has a choice between nuclear energy versus renewable energy. We hope to highlight in examining the development of the UK Energy Act 2013 that it was an inclusive process and that that Act also benefits other energy sources. Further, we advocate that in future political economy energy justice debates it is not whether one of nuclear energy or renewable energy will be the winner or loser, but that that the focus needs to be on the energy system in its entirety. The debate needs to include fossil fuels and if climate science and environmental pollution data are examined it is fossil fuel energy sources that need to be the losers, and low-carbon energy sources, the winners.

3.3. Uranium Mining: An Australian case study

In this case study of uranium mining in Australia we illustrate the emergence of justice as recognition in practice. Throughout, we identify the need to recognise previously misrecognised social groups – including, most pertinently in Australia, First Peoples. We demonstrate too that recognition alone is not sufficient, and show instead that it must be accompanied by due process. Thus we highlight the potential for hidden injustices and losers with regards to energy justice.

Geographically, Canada, Kazakhstan, and Australia account for more than half of global production of uranium, an estimated 70 per cent of which is mined in the traditional lands of First Peoples.^{47,48} It is a story well versed that governments permit large corporations to undertake mining on their land in exchange for the growth and prosperity of their country. However, whilst there are some benefits, such practices can be at the detriment of the local area. The potential for negative impacts include, amongst others, damage to human health and the local environment, poor economic compensation, concerns over sovereignty and indigenous rights and the erosion of indigenous social cultures.^{49,4848}

Sovacool and Dworkin⁴⁷ draw attention to the case of the now-closed Rum Jungle mine in Australia, where they illustrate widespread environmental damage, giving evidence of the discharge of acidic liquid wastes into surrounding creeks and the Finniss River, land contamination, and localised land erosion. Socially, too, relationships between mining organisations and landowners have typically been damaging, characterised by conflict, negative influence and the denial of rights.⁴⁸ An assessment of uranium mining practice within the Kakadu National Park in the Northern Territory of Australia, for example, illustrates the use of coercive tactics to override opposition. Sovacool and Dworkin⁴⁷ (p. 168) report that historically ‘operators of both the Jabiluka Mine and the Ranger Mine (both of which are within the national park’s boundaries) have been documented intimidating, illegally imprisoning, bullying, and bribing the indigenous Mirrar people into signing over land rights’. Such cultural domination - a form of misrecognition - is common in resource conflicts around the world, especially in regard to the relationship between indigenous populations and extractive industries.⁵⁰

In the face of previous malpractice and as the result of increasing attention to the social and environmental impacts of uranium mining, including calls to recognise the rights of indigenous peoples, the global mining industry has progressively turned to the concept of corporate social responsibility (CSR) to improve their operations.⁵¹ Australia’s three operating mines as well as the sites at which major uranium deposits have been discovered, are all situated on the traditional lands of the country’s First Peoples.⁴⁸ Thus, in this context, the mining industry’s focus on CSR necessitates the recognition of newly empowered stakeholders, and engaging with affected communities in a way which is respectful of their host community’s interests, knowledge, concerns and objectives.^{52,53,48} However, top-down processes for mining decision-making commonly lack legitimacy for indigenous stakeholders⁵⁴. In this regard our uranium mining case further highlights the political economy of energy justice, where recognition justice cannot exist in silo – it requires the presence of procedural justice too. At this point, we further develop our case of Australian uranium mining.

In Australia, the 1993 Native Title Act has given native populations increasing power to negotiate agreements with developers, often ensuring some kind of monetary

compensation for social, cultural and environmental damage, as well as employment and business development opportunities.⁵⁵ Yet the Act, a structure designed to increase fairness of governance structures, does not ensure exclusive indigenous control over lands and resources, especially if the lands contain resources of national interest.⁵⁶ Take for example Banerjee's⁵⁶ explorations of the development of the Jabiluka mine in Australia. Despite protests from the indigenous Mirrar community and various national and international environmental groups, including UNESCO, developments were given the all clear. In addition to failing to hear the extensive objections, developers were criticised for failing to provide equal opportunity for the Aboriginal population to view and comment on environmental reports.⁵⁶ Thus, despite their recognition, they were unable to participate in due process. Jenkins⁵¹ (p. 168) rather scathingly states in this regard that the Australian mining industry takes a 'devil may care' attitude, 'operating in areas without social legitimacy, causing major devastation, and then leaving when an area has been exhausted of all economically valuable resources'.

Such examples raise questions of not only who is involved in decision-making, but the legitimacy of social inclusion. In this respect it is not sufficient for the state to recognise its citizens in equal, legal form - the state and the powers that be must also 'establish comparable life chances between citizens through provision of social entitlements'.⁵⁵ Flüeler and Blowers⁵⁷ add, in line with the principles of good governance, that participating local communities must benefit from their involvement in decision-making, and not only via short-term compensation. This is even more the case when we consider the use of financial compensation for losses. These payments are frequently used to cover the costs of services that the state already has a duty to provide e.g. health care and education. Financial payments, therefore, should not be substituted for social entitlement.⁵⁵

4. Operationalising Energy Justice

Our chapter so far has introduced two key ideas; energy justice as it exists in theory, and energy injustice as it exists in practice. In providing real-world examples of the tenet's applicability, we have demonstrated the concept's ability to highlight areas of injustice – giving it evaluative reach. Cognisant of such opportunities to improve the social performance of our energy systems, there is recognition of the need to address

the key political economy questions of ‘who wins, who loses, how and why they relate to the existing distribution of energy, who lives with the side effects of its sites of extraction, production and generation, and who will bear the social costs of decarbonising energy sources and economies’⁵⁸ (p. 133). Here, our political economy and energy justice foci provide real potential.

Through our three brief case studies, we have also sought to demonstrate that energy justice is subject to its own political economy - demonstrating in real terms the challenges of balancing the winners and losers in the nuclear sector and in balancing the tenets of energy justice. By utilising case studies from throughout the nuclear energy system, at the stages of uranium mining, energy production and waste, we have further highlighted that these winners and losers not only exist on a site-by-site basis, but between systems components and across both space and time. We argue here then that energy justice, while full of potential, needs to be managed effectively or it is liable to endure its own political economy.

As a further illustrator to our discussion above, whilst it is sometimes acknowledged that nuclear energy is a low-carbon energy source⁵⁹, Newell and Mulvaney⁵⁸ (p. 138) discuss the frequent presentation of nuclear power as ‘clean’ energy, without acknowledgement of its social context, including the environmental injustices associated with uranium/yellow cake mining and long-term nuclear waste storage problems. They warn, then, of the burdens of nuclear power being unevenly distributed internationally, ‘particularly if “clean energy” is pursued without attention to energy justice’. Furthermore, nuclear power’s depletion of finite uranium sources, production of long-lived nuclear waste and contribution to climate change raises justice questions between generational borders.^{60,30} Indeed, with the issue of nuclear waste in mind, the benefits of nuclear power exist primarily for the present generation, leaving the burdens of long-lived radioactive waste to future cohorts.^{61,30} However, this has to be taken into the context of all energy sources which all leave waste in some form to future generations.

With such dilemmas in mind, many authors argue for a multi-scalar focus; an acknowledgement, according to Holifield *et al.*⁶² (p. 4), that ‘place-specific policies and practices can have consequences that cross national boundaries, affect multiple scales,

and extend across global networks'. In this vein, Newell and Mulvaney^{58 (p.138)} comment too that the 'social and spatial dimensions of energy and climate justice force us to consider the scope for stronger forms of energy governance beyond the state that are able to address these complex relationships'. Such an approach, according to Newell and Mulvaney 'reiterates the importance of comprehending the global dimensions of the issue in the everyday, increasingly transnational, organisation of production and consumption through global supply chains, rather than through the dramatic, site-specific and more visible instances of environmental justice conflicts and mobilisations which feature in much of the literature'.^{58 (p. 133)} Further, such an approach overcomes scalar ambiguity and failures to account for actor diversity within the current environmental and energy justice literature⁶³.

When a political economy perspective on energy justice is developed with a whole systems approach to energy justice, it highlights not just case-specific injustices, but also the trade-offs required between different systems components, allowing a full social costing of an energy source. In light of this, Heffron and McCauley⁶⁴ highlight the importance of the energy justice concept for two reasons: (1) the assessment of justice throughout the supply chain can enable an energy source to be valued at full cost and (2) valuing an energy source at full cost will affect whether it is chosen as an energy source, and therefore affect energy security. In this regard, Sovacool *et al.*^{30 (p. 200)} comment that 'the incorporation of considerations of justice into energy policy making will alter how we view entire energy systems'.

5. Conclusion: A Future Outlook on Energy Justice in the Energy Sector

Throughout our exploration, we have used three case studies to highlight the merit of a political economy approach to energy justice. Our examination of the siting process for a Deep Geological Repository for Canadian nuclear waste demonstrated potential trade-offs between the tenets of energy justice. Here we showed that procedural justice can significantly lengthen the progress for distributional justice, as, over a 40 year timespan, demands for extensive consultation in Canada has meant that no site has been developed and nuclear waste destined for the DGR remains in aboveground, distributed, interim storage. Secondly, in our exploration of the development of the UK Energy Act 2013, we examined participation, consultation and due process. We

highlighted that through a focus on procedural justice, energy justice can resolve the political economy dilemma of having winners and losers from an energy policy perspective. Finally, our example of the recognition of indigenous groups surrounding uranium mines highlighted the importance of considering not only who is involved in decision-making, but the legitimacy of social inclusion; in essence, the necessity of operationalising both recognition and procedural justice in tandem. Thus our exploration of political economy approaches to energy justice not only provided cautionary tales around the implementation of energy justice tenets, but also demonstrates how energy justice may be used as a positive tool for resolving political economy issues.

With this in mind, we conclude that energy justice offers, firstly, an opportunity to develop new crosscutting social science agendas on exploring where injustices occur, developing new processes of avoidance and remediation, and recognizing new sections of society. It is therefore a paradigm that inspires both evaluative accounts and normative solutions for dealing with both the winners and losers in energy policy.

Energy justice provides, secondly, a new framework for bridging existing and future research on energy production and consumption. The hitherto competing discourses are united in the common goal of achieving *just* energy-based processes and outcomes.

Lastly, it sets out a three-pronged framework for assessing the winners and losers. Distributional and recognition-based injustices in the siting of nuclear waste and mining infrastructures are evoked above within the context of opposition and developer movements, highlighting trade-offs between energy justice's core tenets. With regards to procedural justice, our case highlights that energy justice can resolve the political economy dilemma of having winners and losers from an energy policy perspective.

Our whole-system analysis suggests that the contribution of political economics in energy policy requires, more generally, to be revised. Economics, more specifically, needs to better accommodate (1) other disciplines in its calculations for modeling and analysis and (2) inherent physical attributes of whole energy systems. This call for a new direction is driven by several concerns. Pre-eminent among these is the

unacknowledged reliance on the same economic thinking, the Chicago neo-classical economic perspective, which has created the current unjust distribution of winners and losers. This economic viewpoint and its drive for competition have led to the current *malaise* of many sectors in the economy. At the same time, investments in energy policies such as nuclear involve a buy-in to the physical constraints of its whole energy system. In this way, we must develop new concepts such as energy justice as a means to investigate the injustices of both economic thinking and physical realities.

Dominant neo-classical economic thinking continues therefore to prop up the ‘physical frameworks of injustice’ of whole energy systems. Because of word limitations here we are unable to investigate fully the relationship between physically generated injustices in whole energy systems and economic social systems, though we note that this area is ripe for future research. We call, in any case, for a reflection on what contribution energy justice can make to our adaptation and mitigation strategies. Further, we propose, as an area of further research, that scholars develop energy justice metrics as a new tool for costing energy infrastructural projects with an explicit link to whole energy system implications. This builds on the energy justice matrix or checklist proposed by Sovacool and his peers³⁰, where through the matrix or checklist it is possible to assess the justice ‘performance’ and true social impacts of our energy system – though this matrix / checklist is a qualitative and potentially subjective process. Metrics, however, are more precise in their approach and aim to directly connect with economists and early work has been started in this regard.³ Thus the aim of energy justice inspired metrics is to incorporate them into economist’s models, and deliver a concept which has a value that can be calculated and costed so that the consequence of its application can be more easily understood by the public, ensuring, we hope, more *just* energy outcomes.

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