

The political economy of the 'just transition'

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This paper explores the political economy of the 'just transition' to a low carbon economy. The idea of a 'just transition' increasingly features in policy and political discourse and appeals to the need to ensure that efforts to steer society towards a lower carbon future are underpinned by attention to issues of equity and justice: to those currently without access to reliable energy supplies and living in energy poverty and to those whose livelihoods are affected by and dependent on a fossil fuel economy. To complicate things further this transition has to be made compatible with the pursuit of 'climate justice' to current and future generations exposed to the social and ecological disruptions produced by increasing concentrations of greenhouse gas emissions in the atmosphere. Here we seek to identify and analyse the immensely difficult political trade-offs that will characterise collective attempts to enact and realise a just transition. We explore procedural and distributional aspects of energy politics and practice in particular as they relate to the just transition: energy access for those who do not have it; justice for those who work within and are affected by the fossil fuel economy; and attempts to manage the potential contradictions that might flow from pursuing energy and climate justice simultaneously.

KEY WORDS: just transition, energy justice, climate justice, low carbon economy, political economy, energy poverty

Introduction

The UN has declared 2012 the International Year of Sustainable Energy for All. How can an unevenly energy insecure world be transformed into one of clean energy access 'for all'? Coping with the problems of energy insecurity, energy poverty and climate change will require new sources of finance, novel technologies and substantial reforms to institutions and policy-making processes. None will be easy to deliver, nor will any, in isolation, be a panacea. Issues of equity and justice will be intrinsic to whichever energy trajectory is pursued, however, and they need to be better understood and anticipated.

There is now increasing attention to the concept and practice of climate justice (Bond 2012; Okereke 2010). But far less attention is paid to the fact that pursuing climate justice intra and inter generationally, in a socially just way in a highly unequal world will mean having to address 'energy justice' for the 1.6 billion people worldwide without access to electricity (International Energy Agency (IEA) 2012) that is so essential to development, as well as the energy injustice that characterises the distribution of harm and benefit within the current fossil fuel dependent global

economy. This is so because the intimate relationship between energy and development on the one hand, and carbon and growth on the other, remain tightly coupled. In this context there is increasing interest in the notion of the 'just transition' to a lower carbon economy that recognises the trade-offs between these competing needs and priorities and seeks to address them in an equitable manner (Swilling and Anneck 2012). Pursuing a 'just transition' to a low-carbon economy is proposed, therefore, as one foundation upon which to build energy justice in a carbon-constrained world. In this paper we explore the procedural and distributional dimensions of such a transition and the links between the two since any attempt to restructure the global fossil fuel economy will face immense political resistance and institutional challenges that will test to the full the weak and underdeveloped architecture we currently have for global energy governance which will have to play an increasingly important role in steering the world towards climate compatible development.

We strike a note of caution about the degree of capacity, autonomy and willingness many state and inter-state institutions have to oversee such a 'just transition' in a neoliberal context in which direct

control over energy production and consumption is often either shared with or delegated to the private sector and in which global bodies notionally charged with governing energy have been granted few powers by their member states to strengthen themselves in ways which might enable them to manage and reconcile global trade-offs between tackling energy poverty, energy injustice and climate justice simultaneously.

What this short exploration of the interface between climate justice and energy justice suggests, therefore, is the need to be alert to the political economy of global environmental justice, characterised as it is by uneven power relations, conflict and often violence, and shaped as it is by a global political economy in which the interests of global elites are more often than not misaligned with the energy needs and environmental vulnerabilities of the world's poorest people. The praxis of the just transition will be have to centrally address the key political economy questions of 'who wins, who loses, how and why' as 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 (Newell *et al.* 2011). This emphasis locates our paper in the more critical strands of environmental justice scholarship (McDonald 2002; Cole and Foster 2001) that emphasise the ways in which uneven exposure to environmental benefits and harm is often not accidental and unintentional, but rather a product of a particular way of organising production and its constitutive social relations. It also 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 (Iles 2004) rather than through the dramatic, site-specific and more visible instances of environmental justice conflicts and mobilisations which feature in much of the literature (Martinez-Alier 2002).

Before we proceed further, let us first introduce the concept of the 'just transition'.

The 'just transition'

The term 'transition' has gained increasing currency in political parlance amid plans from governments for transitions to a lower carbon future. In academic circles the term derives from a set of literatures on 'socio-technical' transitions (Geels 2005; Geels and Schot 2007) that are also increasingly being applied to questions of energy policy and politics (Scarse and Smith 2009; Kern and Smith 2008). The term 'socio-technical transitions' refers to deep structural changes in systems, such as energy, that involve long-term and complex reconfigurations of landscapes with technology, policy, infrastructure, scientific knowledge, and social and cultural practices towards sustainable ends. There is an increasing recognition, however, of both the need to address the politics of transition

(Meadowcroft 2009) and to ensure proposed transitions are (socially) just in a way which goes beyond the more apolitical and managerial origins of the concept (Goldthau and Sovacool 2012). We would add that such transitions also need to be environmentally just by ensuring that existing environmental inequalities in terms of exposure to ill-health and localised degradation are not reproduced or exacerbated, while aiming to alleviate a global environmental threat such as climate change.

In policy terms the call for a 'just transition' is often directed to states. Governments will have to play a key enabling and steering role in improving levels of support and access to clean energy and mediating the competing powerful interests at stake in any effort to transition to lower carbon forms of energy production and consumption. This raises a whole series of procedural issues about how decisions are taken, options assessed and trade-offs made between different energy futures or around what Bradshaw (2010) refers to as 'the global energy dilemma nexus'. There was some discussion at the UN Conference of the Parties to the climate change convention in Cancún in 2010 around the idea of 'just transitions': interpreted as how to ensure moves towards a low carbon economy are equitable, sustainable and legitimate in the eyes of their citizens. It builds on interventions such as that by the Argentinian government in the Ad Hoc Working Group on Long-term Cooperative Action, which called for mechanisms to ensure a fair transition for workers who might suffer socio-economic impacts of measures taken to effect climate mitigation. This implies economic resources and technology transfer to poorer countries, as well as the strengthening of key institutions to oversee industrial restructuring in a way that generates 'sustainable jobs' (UNEP *et al.* 2008; SecAyDS 2009).

Indeed, one of the earliest formulations of the concept of a 'just transition' was developed in the 1980s by the US trade union movement in response to new regulations to prevent air and water pollution, which resulted in the closure of offending industries. The UK's Trade Union Congress has campaigned for the same principles to be applied to industries in the UK that will be affected by low-carbon restructuring (Trade Union Congress 2008) and such claims have been reiterated by trade unions in South Africa anxious about the social impacts of the restructuring of the world's most carbon-intensive economy. The International Trade Union Confederation (ITUC) at a workshop in Durban in July 2011, for example, stated:

Climate is also our issue because addressing it implies recognising the need for a huge transformation in our societies, in our production and consumption systems, and therefore also on jobs. And recognition alone is not sufficient. Leadership by the labour movement is needed for transforming the system. Unless we fight for making

this transformation work for the people, ensuring a Just Transition towards a truly sustainable model, we will only see superficial changes towards more inequality and environmental degradation.

ITUC (2011)

In this rendition of the concept, a just transition aims to take appropriate measures to protect jobs in vulnerable industries. This will be important where there is a risk that job losses would simply mean the transfer of carbon-intensive activities to other countries, or where organisations are failing to take sufficient steps to prepare for the low-carbon transition. Where job losses are unavoidable, adequate support would be needed for people and sectors that stand to lose out as a result of decarbonising the economy through compensation and retraining for new employment opportunities. It would also ensure that new jobs created in low-carbon sectors provide 'decent' jobs (which pay a living wage, provide decent working conditions, are accessible to people with a range of skills and offer clear career progression opportunities) (Bird and Lawton 2009).

Aside from calls for 'just transitions' in international arenas and by organised political interests, there have been movements mobilising around this idea, going beyond a focus on 'transition towns' which have been initiated in the UK, for example, to prepare for a world after oil (Bulkeley and Newell 2010), to emphasise the social justice elements of such a transformation. These seek to get the support of a broad range of actors behind difficult policy choices and engage with local initiatives sharing similar goals. This can be done either through engagement with a broad-based set of social movements and community actors in defining an alternative vision for a region or by seeking to bring together a coalition of actors to provide and finance 'just energy' as has happened in South Africa as we show below.

Concrete examples of interventions and mobilisations aimed at realising elements of a just transition include the following. The *Just Transition Alliance* is a coalition of environmental justice and labour organisations based in California. Together with frontline workers and community members living alongside polluting industries, the coalition seeks to create healthy workplaces and communities. It focuses on contaminated sites that should be remediated, and on the transition to clean production and sustainable economies. For example, on issues such as 'clean coal' the *Just Transition Alliance* voices objections based on local as well as global impacts, including local air pollution, working conditions and the detrimental environmental impacts of mining on local landscapes and water use (Just Transition Alliance 2011). Meanwhile, more proactively, 'Just Energy' is an innovative collaboration between a development NGO (Oxfam), an engineering firm (Arup), a legal firm (Simmons & Simmons), a university (MIT) and consulting compa-

nies (McKinsey and Marmanie). Based in South Africa, it aims to enable low-income communities to develop renewable energy (RE) enterprises as a means of generating revenue and employment opportunities, aiming to provide 'a fair return on renewable energy for local people and investors alike' (Just Energy 2011). It has set the following goals to be achieved by 2020: to develop 20 RE enterprises of 10–80 MW of clean energy, starting with wind farms in South Africa, then to develop enterprises across Africa, Asia and Latin America; to generate income streams of £3 million per year for social and economic development in low-income communities; to reduce carbon emissions by 1.8 million tonnes annually; to create jobs and transfer new business and technology skills to local people; and to transform RE markets in developing countries so that low-income communities receive fair value for what they bring to the project.

Another example of maximising the co-benefits of clean energy interventions comes from retrofitting buildings in Los Angeles. Here a grassroots coalition of community-based organisations, trades unions and environmental groups (the LA Apollo Alliance) campaigned to ensure that city council programmes to improve energy efficiency and deploy RE also brought economic benefits to disadvantaged people living in the city. This included retrofit of public buildings in low-income communities, jobs for poorer people and supporting businesses owned by local minorities and women. Other 'just transition' experiments are aimed at coping with the flight of fossil fuel-based industry. Gelsenkirchen, Germany was once renowned as an industrial hub for coal, steel and glass industries until the relocation of heavy industry. In the 1990s local officials decided to regenerate land abandoned by the industry and set up an energy technology park. Supported by the European Union, the federal government and the utility RWE, solar technology became the new focus of development. In 2001 the city passed a voluntary carbon reduction target aimed at transforming it from a 'city of a thousand furnaces to a city of a thousand suns'. Similarly, in Australia's Hunter Valley, community distress about the cumulative local ecological and human health impacts of coal mines and power stations and alarm about global climate change has given rise to a vocal, growing and globally linked social movement that is challenging the primacy of coal, and demanding a transition from coal dependency to a clean energy economy (Evans 2010). Key aspects of a just transition include boosting resilience and adaptive capacity, public investment in RE industries and alliances between the climate justice, environment and labour movements (Bird and Lawton 2009).

The global political economy of a just transition

Whatever these episodes reveal about the potential of trying to articulate and enact a 'just transition' in

practice, there is a larger political economy of energy justice and injustice that needs to be addressed if a 'just transition' is to be realised globally in a world of high levels of energy interdependence. In other words, seeking to ensure the uptake of lower carbon energy is sensitive to the distribution of social harm and benefit is just one side of the story. Addressing justice issues in the prevailing global fossil fuel economy presents an even greater challenge.

Cheap energy is the engine of industrial economies and the foundation of consumer culture. As Bradshaw (2010, 276) notes, 'The fabric of our economy, and some would argue our political system ('carbon democracy') is dependent upon the plentiful and relatively inexpensive supply of fossil fuels'. Yet people and places unevenly experience the costs and benefits of energy extraction, generation, financing, distribution and consumption (Practical Action 2010). Inequality is present throughout many energy commodity systems, most evidently where nations export vast energy riches yet remain mired in energy poverty. These expressions of energy injustice are shaped by an array of actors, institutions and interests whose actions affect international flows of energy provision and consumption, affecting barriers to, and the terms of, energy access. The everyday governance of energy (or lack thereof) shapes matters of distributive justice. At the same time, patterns of uneven development pose key governance challenges such as providing energy to those living in poverty (energy access); supplying energy in a regular, fair and predictable manner (energy security); and minimising the environmental externalities and unequal burdens of energy extraction, provision and consumption (energy and climate justice).

Questions around energy poverty and struggles over particular sites of energy production and extraction have been raised in other work on environmental justice (Seze 2005; Newell 2007), but the *global* justice dimensions of energy have received less attention. Yet the global justice aspects of energy access, security and the relationship between energy and climate change deserve greater scrutiny (Caney 2011). Exploring energy justice forces questions of security, violence and structures of production centre stage in debates about global environmental justice. Because energy relates so closely to economic growth, security and war, it assumes a prominent place in the geopolitical and economic strategies of ruling elites. This has implications for the distribution of impacts from energy production (Who benefits? Who experiences burdens?) and how this relates to decisionmaking processes (Who participates and influences policy?). Hence questions of power are central to any inquiry into energy justice.

As important as distributive struggles are, issues of participation and recognition are equally important, therefore. Indeed, some environmental justice scholarships attempt to bring all three concerns together (cf. Schlosberg 2004 2007). Procedural justice is criti-

cal to energy governance. Decisions to allocate, use and consume energy in particular ways for particular purposes are mostly made out of the public eye and rarely in democratic forums. Whether for reasons of commercial confidentiality or geo-strategic sensitivities, public participation and deliberation around questions of energy governance has traditionally been very weak. Even when public participation is encouraged, it often serves more to legitimate preordained decisions than to involve stakeholders in shaping outcomes: inviting consultation on a limited range of policy choices based on models and forecasts whose assumptions are not open to scrutiny. The case for nuclear energy, for example, is often premised on an 'energy gap' between demand and supply which takes little account of the potential for energy conservation and efficiency, such that demand can only be met by an energy source such as nuclear which is presented as the obvious solution. Where energy injustices occur it is even difficult to hold parties, often powerful elites or multinational corporations, to account because energy provisioning is in the private sector. This is especially the case where states have either relinquished control over, or been required to liberalise, energy sectors as part of reform programmes often overseen by multilateral development banks (Wamukonya 2003). What is particularly disconcerting is that energy's political and economic sensitivities make nations reluctant to cede control over energy policy to global bodies, resulting in the weakness and underdevelopment of institutions of global or even regional energy governance: arenas in which key priorities might be set and pursued, conflicts identified and mediated, and issues of injustice evaluated and resolved (Florini and Sovacool 2009; McGowan 2009). The following sections explore challenges to the pursuit of global energy justice that arise from efforts to provide energy access and security, while transitioning to low-carbon energy sources.

Improving energy access in the just transition

A just transition will have to address how decarbonisation strategies allow for increased access to electricity for those currently coping with energy poverty. Alleviating energy poverty is central to achieving the millennium development goals. A total of 1.6 billion people in the poorest regions of the world still have no access to electricity and under most scenarios 1.3 billion people will still lack access to electricity in 2030. Worldwide, 2.7 billion people rely on traditional biomass for cooking and heating and another billion are connected to unreliable electricity networks (World Energy Outlook 2010). Accordingly, the goal to halve extreme poverty by 2015 cannot be achieved without policies specifically designed to address energy poverty. Yet policymakers have systematically neglected energy poverty (Sanchez 2010). Activists describe this scenario as an 'injustice', even

invoking the language of 'apartheid' to highlight the stark inequalities in energy use (Corbyn 2010).

Attempts to balance developing countries' right to develop with the need to decarbonise the global economy, amid calls for developed countries to pay 'carbon debts' and deliver 'climate justice', are generating significant stalemate in international climate change negotiations (Bond 2012). Such debates are more complex than the narrative of developed versus developing countries, as responsibilities and impacts are distributed unevenly within nations along the lines of urban/rural, rich/poor as well as gender, race and class as we discuss further below (Newell 2005). Attempts to address energy poverty are also replete with contradictions. China's development of coal-fired electricity generation will increase energy access to the poor, but with severe consequences for environmental quality and climate change. Likewise, the Three Gorges Dam increases energy access to millions but results in environmental refugees displaced by the mega-project (Tan and Yao 2006). Inter-generational, inter-national and intra-national trade-offs of this sort strongly characterise the global politics of energy justice.

Addressing energy injustice in the global fossil fuel economy

Fossil fuel energy resources are unevenly distributed and commonly implicated in patterns of violence and insecurity. Rising energy costs and consequences for economic activities are often invoked as rationales to mobilise military forces to secure energy supplies, as seen in recent conflicts in the Middle East and North Africa. Energy commodity chains linked to zones of conflict raise questions of basic security and freedom from violence associated with securing energy supplies to support consumption patterns of the global North. These create a 'boomerang effect' (Beck 1990), whereby energy procurement creates injustice for others in ways that come back to haunt consumers through insecure access, costly military engagements or price rises. This suggests that energy justice cannot be delivered by, or contained within, the borders of the nation state in a globalised economy. A global justice framework is required.

Conflicts and contradictions between energy security and human rights are found throughout global energy commodity chains. Some claim that developing nations awash in energy and natural resources – particularly those heavily reliant on exports for foreign exchange earnings – are prone to the resource curse where, as Ross puts it, 'Countries that are rich in petroleum have less democracy, less economic stability and more frequent civil wars than countries without oil' (Ross 2012). The injustices of petro-violence and human rights abuses by petro-states are well known features of the global oil commodity complex (Watts 2005). The interests of dominant actors are poorly aligned with those of

marginalised groups who remain without energy or whose land and livelihoods lay in the path of lucrative state and private revenue. This dynamic is clearly illustrated by numerous conflicts between and within indigenous groups and the state, acting on behalf of state-owned and multinational enterprises (Kimerling 1996).

The thirst for steady, affordable and reliable energy resources is also driving land grabs by wealthy countries and multinational firms to meet rising and expected future energy demands. While the World Bank sees an opportunity for the poor to benefit from large-scale land acquisitions (Li 2011), others simply characterise the process as enclosure or accumulation by dispossession (Harvey 2003; Borras *et al.* 2010). Biofuels development is one area where such land grabs are actively moving forward, but other resources are undergoing these processes. The natural gas industry experienced a land grab for shale resources in the USA over the past decade, while Russia is mapping the Arctic energy frontier to claim untapped mineral wealth there. Likewise, electrification of automobiles may set in motion land grabs for territories with new-found value, such as the Altiplano in Bolivia or Afghanistan, where there are vast deposits of lithium (Romero 2009; Risen 2010), leading some to argue that foreign oil dependency will simply be replaced by dependence on other imported materials, reproducing energy insecurity.

What this suggests is that decarbonisation strategies may well be characterised by similar patterns of exploitation and dispossession that characterise the current global political economy unless some of these social and environmental consequences are taken into account as part of a 'just transition'. Technological innovation and the search for new sites of accumulation can produce injustice in surprising and unpredictable ways, including around the development of 'clean' (low carbon) technologies (Zehner 2012). In 2010, rare earth elements (REEs) – essential to many clean tech commodities like wind turbines and electric vehicle batteries – emerged in mainstream geopolitical discourses on energy security. China, who supplies 99.9% of REEs, cut off the supply to Japan and threatened to reduce exports. This set in motion a World Trade Organisation (WTO) trade suit and the reopening of a Mojave Desert REE mine that had previously closed because of water pollution impacts upon a downstream community.

There is a tendency to treat all clean technologies as homogeneously 'green'. Yet solar photovoltaic technologies rely on semiconductor technologies that require hazardous chemicals, complex global supply chains, and contract manufacturing (Silicon Valley Toxics Coalition 2009). The legacy of environmental injustice in the wake of the semiconductor manufacturing in the 1970s and 1980s – toxic waste sites and occupational health problems in mostly immigrant women workers – reminds us that all commodities

come at unequal costs (Pellow and Park 2002). The embrace of biofuels as a 'clean' energy resource is another example of how attempts to address energy insecurity produce patterns of injustice in their wake. Today Brazil is self-reliant in fuel for passenger cars because of domestic sugarcane ethanol production. Programmes initiated in the 1970s increased sugarcane production and mandated that new cars have flex fuel engines to run on ethanol. A strong and coherent policy fostered this technological pathway. But the industry is continually confronted with accusations of poor working conditions, including slave and child labour (Dos Santos 2007). In the USA energy security policies have mandated increases in corn ethanol production, raising concerns about the trade-offs between food security and energy security. Corn-based ethanol demand contributed to rising global corn prices, causing 'tortilla riots' by Mexican campesinos reliant on corn as a staple food.

Similarly, energy pathways that require intensive water use may have implications for 'water justice'. Whether it is the usurpation of water rights for hydroelectric power generation, cooling towers or water quality impacts from extracting natural gas from shale, there will be emerging conflicts between future demands for water.

Issues of justice will be intrinsic to whichever energy trajectory is pursued within and beyond the fossil fuel economy and they need to be better understood and anticipated by future efforts to secure a 'just transition' around questions of extraction, labour and the distribution of benefits.

The climate justice dimension

Confronting climate change will require drastic changes in energy production and consumption. The political decisions that drive this transition have enormous implications for climate justice. The decision to stabilise atmospheric concentrations of CO₂ at 450 parts per million or reduce current concentrations to 350 parts per million will put some communities at greater risk. But the question of who pays for the transition is also a matter of justice. Avoiding the worst effects of dangerous climate change implies radical change to the current energy order. Developing countries will not accept proposals to cut back global carbon emissions that do not take account of their right to development and need to confront energy poverty.

Patterns of energy use raise issues of energy justice in the form of responsibility (current versus historical) and entitlement (whose needs are most pressing and who decides who can emit how much). Various climate change policy proposals have sought to address these issues, each balancing issues of equity, efficiency and effectiveness differently in their attempts to rapidly reduce greenhouse gas emissions. Proposals include 'contraction and convergence', an idea promoted by the Global Commons Institute and supported by many

developing nations. This framework aims to 'contract' overall carbon emission safely below a threshold which avoids runaway climate feedbacks and keeps warming within tolerable limits. At the same time, overall per capita carbon emissions would 'converge' by redistributing emissions entitlements. Others, such as the Greenhouse Development Rights (GDR) framework, developed by a coalition of NGOs and research organisations, seek to reconcile the right to development with the need to drastically reduce greenhouse gas emissions on the basis of a metric incorporating population, GDP and cumulative emissions contribution. Different justice principles are invoked in each. Proposals based on 'grandfathering' favoured by the USA take the status quo as the most legitimate starting point, while contraction and convergence and GDR proposals place intra- and inter-generational equity principles more centrally. Pursuing a just transition, therefore, means having not only to handle trade-offs between competing actors and interests now, but also addressing sensitive questions about historical responsibility which impinge upon who has to reduce most now based on previous inequitable use (overconsumption) of global atmospheric space. In other words, how should current generations be held accountable for the emissions generated by prior generations? On the one hand, the consequences of these emissions were not known when emitted. On the other hand, current generations have materially benefited from those emissions.

Advancing a 'just transition' will also mean dealing with the potential production of injustice through existing market-based efforts to tackle climate change, which can enrol the resources and impact the livelihoods of many poorer people in the global South. As major industrialised economies fail to significantly decarbonise their energy sectors they instead search for low-cost abatement opportunities in the global South through the Kyoto Protocol's Clean Development Mechanism (CDM). The pursuit of 'clean energy' through projects supported under the CDM has led to struggles over land and the distribution of revenues derived from the carbon credits in countries where they are hosted (Newell and Bumpus 2012). The development of wind, biomass and solar power projects have intensified land pressures, leading to claims that peoples' land rights are being usurped and affected groups have not adequately been consulted (Böhm and Dabhi 2009). Hence, revenue streams that support action on climate change can entrench procedural inequalities in decisions that affect access to land and livelihoods.

One of the key challenges for energy justice is how to reconcile efforts to tackle energy poverty and climate change simultaneously. The controversial use of World Bank climate funds to support the construction of the Medupi coal-fired power plant in South Africa illustrates these tensions at work. The World Bank argued that their mandate to tackle energy

poverty meant lending support to large-scale infrastructural projects (rather than small-scale renewables), and that supporting cleaner forms of coal combustion ensured this occurred in a less carbon-intensive way. Critics meanwhile claimed the project would mainly benefit large-scale industry rather than poorer consumers and that the World Bank's ambitions to serve as a key institution of climate finance were damaged by offering unwavering support for conventional fossil fuel projects. So-called 'clean coal' technology might allow some reduction in carbon emissions, but requires 30% more coal use for the same amount of energy (Ansolabehere *et al.* 2007) and increased coal demand will have far-reaching implications for coal-producing communities and the dozen mines that will feed the Medupi coal plant.

The low-carbon electricity produced from nuclear power plants likewise is often advocated as a response to the climate challenge. The recent nuclear renaissance is largely driven by its reinvention as a clean energy solution to the climate crisis. Yet, as the Fukushima accident reminded us, it can reproduce crises of its own. Likewise, presenting nuclear power as 'clean' when environmental injustices associated with uranium/yellow cake mining and long-term nuclear waste storage problems are taken into account is an impressive discursive achievement made possible by carbon reductionism devoid of social context. One thing is clear from these examples. The burdens of the transition to a low-carbon economy will be unevenly distributed, particularly if 'clean energy' is pursued without attention to energy justice.

Towards global energy justice?

Who defines *what is just*, and *for whom*, will be determined by power struggles in particular contexts as measures aimed at achieving energy and climate justice are simultaneously deployed. But the global dimensions, interconnections and spill-overs that characterise patterns of justice and injustice in the fossil fuel economy complicate how a just transition will have to be pursued. 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.

A lack of attention to the justice implications of energy access and the links between climate and energy justice is, in part, a product of weak and incoherent global energy governance (Florini and Sovacool 2009; Karlsson-Vinkhuyzen 2010). International institutions with missions related to energy, including the International Energy Agency, OPEC (Organization of the Petroleum Exporting Countries), UN-Energy, the Global Environment Facility, as well as public-private partnerships such as the Renewable Energy and Energy Efficiency Partnership and REN21 do not currently amount to a substantive, coherent or effective

architecture of global energy governance. The actors that wield the most power on energy issues are nations, albeit often beholden to multinational energy corporations. The geopolitical sensitivity and strategic importance of issues of energy supply and access leads most states to prefer to maintain autonomy and control over energy pathways, even if powerful states or firms also seek to secure control over weaker and poorer countries' energy supplies.

In this regard those chapters of regional and bilateral trade and investment agreements dealing with energy have proven to be among the most sensitive to negotiate. The effect of this is that the space for claim-making around energy justice within global arenas is highly restricted because few bodies exercise direct authority over energy resources. Where energy features in trade and investment agreements, and when key decisions about energy access and security exclude broader publics, NGOs, trades unions and indigenous peoples' movements have mobilised to demand both procedural justice (the right to participate in deliberations which affect them) and distributional justice (either defence of their land from energy exploration and extraction or greater access to the rents extracted from the resource exploitation), often forming transnational alliances (such as the Hemispheric Social Alliance) to do so, in an attempt to open up policy to demands for environmental and social justice, where it is feared energy sector liberalisation will compromise energy security, sovereignty and access for the poor (Newell 2007).

As calls for universal access to secure, low-carbon electricity intensify, it is possible that pressures for stronger institutions to govern energy will increase. There is a complementary nexus between efforts to tackle energy poverty, security and climate change simultaneously (Casillas and Kammen 2010) in spite of the conflicts and trade-offs described above. But stronger forms of governance to manage these trade-offs globally have yet to seriously emerge, despite energy security long being a feature of G8/G20 agendas. Hence the pursuit of energy justice as part of a just transition requires strategic reflection about which arenas are most likely to deliver outcomes beneficial to those living without energy, with the injustices created by the energy choices of others, or with the effects of climate change generated by existing and past systems of energy production and consumption. This will be critical to the success of collective efforts to address the scenario sketched out by the IEA's *World energy outlook*:

It is no exaggeration to claim that the future of human prosperity depends on how successfully we tackle two central energy challenges facing us today: securing supply of reliable and affordable energy; and effecting a rapid transformation to a low-carbon, efficient and environmentally benign system of energy supply

IEA (2008, 37)

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